Immunisation Practice in Southern Sudan

A Manual for Operational Level Health Workers – 1st Edition February 2011

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Foreword

The primary goal of the Southern Sudan Immunization Program is to ensure that all the targeted beneficiaries who are children under one year of age and Women of Childbearing Age (WCBA) are reached with high quality and effective vaccines against the target vaccine-preventable diseases. This will be achieved through: increasing access to immunization services; ensuring availability of potent, safe, and effective vaccines; increasing demand for immunization services; building capacity for delivery of immunization services, monitoring disease incidence, trends and programme performance.

The government of Southern Sudan and related services delivery programs are still young and findings from program reviews (Support supervision visits, monitoring reports and several consultancy review reports) show that most service providers have limited knowledge and skills to provide quality immunization services. Secondly, since the signing of the Comprehensive Peace Agreement (CPA) and the establishment of the Government of Southern Sudan, there has been no systematic nationwide operational level training focusing on immunization service delivery. In addition, the changing human resources dynamics between Non-Governmental Organizations (NGOs) and the evolving Civil Service in South Sudan, many new health workers have been recruited while others have left the immunization service sector given that most of the vaccinators were considered the unclassified cadre of health workers. It is therefore impossible to assure quality of Immunization services without a formal and organized training program.

This 1st edition of "Immunization practice in Southern Sudan" is therefore intended to provide detailed information on immunization planning, service delivery and monitoring/evaluation to all players involved. The manual for immunization practice in South Sudan includes sections on definition of immunity, targeted diseases, vaccines used in the program, management of the cold chain equipment, management of vaccines, diluents and related supplies, planning, organization and conducting of immunization sessions, communications for EPI, Injection Safety and Waste Management, monitoring and evaluation of program performance. In addition, planning for Health Services at State, County and health facility levels including the Reaching Every County (REC) strategy and Vaccine Preventable Diseases surveillance have been included.

In accordance with the Mandate of the Ministry of Health, this standard training and reference material shall be used for the training of health workers at all levels of service delivery. County Health department (CHD) managers and service providers are therefore expected to use the information provided in this manual and other reference materials on immunization that have been produced to improve the quality and coverage of immunization services.

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GLOSSARY

Adverse Event Following Immunisation (AEFI)	Any undesired medical occurrence observed within four weeks following immunisation and are believed to be caused by vaccination.
Antibodies	These are special proteins in the blood which inhibit micro-organisms or toxins that cause diseases. They may be produced as a result of vaccination or natural infection.
Carrier	A person or animal that has germs of a certain infection but does not show symptoms of the disease. A carrier can transmit the infection to other people.
Dropout	Drop out is when children (0-11 months) or /women of child bearing age start the immunisation schedule but do not complete, as recommended.
Elimination	This is a situation whereby occurrence of the disease is stopped in a large geographical area due to interventions like immunisation. However, the disease may reoccur if measures are not put in place to prevent its reoccurrence. Example of a disease targeted for elimination is neonatal tetanus.
Eradication	Complete interruption of transmission or occurrence of a disease worldwide. As a result, deliberate efforts or intervention methods may no longer be needed. Eradication represents the sum of successful elimination efforts in all countries. An example of a disease eradicated is small pox. Polio is targeted for eradication.
Hard-to-reach population	Populations that are not easily accessed with immunisation services due to geographical, social (cultural or religious), economic and security reasons.
Immunity	Resistance and protection against a specific infection or disease, resulting from previous exposure to the infection or vaccination.
Immunization	This is the process of developing body defence mechanism following the administration of a particular vaccine or exposure to specific antigen. The created antibodies protect the individual against the specific disease.
Incubation Period	The time interval between first contact with a germ and the appearance of the first sign or symptom of disease.
Missed Opportunity	This is when a child or woman of child bearing age comes to a health facility or outreach site and does not receive some or all the vaccine doses for which he or she is eligible.
Side effect	Any unintended effect of a vaccine occurring at normal doses.
Signs	Abnormal conditions indicating disease discovered on examination of a patient by a health worker or attendant.
Symptoms	Abnormal function,appearance or sensation indicating a disease, as experienced by a patient.
Toxin	Poisonous substance produced by germs.
Toxoid	A toxin, treated to destroy any poisonous properties, which is capable of stimulating the body to produce antibodies.
Vaccination	This is the act of introducing a vaccine in the body of an individual in order to stimulate the immune system against a specific disease causing organism.

Introduction to the Manual

Purpose of this Manual

This manual has been developed to provide managers and service providers at State, County Health Department, health facility and community levels with information to plan, deliver, monitor and evaluate quality immunisation services. The manual is a practical resource material for training and day to day operations management of immunization in South Sudan.

The manual is an adaptated version of the WHO immunization in practice modules prepared in a language that is understandable in the local context of Southern Sudan. It is sub-divided into the following learning modules:

Module 1:	**Immunity**
Module 2:	PEI Targeted Vaccines
Module 3:	EPI Vaccines
Module 4:	Management of the Cold Chain Equipment
Module 5:	Management of Vaccines, Diluents and other EPI logistics
Module 6:	Planning, organization and conducting an immunization session
Module 7:	Injection Safety and Waste Management
Module 8:	Planning for Immunization services at State, county and H/Facility levels
Module 9:	Communicating with parents and building alliance
Module 10:	Monitoring and evaluation of EPI program performance
Module 11:	Vaccine preventable Diseases surveillance

Target audience

The primary audience for this manual is service providers. However, the information provided is detailed, therefore it will also be used by:

i. County Health Departments
ii. Hospital Managers
iii. Tutors and students in Health Training Institutions.
iv. Managers of Non – Governmental Organisations

Limitations of the manual

This manual focuses on the childhood immunisable diseases and the vaccines that are currently used or are proposed for future introduction in the routine immunisation program. There is no information in this manual on vaccine preventable diseases of epidemic potential, for example meningococcal meningitis.

UNIT 1: IMMUNITY

1.1 About this Unit

This unit defines immunity and describes its main types. It also discusses the advantages and disadvantages of each type of immunity.

Learning Objectives

After studying this unit you should be able to:

1) Define the term immunity.
2) Describe the types of immunity.
3) Explain advantages and disadvantages of each type of immunity.

1.2 Introduction

When microorganisms, such as measles virus, enter the body for the first time, the body produces special substances known as antibodies. These antibodies fight the microorganisms and kill them.

If the microorganisms enter the body again, the body will recognize them, having met them before and quickly reproduces the same antibodies to kill them. Each kind of antibody that is produced matches with only one particular organism. This is why antibodies against one disease, such as measles do not protect a person against another disease. Antibodies against polio cannot protect one against tuberculosis.

1.2.1. What is Immunity?

Immunity is the ability of the body to fight certain disease- causing organisms. A person who has antibodies to a particular disease is said to be immune to that disease. Immune means that the individual has enough antibodies to fight and kill or weaken microorganisms (germs) that cause that particular disease. As a result the person will not suffer from that disease.

1.2.2 What are the types of immunity?

There are two types of immunity, active and passive which can be further sub-divided into natural and artificial.

1.2.2.1 Active immunity

Active Immunity occurs when the body produces its own antibodies against disease. This occurs in two ways:

1. When a person is exposed to a disease-causing organism, the body produces its own antibodies against that particular organism. For example, if a child gets infected with measles, the body will produce antibodies against measles virus.The body will then become immune against further attacks of measles infection. This is called **"natural active immunity"** also referred to as **"natural acquired active immunity".** It is natural because it occurs in the normal course of life without any medical intervention. It is active because the body actively develops its own antibodies.

2. Another way to stimulate the body to produce the antibodies is by administering either attenuated (weakened) or killed organisms or products of an organism of that particular disease.

Here are examples:

- Attenuated organisms of BCG vaccine
- Killed organisms of pertussis vaccine
- Modified products of an organism e.g. Tetanus Toxoid

When immunity is created by giving a vaccine, it is called “Artificial active immunity” also known as “artificial induced active immunity”. This is when the body has been tricked to believe that an infection has occurred, hence it starts to produce antibodies against that particular organism.

Advantage of Active Immunity

Active immunity is the best kind of immunity because it lasts for many years and in some diseases, it lasts for life.

Disadvantages of Natural Active Immunity

1. In the process of developing natural active immunity, the disease may be so severe leading to disability or death of the child.
2. If we wait for natural immunity to take effect it will be expensive to the family, health services and the nation at large, in terms of treatment costs.

1.2.2.2 Passive Immunity

Passive means inactive. Passive immunity is when ready-made antibodies are given to a person. It means that the body receiving these antibodies does not have to participate to produce them. There are two types of passive immunity and these are:

a) Natural passive immunity

b) Artificial passive Immunity

a) **Natural passive immunity**

Natural passive immunity is when a baby receives antibodies from the mother during the time the baby is still in the mother’s womb. The mother’s blood, which contains antibodies to some of the diseases she has had during her life, comes into close contact with the baby’s blood in the placenta. In the process, the mother’s antibodies pass into the baby’s blood and provide him with ready-made antibodies against these diseases.

However, these antibodies gradually disappear within a period of 6 to 9 months of life. An example of this is measles. Measles antibodies, which the baby receives from the mother, may be much reduced by the time the baby is 9 months old.This is due to the fact that the baby’s body is not replenishing the antibodies.Hence,measles vaccination is given at the age of 9 months or soon after.

Another example is, if a pregnant woman is immunized against tetanus with tetanus toxoid, her baby gets passive immunity for tetanus. Here again, the tetanus antibodies, which the baby receives, last for only a few months. This is why DPT- HepB+Hib is given as early as six weeks after birth.

b) **Artificial Passive Immunity**

Artificial passive immunity is when a person receives an injection of serum, which contains ready-made antibodies. For example, a person who has been bitten by a stray dog is given anti-rabies serum to protect him or her from contracting rabies. Another example is when anti tetanus serum is given to a person who has had accident or a wound to protect him/her from getting tetanus.

Advantages of Passive Immunity

- The person or baby receiving the antibodies does not have to wait for his own body to produce them as in active immunity. This means he has immediate assistance in fighting an infection he or she is exposed to.
- Artificial passive immunity can be used as treatment e.g. when diphtheria serum is given to patients with diphtheria or anti-tetanus serum (ATS) is given to patients who are at risk of getting tetanus.

Disadvantages of passive immunity

- It is short-lived. Since the person receiving the antibodies has not produced them himself and there is no antigen stimulating the body to produce more, these antibodies are depleted in a few months and the protection is lost. Since the body did not produce the antibodies, there is nothing to "remember" if the body is exposed to the disease again. This means that the body cannot make antibodies almost immediately on infection as it does when one has active immunity.
- Some people may develop allergic reaction when they receive anti-tetanus serum. For this reason, it's advisable to give a test dose of anti-tetanus serum (ATS) before giving a full dose (refer to National Clinical Treatment Guidelines).

Key Messages

- Immunity is acquired when the body is exposed to vaccines or disease causing organisms.
- There are 2 main types of immunity: active and passive. Each type is sub divided into
- Natural and Artificial immunity
- The safest type of immunity is the one acquired through vaccination.
- Give a test dose of ATS before giving a full dose and watch the reaction

Exercise 1

1. How does each type of immunity occur?

UNIT 2: EPI Target Diseases

2.1 About this Unit

In Southern Sudan, vaccine preventable diseases are among the causes of illness and death in children below 5 years old. In this Unit, the causative agent, incubation period, mode of transmission, signs and symptoms, management, complications and prevention of each of the immunisable diseases targeted by Ministry of Health/GOSS/EPI have been outlined.

Learning Objectives

After studying this unit, you should be able to:

1. List the EPI target diseases.
2. State the causative organism of each disease.
3. Explain the mode of spread of each disease.
4. Describe the signs and symptoms of each disease.
5. Outline the complications of each disease.
6. Discuss treatment and prevention of each disease.

Performance objectives

After studying this unit, you should be able to perform the following:

a) Diagnose EPI target diseases.

b) Treat and prevent EPI target diseases

2.2 EPI Target Diseases

Currently, the Ministry of Health of the Government of South Sudan (MoH/GoSS) is targeting the following diseases;

- Tuberculosis
- Diphtheria
- Pertussis (Whooping cough)
- Tetanus
- Poliomyelitis
- Measles

In addition, the MoH/GoSS is planning to introduce vaccination against other target infection/diseases as they become readily available. The vaccines to be introduced are:

- Hepatitis B
- Haemophilus influenzae type b infections: meningitis, pneumonia and other infections
- Gastroenteritis caused by rotavirus
- Pneumococcal pneumonia caused mainly by streptoccus pnemoniae
- Cancer of the Cervix and other infections caused by Human Papilloma Virus

The following section describes the causative agent, incubation period, mode of transmission, signs and symptoms, management, complications and prevention of each of the targeted immunisable diseases listed above.

2.3 Tuberculosis (TB)

It is estimated that there are 138 new cases/100,000 population worldwide. In 2008, approximately two million people worldwide died of tuberculosis (WHO Report 2009). In the same year, the estimated new cases of TB were 9.9 million. The report also outlined the importance of HIV infection in fueling the TB epidemic. The magnitude of TB in Southern Sudan is high, an estimated 18,500 people develop TB, and 5,300 die of TB annually.The Government of Southern Sudan therefore, puts emphasis on prevention and control of TB.

2.3.1 What is tuberculosis?

Tuberculosis is a disease that usually attacks the lungs. The disease can also affect other parts of the body, including the bones, skin, joints, and brain. The disease is caused by a bacterium (mycobacterium tuberculosis). There is a difference between tuberculosis infection and the disease. People with the infection may not feel ill and may have no symptoms. The infection may last for a lifetime and the infected person may never develop the disease.

2.3.2 How is tuberculosis spread?

Tuberculosis is spread through the air. When a person with the disease coughs, or sneezes the germs enter the air (droplet infection). A person inhaling air that contains TB germs may become infected.It spreads rapidly, particularly where people are living in crowded conditions, have poor access to health care and are malnourished.

Key Message

TB can spread rapidly where people are:

- Living in crowded conditions,
- Having difficulty in obtaining medical care,
- Poorly nourished.

In some cases, it is possible to become infected with the animal type of TB (bovine). This type of TB is contracted by consuming infected un-boiled milk and its products or eating improperly cooked infected meat.

People of all ages can contract tuberculosis, but the risk of developing TB is highest in young children and in old people. People with HIV/AIDS and those who are malnourished have weakened immune system and are more likely to develop the disease.

2.3.3 What is the incubation period?

The incubation period is 4-12 weeks but the infection may persist for months or years before the disease develops. A person with the disease continues to infect others and even for several weeks after he or she begins treatment.

2.3.4 What are the signs and symptoms?

The signs and symptoms of TB may include the following

- General weakness
- Weight loss
- Fever and night sweats
- Persistent cough for over a month
- Coughing blood
- Chest pain
- Generalized lymphadenopathy.

However, in young children, the only sign of pulmonary TB may be stunted growth or failure to thrive.

Other signs and symptoms depend on the part of the body that is affected. For instance, in TB of the bones and joints there may be swelling, pain and crippling effects in the hips, knees or spine.

2.3.5 What are the complications?

TB weakens the body generally, increasing the likelihood that the infected person will contract other diseases or that existing diseases will become more severe. Untreated pulmonary TB results in debility and death. This may be more rapid in persons infected with HIV/AIDS.

2.3.6 How is tuberculosis treated?

People with TB must complete a course of curative drugs (chemotherapy), which usually includes taking two or more anti-tuberculosis drugs for at least six months or as prescribed by a qualified health worker (Refer to TB treatment guidelines). Unfortunately, some people fail to take medications as prescribed or to complete their course of therapy, or they may be given ineffective treatments. This may lead to multi-drug resistant TB, which can be spread to other people.

2.3.7 How is Tuberculosis prevented?

Immunisation of infants with Bacillus Calmette-Guérin (BCG) vaccine offers the best protection when given at birth or soon after. BCG vaccine is not recommended after 12 months of age because the protection provided is variable and less certain.

In addition, TB may be prevented by:

- ❖ Avoiding overcrowding.
- ❖ Encouraging good nutrition.
- ❖ Early detection and treatment of cases.
- ❖ Improvement of general hygiene.

Key Messages

- TB usually affects the lungs but can also affect other parts of the body, including the bones, joints and brain.
- TB is spread through the air.
- The symptoms of TB include general weakness, weight loss, coughing blood, fever and night sweats.
- People who develop TB must complete a course of drug therapy otherwise they can spread the disease to others.
- The recommended method of prevention for children who are younger than 12 months old is to immunize them at birth or soon after birth with BCG vaccine.

2.4 Diphtheria

2.4.1. What is Diphtheria?

Diphtheria is a disease caused by a germ called 'Corynebacterium diphtheriae'. The germ produces toxins that harm or destroy human body tissues and organs. One type of the disease affects the pharynx and other parts of the throat. Another type, commoner in the tropics, causes ulcers on the skin. The disease affects people of all ages, but mostly un-immunized children.

2.4.2 How is Diphtheria spread?

- ❖ The type of diphtheria that affects the throat is spread in droplets and secretions from the nose, throat and eyes when there is close contact between infected and uninfected people.
- ❖ The other type is spread through contact with skin ulcers. This form of the disease is often disseminated on clothing and other articles that have been contaminated with fluid from skin ulcers.
- ❖ The spread of the disease is favored in overcrowded and poor living conditions e.g. slums, houses without windows and inadequate ventilation.

2.4.3 What is the incubation period?

People infected with Diphtheria usually become ill within two to four days, although symptoms and signs may not appear until six days have elapsed. Infected individuals can usually spread the disease to others for up to four weeks. Rarely this can happen for up to six months.

During outbreaks and epidemics some children may carry the germ without showing any signs or symptoms but can still spread the disease to other people.

2.4.4 What are the signs and symptoms?

Diphtheria affects mainly the throat and tonsils. The early signs and symptoms are:

- sore throat
- loss of appetite and slight fever
- a bluish-white or grey membrane forms in the throat and tonsils
- bleeding may occur if attempts are made to clean the throat
- in severe disease, patients do not show high fever but may develop swelling of the neck and obstruction of the airway

When diphtheria affects the skin, the lesions may be painful, reddened and swollen. Any chronic skin lesions may become infected with diphtheria.

2.4.5 What are the complications?

- Abnormal heartbeats may occur during the early phase of the illness or weeks later, which can result in heart failure.
- There may be inflammation of the heart muscles and valves, leading to chronic heart disease and heart failure after many years.
- Respiratory obstruction followed by death. Death occurs in 5-10% of cases.

2.4.6 How is Diphtheria treated?

- A child with diphtheria or suspected case of diphtheria is very ill. He/she should be referred to referral health facility for appropriate management.
- A child with diphtheria or suspected case should be given diphtheria anti-toxin and recommended antibiotics such as erythromycin or penicillin.
- Once admitted, Diphtheria cases should be isolated to avoid exposing others to the germs.
- Patients become non-infectious about two days after the commencement of antibiotic treatment.

2.4.7 How is Diphtheria prevented?

The most effective way of preventing diphtheria is to maintain a high level of immunisation in the community. In Southern Sudan, Diphtheria toxoid is given together with Pertussis and Tetanus (DPT). However, when new vaccines will be introduced, Dophtheria toxoid will be given in combination with Pertussis, Tetanus, Hepatitis B and Heamophilus influenzae type B vaccines (DPT-Hep B + Hib) or another best fitting combination.

Key Messages

- Diphtheria is spread from person to person in airborne droplets and through close contact.
- The disease can spread rapidly and result in large epidemics where immunisation coverage is low.
- It mostly affects un immunised children.
- The most effective way to prevent diphtheria is to maintain a high level of immunisation coverage within the community.

2.5 Pertussis (Whooping cough)

2.5.1. What is pertussis?

Pertussis or whooping cough is a disease of the respiratory tract caused by a germ called Bordetella pertussis, which lives in the mouth, nose and throat. Many children with pertussis have persisten coughing spells that last about four to eight weeks. The disease is most dangerous in children aged under 1 year especially those who are un-immunized.

2.5.2 How is pertussis spread?

Pertussis spreads from an infected person in droplets through coughing or sneezing. Most unimmunized persons exposed to the germs become infected.

In many countries the disease occurs in regular epidemic cycles of three to five years. The most susceptible people are the youngest non-immunized children.

2.5.3 What is the incubation period?

The incubation period is 5 to 10 days. The disease is most readily transmitted as from seven days after a person has been exposed to the germs until three weeks after the start of coughing.

2.5.4 What are the signs and symptoms?

There are usually three stages in the illness;

- **Initial Stage:** The child appears to have a common cold, with runny nose, watery eyes, sneezing, fever and a mild cough. The cough gradually worsens.
- **The second stage** involves numerous bursts of rapid coughing.At the end of these bursts of coughing the child takes in air with a high pitched whoop. The child may turn blue because of lack of oxygen during a long burst of coughing.

  Vomiting and exhaustion often follow the coughing attacks, which are particularly frequent at night. The attacks become milder with the passage of time. This stage usually lasts one to six weeks but may go on for up to ten weeks
- **In the third stage,** when recovery takes place, the coughing gradually becomes less intense and stops in two to three weeks. There is usually no high fever during the illness.

2.5.5 What are the complications?

Complications are most probable in infants. The commonest and cause of most deaths is bacterial pneumonia. Children may also experience complications such as;

- Convulsion and seizures due to fever or reduction in oxygen supply to the brain.
- Loss of appetite, inflammation of the middle ear, and dehydration.

2.5.6 What is the treatment for pertussis?

Treatment with an antibiotic, usually erythromycin, may make the illness less severe. The use of antibiotics also reduces the ability of the patient to infect others because the medicines kill germs in the nose and throat. Plenty of fluids should be given to prevent dehydration.

The patient should be treated at or referred to the health facility, which has a qualified health worker with appropriate facilities for proper case management.

2.5.7 How is pertussis prevented?

Prevention is by Immunisation with pertussis vaccine, which is given together with Diphtheria and Tetanus (DPT). However, when new vaccines will be introduced, Partusis will be given in combination with Diphtheria, Tetanus, Hepatitis B and Heamophilus influenzae type B vaccines (DPT-Hep B + Hib) or another best fitting combination.

Newborns and infants are not protected against pertussis by maternal antibodies.

A person infected with pertussis usually acquires life long immunity.

Key Messages

- Pertussis is a bacterial infection that spreads from an infected person (droplets) through sneezing.
- The disease is extremely contagious, especially where people live in crowded conditions and nutrition is poor.
- Infants and children under five years are the people most likely to be infected. They may also develop life-threatening complications like bacterial pneumonia and die from the disease.
- The most effective way to prevent pertussis is to immunize all children under 1 year.

2.6 Tetanus

Tetanus affects people of all ages. The disease is particularly common and serious in newborn babies (less than 28 days old) where it is called Neonatal tetanus. Neonatal tetanus kills between 500,000 and 1 million babies every year worldwide (WHO). Almost all neonates who get the disease die. Neonatal tetanus is particularly common in rural areas where most deliveries are at home without adequate sterile procedures.

2.6.1 What is tetanus?

Tetanus or lock-jaw is a disease caused by the bacterium clostridium tetani. The bacteria grows in dead tissue, for instance in a wound or in a baby's umbilical cord. The bacteria are common in the environment, often occurring in soil containing manure. The bacteria form spores that can survive in the environment for years. The bacteria produce toxin that affects the nerves that control the muscles, and this causes stiffness.

In tetanus, the affected person's muscles all contract, making the body stiff. The disease is particularly common and serious in newborn babies, when it is called **Neonatal Tetanus (NNT).**

2.6.2 How is tetanus spread?

Tetanus is not transmitted from person to person. A person may become infected if soil or dung enters a wound or cut. This may happen, for example, if a wound is created by a contaminated object. Tetanus bacteria are likely to grow in deep puncture wounds caused by contaminated nails, needles, barbed wire, thorns, wood splinters and animal bites. Women face an additional risk of infection if contaminated equipment or instruments are used during childbirth or abortion.

A newborn baby may become infected if:

- The knife, razor or other instrument used to cut the umbilical cord is contaminated
- The hands of the person delivering are not clean
- Cow dung , ash or lizard droppings is used to dress the cord
- Soil enters the baby's cord

Infants and children may also contract tetanus when contaminated instruments are used for circumcision, scarification and skin piercing; and when contaminated charcoal or other unclean substances are rubbed into a wound.

2.6.3 What is the incubation period?

The incubation period is between 3 to 21 days with an average of 7 days. The shorter the incubation period, the higher the risk of death.

2.6.4 What are the signs and symptoms?

The signs and symptoms may include the following:

- ❖ The first sign is failure to open the mouth due to muscular stiffness in the jaw ,
- ❖ Stiffness of the neck,
- ❖ Difficulty in swallowing,
- ❖ Stiffness of the abdominal muscles,
- ❖ Muscle spasms, sweating and fever.

However, in newborn babies, neonatal tetanus presents with excessive crying, failure to breastfeed, muscle twitches, failure to swallow and generalised body stiffness. Sweating and fever may also occur

Case definition for neonatal tetanus

The standardized case definition of neonatal tetanus (NNT) is;

- ➢ History of normal sucking and crying for the first 2 –3 days of life;
- ➢ Onset of illness between 3 and 28 days of age;
- ➢ Illness is characterized by inability to suck followed by stiffness/and or severe muscle contraction and convulsions and often death follows in most cases.

2.6.5 What are the complications of tetanus?

The following are the common complications of tetanus;

- Fractures of the spine or other bones may occur as a result of muscle spasms and convulsions.
- Abnormal heartbeat.
- Pneumonia and other infections may also occur.
- Death is particularly likely in very young and old age groups.

2.6.6 What is the treatment for tetanus?

The management of patients with tetanus is complicated, and therefore needs special skills and facilities. Health workers with limited facilities should do the following;

- ➢ Clean wounds thoroughly and remove dead tissue.
- ➢ Give anti-tetanus serum (ATS) to patients with wounds that are not clean and are not fully protected against tetanus. ATS is likely to be available in hospitals.
- ➢ Refer suspected cases of tetanus to health facilities with skilled health workers for proper management.

Persons who recover from tetanus do not have natural (acquired) immunity and are therefore not protected from future tetanus infections.

2.6.7 How is tetanus prevented?

1. Immunizing women of childbearing age (pregnant and non pregnant) with 5 doses of

tetanus toxoid. TT is given to women of childbearing age (pregnant and non-pregnant women) to protect them against tetanus and also to prevent neonatal tetanus in their newborn infants. When given to a woman, who is or becomes pregnant, the antibodies that form in her body cross the placenta into the foetus.These antibodies protect the baby against tetanus during birth and for a few months thereafter. A maximum of five doses will protect women throughout their childbearing years.

2. Immunizing infants and children with tetanus vaccine which is given in combination with Diphtheria and Pertussis (DPT vaccine) or Diphtheria, Pertussis, Hepatitis B and Heamophilus influenzae type B vaccines as DPT-HepB + Hib vaccine.
3. Ensuring safe and clean practices during childbirth
4. Ensuring clean wound or umbilical cord care

Key Messages

- In Southern Sudan, neonatal tetanus remains a serious problem in Countys with poor immunisation coverage and unclean practices associated with childbirth.
- If untreated, tetanus is a very serious disease at any age, almost every person contracting tetanus dies.
- All children should be immunized against tetanus because antibodies transferred from the mother before birth last for only a few months.
- Infection occurs when contaminated objects puncture or cut the skin and umbilical cord. It can also occur during unclean delivery practices.
- The most important way to achieve prevention is to immunize women of childbearing age 5 doses of TT vaccine and to ensure clean delivery practices
- Children receive protection from tetanus by receiving 3 doses of DPT- HepB +Hib vaccine.

2.7 Poliomyelitis (Polio)

Polio is targeted for eradication globally. It has been eradicated in western countries but is still prevalent in some African and Asian countries. In Southern Sudan, the last case of wild polio was seen in 2009. However this does not mean that the disease has been eradicated in the country. Eradication will be achieved when no country in the world reports a single case for at least 6 months.

2.7.1 What is polio?

Polio is a crippling disease caused by any of the three related polio virus types: poliovirus types 1, 2 or 3. Although Wild Polio virus infections are most common in children less than 15 years of age, they can occur in adults.

2.7.2 How is polio spread?

The polio virus enters the body through the mouth when people eat food or drink water contaminated by faeces carrying it. The virus colonises the intestinal cells before entering the blood stream and may invade certain types of nerve (anterior horn) cells, which it can

damage or destroy. Consequently the disease is most likely to spread in areas of poor sanitation as the virus is secreted through stools of infected persons for nearly 60 days.

It also occurs in throat secretions. Sometimes it is spread in airborne droplets through close contact with persons carrying the infection who are sneezing or coughing. It can also be spread through exposure to the throat and nose secretions in other ways.

Nearly all children living in households where someone is infected become infected. Persons are most likely to spread the virus 7 to 10 days before and 7 to 10 days after they first experience symptoms of the disease. Infected persons who do not have symptoms can also spread the disease

2.7.3 What is the incubation period?

The incubation period ranges from 3 to 35 days.

2.7.4 What are the signs and symptoms of polio?

- The majority of People infected with the poliovirus may not feel ill. Some (less than 10%) may have influenza-like symptoms such as: fever, loose stools, sore throat, stomach upset, headache or stomach ache.
- Sometimes there may be pain or stiffness in the neck, back and legs.
- The most serious form of the disease is paralytic polio which occurs in 1 out of every 200 infections. The paralysis due to Polio has sudden onset rapidly developing, often reaching full inability to use affected limb within hours following history of fever. The paralysis is completed by the end of three days and is flaccid (floppy).

Polio paralysis is usually asymmetrical affecting one side more than the other. It involves the legs more commonly than the arms and affects the proximal muscles (those close to the trunk) more commonly than the distal muscles (those further from the trunk). Involvement of all four limbs is almost never seen in infants affected by polio. The sensory nerves are usually not affected, and the senses of touch and pain are normal.

In some cases, polio paralysis causes severe difficulty in breathing, swallowing, speaking or controlling the bladder and bowels. The risk of death from respiratory paralysis is higher in such patients. The risk of dying is higher in older patients than among infants and young children.

Over years, the unstimulated muscles of the paralysed patient will diminish in size (atrophy), leaving the affected limbs thinner than the other.

2.7.5 What are the complications of polio?

- About 1% of infected children become paralyzed, and a large percentage of these children have some permanent paralysis.
- Death may occur if the muscles used for breathing are paralyzed and no respirator is available.

2.7.6 How is polio treated?

There is no treatment for Polio but the symptoms can be relieved. Sometimes the patient has to use a respirator in order for breathing to continue.

Refer the child or suspected polio case to a rehabilitation facility (polio clinic or Hospital for physiotherapy), which can help to reduce the long-term crippling effect of polio.

2.7.7 How is polio prevented?

- Through Immunisation with four or more doses of oral polio vaccine (OPV).
- Improved water supply and sanitation practices.

As part of the polio eradication initiative, supplemental doses of OPV are given to all children in the age group 0 – 59 months during the National Immunisation days (NIDs) or Supplemental Immunisation Activities (SIAs).

Key Messages

- Most people who get polio infection do not become ill but may spread the disease to others who may become ill.
- About 1 child in every 200 infected with the polio virus develops paralysis.
- Polio is caused by a virus and can lead to severe, possibly lifelong paralysis.
- The disease is easily spread from person to person and from hand to mouth, through eating food or drinking water that has been contaminated with faeces from an infected individual.
- The recommended method of preventing Polio in children is to immunize them with 4 or more doses of oral polio vaccine (OPV) starting soon after birth.
- Ministry of Health together with Development Partners are working very hard towards the attainment of the Global goal of polio eradication.

2.8 Measles

Measles affects more children than any other EPI targeted disease. It is constantly present in some populations and often in epidemic proportions. Measles epidemic is more likely in conditions of over crowding, poor nutritional status and poverty where large numbers of non-immunized people are in close contact. The disease is more severe among unimmunised children less than five years old in Southern Sudan.

2.8.1 What is measles?

Measles is a disease caused by the measles virus. It is a highly communicable and infectious disease – it spreads easily and will always find and infect every unvaccinated child.

2.8.2 How is measles spread?

Measles is spread by contact with nose and throat secretions of infected people and in airborne droplets released when an infected person sneezes or coughs. Transmission by airborne droplets can occur even two hours after an infected person has left a room or other closed area.

A person with measles can infect others for several days before and after he or she develops symptoms. The disease spreads easily in areas where infants and children gather e.g. health centres, schools and among Displaced Persons (either IDPs or refugee camps).

2.8.3 What is the incubation period?

The incubation period ranges from 7 to 21 days with an average of 10 days.

2.8.4 What are the signs and symptoms?

The first sign of infection is a high fever lasting one to seven days. During this period there may be a runny nose, cough, red and watery eyes (conjunctivitis), and small white spots inside the cheeks (Koplik spots).

After 3 days a slightly raised rash develops, spreading from the face and upper neck to the body. It further spreads to the hands and feet over a period of about three days. It lasts for five to six days and fades successively from the same areas. There may also be loss of appetite and loose stools, especially in infants.

Case definition of measles

- Generalized rash lasting at least three days
- A history of fever of at least 380C (hot to touch if not measured) and
- At least one of the following;
    i. Red eyes (conjunctivitis)
    ii. Red lips and sore mouth (stomatitis)
    iii. Cough or
    iv. Runny nose or coryza

2.8.5 What are the complications?

The complications of measles include:

- Malnutrition leading to severe weight loss,
- Pneumonia
- Dehydration
- Damage to the cornea leading to blindness
- Discharge from the ear(s) leading to hearing impairment
- Convulsions, or coma
- Death.

Children aged less than twelve months, if not immunized, are the most likely to acquire measles infection. Severe measles is particularly likely to occur in poorly nourished children, especially those not receiving sufficient Vitamin A (in their diet or supplementation). It also occurs in children with immune systems that have been weakened by other diseases eg HIV/AIDS.

2.8.6 What is the treatment for measles?

There is no specific treatment for measles disease. The treatment offered is mainly for the complications. Vitamin A administration can help to avoid the complications of eye damage and blindness. Therefore, all children with severe measles should receive Vitamin A supplementation as soon as they are seen at the health facility and a second dose should be given the next day. General nutritional support and the treatment of dehydration with oral rehydration salts (ORS) solution may be necessary. It is very important to continue feeding and giving fluids to a child with measles. Antibiotics should only be prescribed for ear and severe respiratory tract infections. People who recover from measles are immune for the rest of their lives.

2.8.7 How is measles prevented?

Measles is prevented through immunisation with measles vaccine at nine months of age. Children aged six to nine months admitted in hospital should be screened and those found eligible be immunized against measles because of the danger of exposure to infection in hospitals. This should be followed by a second dose at nine months or at first contact after nine months. Children admitted to hospital with measles should be isolated for at least four days after the skin rash has appeared. Malnourished children with measles should be isolated for the duration of their illness, and should be given a balanced diet.

Key Messages

- Measles is a highly infectious viral disease that is spread from person to person through sneezing, coughing and close personal contact.
- Severe complications of measles can be avoided through proper case management and Vitamin A supplementation.
- Measles can be prevented by immunisation at nine months or first contact there after.

Other EPI target diseases for the near future

2.9 Hepatitis B

In the year 2000, there were an estimated 5.7 million cases of acute hepatitis B and an estimated 620,000 deaths from hepatitis B related diseases worldwide. It is estimated that there are about 350 million carriers of hepatitis B virus worldwide. In Southern Sudan, it is estimated that 26% of the total population (2 million people) are infected with hepatitis B virus and are positive for the Surface antigen. This ranks Southern Sudan among countries with highest endemicity in the world.

2.9.1 What is Hepatitis B?

This is a disease caused by the hepatitis B virus and it affects the liver. Adults who get hepatitis B usually recover. However most infants infected at birth become chronic carriers i.e. they continue to carry the virus for many years and can spread the infection to others.

2.9.2 How is Hepatitis B spread?

The hepatitis B virus is carried in blood, saliva, semen, vaginal fluids and most other body fluids. However, it is usually spread by contact with blood in the following ways:

- Through unsafe injection or needle stick injuries. Un-sterilized needles or syringes can contain hepatitis B virus from an infected person, for example from a patient or a needle user.
- By mothers to their babies during the child birth process
- Between children during social contact through cuts, swabs and scratches.
- During sexual intercourse through contact with blood or other body fluids.

The virus does not occur in any infected person's stools except when they contain blood. It does occur in milk of infected mothers but in such small amounts that breast-feeding can proceed.

2.9.3 What is the incubation period?

The average incubation period is six weeks but may be as long as 6 months

2.9.4 What are the signs and symptoms?

The younger a person is when infected the more likely it is that he/she will show no signs or symptoms. A person with no symptoms may remain infected for many years and can spread the infection to others. Such a person is more likely to suffer complications caused by liver damage in the long term than one showing symptoms.

Infected people may feel weak and may experience stomach upsets and other influenza – like symptoms. They may also have very dark urine or very pale stools. Jaundice may appear as yellow skin or a yellow colour in the whites of the eyes. The symptoms may last several weeks. General weakness and fatigue may continue for months. A laboratory blood test is required to determine with certainty whether a person has hepatitis B virus or disease.

Most acute infections in adults are followed by complete recovery and the affected people rarely become chronic carriers. However, many children, even though they are not acutely ill as a rule, do become chronic carriers and may develop complications.

2.9.5 What are the complications?

A small proportion of acute infections can be severe and lead to death. Most serious complications, including chronic hepatitis, cirrhosis, liver failure, and liver cancer, occur in persons with chronic infection.

Infected persons who recover and do not become carriers possess antibodies and are protected throughout their lives.

2.9.6 What is the treatment for Hepatitis B?

There is no treatment for the acute condition. However, supportive treatment such as bed rest, increase in fluid intake, reduction in protein intake and restriction of alcohol improves the outcome (prognosis) of the disease. In chronic infection, refer the patient to a health facility with appropriate facilities.

2.9.7 How is Hepatitis B prevented?

It is recommended that all infants receive three doses of hepatitis B vaccine during the first year of life. In Southern Sudan Hepatitis B vaccine is not yet routinely given to all children. However, it will most likely be given in combination with Diphtheria, Pertussis, and Tetanus and Heamophilus influenzae type b vaccines as DPT-Hep B + Hib vaccine. Otherwise, monovalent Hepatitis B vaccines may also be provided for vaccinating newly born babies (See Hepatitis B vaccination at birth).

Health care workers should use all necessary precautions with all patients because patients who are carriers of the virus can spread the infection to them quite easily through blood contact. Vaccination of health care workers against hepatitis B is also recommended early in their career. At medical training level if the infant doses were missed.

Persons with hepatitis B virus should not donate blood and should not allow other persons to come into contact with their blood or other body fluids. They should use barrier methods when having sex and should not share eating utensils, toothbrushes, needles or razors with other people.

Key Messages

- The Hepatitis B virus is spread through contact between people's blood and other body fluids.
- The younger a person is on becoming infected, the more probable it is that he or she will become a carrier of the disease and develop a severe liver condition later
- Non-symptomatic carriers of the disease can infect other people and mothers who are carriers infect their children. The disease occurs in both acute and chronic form
- All children should receive three doses of Hepatitis B vaccine before their first birth day

2.10 *Haemophilus Influenzae* type b (Hib)

2.10.1 What is Haemophilus influenzae type b?

Haemophilus influenzae type b (Hib) is the commonest form of Haemophilus influenzae. Hib is a leading cause of bacterial meningitis and is also responsible for about 2.7 million cases of pneumonia in developing countries.

2.10.2 How is Hib spread?

The Hib bacterium is commonly present in the nose and throat. The bacteria are spread by droplets from an infected person to others through sneezing, coughing or speaking closely. Getting in direct contact with secretions from an infected person can also spread the bacteria. Hib also spreads among children when they share toys and other things that they put in their mouths.

2.10.3 What is the incubation period?

The incubation period depends of the specific disease e.g. meningitis, pneumonia

2.10.4 What are the signs and symptoms of Hib?

Infected children may carry the Hib bacteria without showing any signs or illness, yet still infect others. Therefore an asymptomatic carrier is a major source of infection in the community.Although infection is common in children below 5 years, it rarely occurs in adults.

Hib bacteria cause severe infections including:

- Bacterial meningitis: inflammation of the membranes that cover and protect the spinal cord and brain.
- Pneumonia: inflammation of the lungs; also called Acute Respiratory Infection (ARI) or Acute Lower Respiratory Infection (ALRI).
- Epiglottitis: inflammation of the epiglottis and the area around the vocal cords. In addition, there could be obstruction of the airway.
- Septicemia: presence of bacteria in the blood; also called blood poisoning.
- Septic arthritis: inflammation of the joints.

2.10.5 What are the complications of Hib?

Children who survive Hib meningitis may develop the following complications:

- Severe mental disorders
- Loss of hearing (deafness)
- Mental retardation
- Visual impairment (blindness)
- Muscle weakness and / or lameness (cerebral Palsy)

Evidence from the World Health Organization suggests that 5% to 10% cases of Hib meningitis cases are at risk of dying. This high death rate is associated with delays in seeking health care, improper treatment or use of inappropriate drugs.

2.10.6 What is the treatment for Hib?

Hib disease can be treated with specific antibiotics (Refer to national clinical treatment guidelines). Children showing signs and symptoms of the disease must be referred to a health facility with a trained health worker for proper case management.

2.10.7 How is Hib prevented?

Hib vaccines are available for prevention of Hib disease. Studies onducted by WHO have shown that vaccination reduces the risk of invasive Hib disease in young children by more than 90%. In Southern Sudan Hib vaccine will be given to children as in combination with Diphtheria, Pertussis, Tetanus and Hepatitis B vaccines as DPT-HepB + Hib vaccine.

Key Messages

- Hib affects mainly children younger than 5 years.
- Hib bacteria are spread through droplets from an infected person.
- Hib is the commonest cause of meningitis among children less than 5 years in Southern Sudan.
- For every case of Hib meningitis, there are 5 cases of pneumonia due to Hib.
- Hib meningitis is one of the major causes of morbidity, mortality and disability in children.

2.11 Yellow Fever (YF)

2.11.1 What is yellow fever?

Yellow fever is caused by the yellow fever virus, which is carried by mosquitoes. It is endemic in 33 countries in Africa and 11 countries in South America. In 2000 it was estimated that there were 200 000 cases of yellow fever, resulting in about 30 000 deaths worldwide.

2.11.2 How is yellow fever spread?

The yellow fever virus can be transmitted by mosquitoes which feed on infected animals in forests, then pass the infection when the same mosquitoes feed on humans travelling through the forest. The greatest risk of an epidemic occurs when infected humans return to urban areas and are fed on by the domestic vector mosquito Aedus aegypti, which then transmits the virus to other humans.

2.11.3 What are the signs and symptoms of yellow fever?

The illness may be so mild that it is not noticed or diagnosed. Three to six days after a person is infected, he or she suddenly develops fever, chills, headache, backache, general muscle pain, stomach upset, and vomiting. As the disease progresses, the person becomes slow and weak. There may be bleeding from the gums and blood in the urine. Yellowing in the white part of the eyes or yellowing of the skin and palms (Jaundice) and black vomiting may also occur.

The diagnosis of yellow fever is difficult to make because its signs and symptoms are similar to other diseases, such as hepatitis and malaria. As a result, any person who develops jaundice within two weeks of the start of a fever should be considered to be a possible case of yellow fever. To confirm the diagnosis of yellow fever, a blood sample should be taken and sent to a laboratory for testing.

2.11.4 What are the complications of yellow fever?

If the illness is severe, the patient may experience convulsions or a coma. The disease usually lasts two weeks, after which the patient either recovers or dies. In areas where the disease is very common, the risk of dying from Yellow Fever is about 5%. However, up to half of infected people may die during epidemics.

2.11.5 What is the treatment for yellow fever?

There is no specific treatment for yellow fever. Supportive treatment is recommended. Dehydration and fever can be treated with oral rehydration salts and medication. Any accompanying bacterial infection should be treated with an antibiotic. Intensive supportive care may improve the outcome for seriously ill patients.

2.11.6 How is yellow fever prevented?

Immunization is the single most important measure to control yellow fever.

The main strategies to control yellow fever are based on a combination of immunization for protection against the disease and surveillance, and are outlined below.

Prevention

- Administering yellow fever vaccine as part of routine infant immunization;*
- Preventing outbreaks in high-risk areas through mass campaigns;*
- Control of Aedus aegypti in urban centres.

**Both these strategies should ensure a minimum coverage of at least 80%.*

Control

- Instituting a sensitive and reliable YF surveillance system including laboratory capacity to analyse samples and confirm suspected cases;
- Emergency response to outbreaks through mass campaigns.

Key Messages

- Yellow fever causes about 30,000 deaths annually.
- Mosquitoes transmit the yellow fever virus.
- 33 African countries (including South Sudan) and 11 South American countries are at highest risk for the disease.
- The symptoms of yellow fever are unspecific and can be confused with many other diseases.
- There is no specific treatment for yellow fever.
- There is a safe and effective vaccine against the disease.

Exercise 2

1. List the vaccine preventable diseases targeted by Ministry of Health/GoSS

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2. What is the causative agent of each of the disease listed above?

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3. How are you going to prevent the occurrence of each of the above mentioned disease in your County/Payam?

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Case study

The Keen Medical Officer

A keen Medical officer named Thomas Deng Stephen is managing a successful immunisation programme in his County. One day, he visited a Hospital in his area and was shocked to find children with measles, some of them severely ill. He asked the hospital staff for information on the immunisation histories of the children which was;

- 15 children had not received measles vaccine
- 4 of the 15 children had never visited any health facility before. This was their first time to be in a health facility.
- 11 of the 15 had gone to a health facility for measles immunisation but had not received it because the health workers would not immunise children who are sick with colds, coughs, or diarrhea.
- Children had received measles vaccine in the same health facility at 9 months.

Exercise

1. Which of those cases of measles would have been prevented? How?

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2. What should the medical officer do to reduce the numbers of measles cases in his County?

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.....

Discuss your answers with your supervisor

UNIT 3: EPI VACCINES

3.1 About this Unit

This unit describes the vaccines used by Ministry of Health/GoSS, to prevent targeted childhood immunisable diseases discussed in unit 2. The vaccines are:

- Bacillus Calmette-Guérin (BCG)
- Diphtheria-Pertussis-Tetanus (DPT)
- Oral Polio Vaccine (OPV)
- Measles
- Tetanus Toxoid (TT)

Plans are under way for possible introduction of vaccines against:

- Hepatitis B and Haemophilus influenzae type b in combination with DPT (DPT-Hep B or DPT–HepB+Hib)
- Yellow Fever

These possible future vaccines will also be briefly discussed in this unit. Details on how to administer the vaccines are discussed in unit 8 of this manual.

Learning Objectives

After studying this unit, you should be able to:

1. Describe each vaccine used by MOH/GoSS to prevent targeted childhood immunisable diseases.
2. Discuss the storage of each vaccine.
3. State schedule and dosage.
4. Describe site and route of administration.
5. Explain side effects and possible contraindications of each vaccine.
6. Discuss management of side effects.

Performance objectives

After studying this unit, you should be able to perform the following;

1. Store vaccines appropriately.
2. Administer vaccines properly.
3. Manage the side effects.

3.2 BCG Vaccine

3.2.1 What is BCG Vaccine?

The letters, B, C and G stand for Bacillus Calmette-Guérin. Bacillus describes the shape of the bacterium/germ; Calmette and Guérin are the names of the people who developed the vaccine. BCG is live attenuated vaccine that protects infants against tuberculosis.

BCG vaccine comes in powder form packed in ampoules or vials. Therefore, it must be reconstituted with the accompanying diluent from the same manufacturer before use.

3.2.2 How is BCG vaccine stored?

- BCG vaccine should be stored at a temperature between +2 °C and +8 °C before and after reconstitution.
- Dry BCG vaccine (i.e. not reconstituted) can be stored at freezing temperatures up to -20 °C and is not damaged by freezing.
- The diluent for BCG is not affected by heat and can be stored at room temperature. However, the diluent must be pre - cooled a day before using it for reconstitution.
- Any reconstituted vaccine must be discarded after six hours or at the end of the immunisation session, whichever comes first.

3.2.3 When is BCG given?

- BCG vaccine is given at birth or as soon as possible after birth, preferably before the first birthday.
- It should never be given to children who have clinical Acquired Immunodeficiency Syndrome (AIDS).

3.2.4 What is the dosage of BCG?

- One dose of 0.05 ml for children less than 12 months old (infants)
- 0.1 ml for children above 12 months, if it is the first contact with the child.

3.2.5 Where and how is BCG given?

BCG vaccine is injected in the top layer of the skin (intradermal) of the left forearm just below the epidermis.

3.2.6 What are the side effects?

Normal reaction

- When BCG vaccine is injected in the top layer of the skin (intra-dermal), a small raised lump appears at the injection site. This usually disappears within 30 minutes.
- After approximately two weeks, a red sore develops which is usually 10mm in diameter (the size of the end of an unsharpened pencil).
- The sore remains for another two weeks and then heals. A small scar about 5mm across, resulting from the sore, remains for life. This is a sign that the child has been effectively immunized.

Abnormal reaction

Swelling of the glands or formation of abscess

Sometimes the glands in a child's armpit or near the elbow swell up after injection with BCG vaccine, or he / she may develop an abscess. Swollen glands or abscesses occur because:

- A non-sterile needle or syringe was used.
- Too much vaccine was injected.
- The vaccine was injected under the skin instead of in its top layer.
- Un-cleaned injection site.

3.2.8 How to manage the side effects

Table 3.1: Management of side-effects (BCG)

Side effects	Management	Remarks
Small sore develops at site after a week lasting for about 2 weeks	Keep dry and clean (do not put any ointment or medicine on it)	Will leave a small scar
Swollen glands	Refer to a doctor	
Abscess	Refer to a doctor or try antibiotic if bacterial infection is suspected	Abscess can be due to bacterial causes other than BCG vaccine.

3.3 DPT

3.3.1 What is DPT?

Diphtheria-tetanus-pertussis vaccine is made from diphtheria toxoid, tetanus toxoid, and pertussis vaccine. It is a liquid vaccine. If a vial of DPT vaccine stands for a long time in a fridge, fine particles may separate from the liquid. They look like fine sand at the bottom of the vial. Before using the vaccine shake the vial to mix the vaccine and liquid together.

3.3.2 How is DPT vaccine stored?

- DPT vaccine should be stored at a temperature between +2^{o}C and +8^{o}C.
- The vials of DPT vaccine should be put next to each other in the refrigerator.

DPT vaccine is damaged by freezing, therefore, **it should NEVR be frozen**. DPT vaccine can be frozen if stored in a freezer compartment of the fridge or if it is stored in a cold box filled with well frozen icepacks. If you suspect that the vaccine has been frozen, carry out a shake test as described in unit 5 under vaccine management.

3.3.3 When is DPT vaccine given?

The target age group of DPT vaccine are children aged 6 weeks to 11 months. The vaccine is given in three doses as follows:

- 1st dose – at 6 weeks (or first contact)
- 2nd dose – at 10 weeks (or 4 weeks after the 1st dose)
- 3rd dose – 14 weeks (or 4 weeks after the 2nd dose)

The interval between doses must be at least 4 weeks.

3.3.4 What is the dosage of DPT vaccine?

Each dose of DPT vaccine is 0.5 ml.

3.3.5 Where and how is DPT given?

DPT is injected into the muscle in the mid outer part of the left thigh.

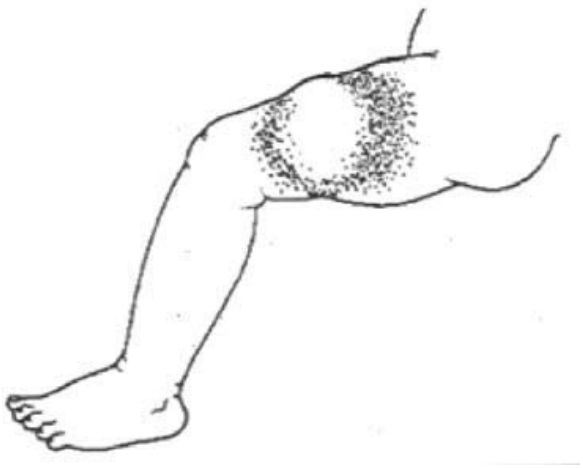
3.3.6 What are the side effects?

Reactions to DPT vaccine are usually mild. Normal reactions include fever and soreness at the site of the injection.

- **Fever:** A child may have fever in the evening after receiving DPT vaccine. The fever should disappear within a day.

  Note: Fever that begins more than 24 hours after DPT injection is unlikely to be a reaction to DPT vaccine and should be investigated at the clinic.
- **Soreness:** Some children have pain, redness or swelling at the injection site. This causes them to become restless and cry excessively.
- **Abscess:** An abscess may develop a week or more after a DPT injection. This is an abnormal reaction and it can happen because:
  - A non-sterile needle or syringe was used
  - The vaccine was not injected into the muscle.

Figure 3.1: Abscess caused by non-sterile procedure, or incorrectly administered DPT vaccine



3.3.7 How to manage the side effects of DPT vaccination

Table 3.1: Management of side effects of DPT vaccination

Side-effect	Management	Remarks
Fever	Bathe baby with warm water 2-3 times, light clothing	Will disappear within 1 day
Pain and soreness	As fever and add Paracetamol	Also disappears after 1 day
Abscess	Antibiotics	May require incision and drainage

3.3.8 Contraindications

A child with an acute illness who is being treated as an outpatient should receive the vaccine if a dose is due. However, any child who is ill enough to be admitted for treatment should be immunized prior to discharge.

A child who gets convulsions within 48 hours after receiving a dose of DPT should not be given a subsequent dose of the same vaccine.

DPT vaccine should NOT be given to children over 5 years of age.

3.4 Tetanus Toxoid (TT) Vaccine

3.4.1 What is Tetanus Toxoid vaccine?

Tetanus Toxoid (TT) is an inactivated tetanus toxin that protects against tetanus. It is provided as a liquid in vials of 10 or 20 doses. It is also available in a single dose pre-filled auto-disable injection device (uniject), which is currently not in use in Southern Sudan.

3.4.2 How is TT vaccine stored?

- ► Tetanus toxoid should be stored at a temperature between +2^{o}C and +8^{o}C.
- ► It should never be frozen. Use the shake test (described for DPT) to find out if it has been frozen.

3.4.3 When is TT vaccine given?

To reduce the risk of Maternal and Neonatal Tetanus, it is recommended that Tetanus Toxoid should be given to all women of childbearing age (15-44 years). Emphasis should be given to pregnant women especially in the Antenatal Clinics (ANC) and school health programmes.

The schedule of the TT immunisation for women of childbearing age is as shown below;

Table 3.2: Tetanus Toxoid schedule for Women of Childbearing age

TT dose	When to give	Expected duration of protection
1	At first contact with woman of childbearing age, or as early as possible in pregnancy.	No protection
2	At least 4 weeks after TT 1	1 – 3 years
3	At least 6 months after TT 2 or during subsequent pregnancy	At least 5 years
4	At least 1 year after TT 3 or during subsequent pregnancy	At least 10 years
5	At least 1 year after TT 4 or during subsequent pregnancy	For all childbearing years

Note: A single dose does not offer any protection to the mother or the newborn.

3.4.4 What is the dosage of TT?

Each dose of TT vaccine is 0.5ml.

3.4.5 Where and how is TT given?

Tetanus toxoid is injected into the muscle of the upper arm of the woman. The mother should be allowed to choose which arm should be injected with TT vaccine

3.4.6 What are the Side effects?

After injection a woman may experience the following at the injection site:

- Mild pain
- Redness
- Warmth
- Swelling for one to three days. This reaction may be more common after later doses than earlier ones.

3.4.7 How to manage the side effects

The management of the possible side effects is summarised in the table below.

Table 3.3: Management of TT side effects

Side-effects	Management	Remarks
Mild pain	Paracetamol	Will disappear within 1 to 3 days
Redness and warmth	No treatment is necessary	
Swelling	No treatment is necessary	In case of severe swelling, which is persistent, fill the AEFI form and notify the county EPI supervisor.

3.5 Oral Polio Vaccine (OPV)

3.5.1 What is Oral Polio Vaccine?

Oral polio vaccine (OPV) is a live attenuated vaccine that gives protection against the three types of viruses mentioned in unit 2 that cause paralytic polio. When the vaccine has all three types of Polio viruses it is called trivalent Oral Polio Vaccine (tOPV). More recently, the vaccine is made with one type of polio virus that is called monovalent Oral Polio Vaccine (mOPV) used commonly for outbreak response. There also exists a vaccine made with two typrd of polio viruses that is called bi-valent Oral Polio Vaccine (bOPV)

It is a liquid that usually comes in two types of vials:

- Small plastic vials that have fixed droppers
- Glass vials with droppers supplied in a separate package.

3.5.2 How is OPV stored?

OPV should be stored at a temperature between +2°C and +8°C at health facility and county level cold stores. At the central (Goss/MOH) and State (SMOH) Level vaccine stores, where there is sufficient storage capacity and regular power supply, OPV is stored at -15°C to -20°C. Thawing multiple times does not harm OPV. It is easily damaged by heat.

3.5.3 When is OPV given?

The vaccine is given in four doses as follows:

OPV0 - At birth or within the first 2 weeks of life
OPV1 - At 6 weeks (or at first contact)
OPV2 - At 10 weeks (or 4 weeks after the 1st dose)
OPV3 - At 14 weeks (or 4 weeks after the 2nd dose)

The interval between doses must be at least 4 weeks.

3.5.4 What is the dosage of OPV?

- Each dose of OPV is two drops.
- If a child has diarrhea, give OPV as usual but administer an extra dose, a fifth dose, at least four weeks after he or she has received the last dose in the schedule.

3.5.5 Where and how is OPV given?

OPV is given in the mouth using the dropper that is supplied with the vaccine.

3.5.6 What are the side effects?

There are no side effects recorded with OPV. In very rare instances OPV may cause Vaccine Induced Acute Flaccid Paralysis (AFP). However, this is rare, about one in three million doses.

3.5.7 OPV Used in Outbreak response or Campaigns

While routine immunization uses tOPV (tri-valent oral polio vaccine), outbreak response campaigns may use mOPV (type 1 or 3) or bOPV (containing both type 1 and 3). All staff involved in Polio Outbreak response campaigns must know what type of vaccine they are using for each round and clearly explain why. For details refer to NIDs field guides

3.6 Measles vaccine

3.6.1 What is measles vaccine?

Measles is a live attenuated vaccine that protects a child from contracting measles. It is packaged in powder form together with a diluent in a separate vial. It must be reconstituted before it is used. It is essential that only the diluent supplied with the vaccine from the same manufacturer be used.

3.6.2 How is measles vaccine stored?

- Measles vaccine and diluent should be stored at a temperature between +2^{o}C and +8^{o}C.
- Dry measles vaccine (i.e. not reconstituted) can be stored at freezing temperatures and is not damaged by freezing
- The diluent is not affected by heat and should be stored at room temperature. However, the diluent must be pre cooled a day before use in reconstitution.
- Any remaining reconstituted vaccine must be discarded after six hours or at the end of the immunisation session, whichever comes first.

3.6.3 When is measles vaccine given?

According to the Southern Sudan National Immunisation Schedule, measles vaccine is given at 9 months of age or at first contact after this age.

3.6.4 What is the dosage of measles vaccine?

Each dose of measles vaccine is 0.5 ml.

3.6.5 Where and how is measles vaccine given?

Measles vaccine is injected into the subcutaneous layer of the upper Right arm.

3.6.6 What are the side effects?

- ***Soreness:*** Some children may experience pain and tenderness at the injection site within 24 hours of immunisation. In most cases, these reactions will resolve within 2 or 3 days without any medical attention.
- ***A mild fever and rash*** lasting one to three days may occur approximately a week after immunisation.
- ***Rash:*** about one in 20 children develop a mild rash 5-12 days after receiving the vaccine. The rash usually lasts about 2 days.

Key Messages

- Measles vaccine protects a child from contracting measles disease.
- Reconstituted measles vaccine must be discarded after 6 hours or at the end of the session.
- All children between 6 and 9 months of age who are admitted in hospital should be given a dose of measles vaccine. This dose should not be recorded on the child health card and such children should receive another dose soon after 9 months

3.7 Proposed additional EPI Vaccines

3.7.1 DPT-HepB + Hib Vaccine

3.7.1.1 What is DPT-HepB + Hib vaccine?

DPT-HepB + Hib vaccine protects against five diseases. These are: diphtheria, pertussis, tetanus, hepatitis B and Haemophilus influenzae type b (Hib) infections. Since it protects against five diseases it is called pentavalent vaccine.

The vaccine is packaged in two-dose vials, as indicated in Figure 3.2; one vial contains DPT-HepB in liquid form, and the other vial contains Hib in a freeze dried /pellet form. This type of DPT-HepB vaccine must be reconstituted with freeze-dried Hib vaccine to make DPT-HepB +Hib vaccine.

Figure 3.2: Vials of DPT-Hep B and Hib Vaccine

Hib DPT-Hep B

However, 10-dose liquid DPT-HepB+Hib vaccine has recently been made available. Management of such liquid DPT-HepB+Hib vaccine is the same as DPT alone and therefore has not been described.

3.7.1.2 How is DPT-HepB + Hib vaccine stored?

- DPT-Hep B +Hib vaccine should be stored at a temperature between +2^{o}C and +8^{o}C.
- The vials of DPT-Hep B and Hib vaccine should be put next to each other in the refrigerator.

- Reconstituted DPT-Hep+Hib vaccine must be discarded after six hours or at the end of the Immunisation session, whichever comes first.
- If liquid DPT-HepB+Hib vaccine is used, the multi-dose vial policy will be applied

All DPT containing vaccines are damaged by freezing, therefore, **should not be frozen**. If you suspect that the vaccine has been frozen, carry out a shake test as described in unit 5 under vaccine management.

3.7.1.3 When is DPT-HepB +Hib vaccine given?

The target age group of DPT-HepB+Hib vaccine is children aged 6 weeks to 11 months. The vaccine is given in three doses as follows:

- 1st dose - 6 weeks (or at first contact)
- 2nd dose - 10 weeks (or 4 weeks after the 1st dose)
- 3rd dose - 14 weeks (or 4 weeks after the 2nd dose)

The interval between doses must be at least 4 weeks.

3.7.1.4 What is the dosage of DPT-HepB +Hib vaccine?

Each dose of DPT-HepB +Hib vaccine is 0.5 ml.

3.7.1.5 Where and how is DPT-HepB +Hib given?

DPT-HepB +Hib is injected into the muscle in the mid outer part of the left thigh.

3.7.1.6 What are the side effects?

Reactions to DPT-HepB+Hib vaccine are usually mild. Normal reactions include fever and soreness at the site of the injection.

- ***Fever:*** A child may have fever the evening after receiving DPT-HepB+Hib vaccine. The fever should disappear within a day.

  Note: Fever that begins more than 24 hours after DPT-HepB+Hib injection is unlikely to be a reaction to the vaccine.

- ***Soreness:*** Some children have pain, redness or swelling at the injection site. This causes them to become restless and cry excessively.

- ***Abscess:*** An abscess may develop a week or more after a DPT- HepB+Hib injection. This is an abnormal reaction and it can happen because:
  - A non-sterile needle or syringe was used
  - The vaccine was not injected into the muscle.

Figure 3.3: Abscess caused by non-sterile procedure, or incorrectly administered DPT-Hep B+Hib

3.7.1.7 How to manage the side effects DPT-HepB +Hib vaccination

Table 3.4: Management of side effects of DPT-HepB +Hib vaccination

Side-effect	Management	Remarks
Fever	Bathe baby with warm water 2-3 times, light clothing	Will disappear within 1 day
Pain and soreness	As fever and add Paracetamol	Also disappears after 1 day
Abscess	Antibiotics	May require incision and drainage

3.7.1.8 Contraindications for DPT-Hep B+Hib Vaccination

A child with an acute illness who is being treated as an outpatient should receive the vaccine if a dose is due. However, any child who is ill enough to be admitted for treatment should be immunized prior to discharge.

A child who gets convulsions within 48 hours after receiving a dose of DPT- HepB + Hib should not be given a subsequent dose of the same vaccine.

DPT- HepB + Hib vaccine should NOT be given to children over 5 years of age.

3.7.2 Yellow Fever Vaccine

3.7.2.1 What is Yellow Fever vaccine?

Yellow Fever is a live attenuated vaccine that protects a child from contracting Yellow Fever. It is packaged in powder form together with a diluent in a separate vial. It must be reconstituted before it is used. It is essential that only the diluent supplied with the vaccine from the same manufacturer be used.

3.7.2.2 How is Yellow Fever vaccine stored?

- Yellow Fever vaccine and diluent should be stored at a temperature between +2^{o}C and +8^{o}C.
- Dry Yellow Fever vaccine (i.e. not reconstituted) can be stored at freezing temperatures and is not damaged by freezing

- ❖ The diluent is not affected by heat and can be stored at room temperature. However, the diluent must be pre-cooled a day before reconstitution.
- ❖ Any remaining reconstituted vaccine must be discarded after six hours or at the end of the immunisation session, whichever comes first.

3.7.2.3 When is Yellow Fever vaccine given?

Currently Yellow Fever vaccine is only used in Outbreak response settings. However, when the vaccine is introduced into the Southern Sudan National Immunisation Schedule, it will be given at 9 months of age or at first contact after this age.

3.7.2.4 What is the dosage of Yellow Fever vaccine?

Each dose of Yellow Fever vaccine is 0.5 ml.

3.7.2.5 Where and how is Yellow Fever vaccine given?

Yellow Fever vaccine is injected into the subcutaneous layer of the upper Right arm.

3.7.2.6 What are the side effects?

- ❖ ***Soreness:*** Some vaccine recipients may experience pain and tenderness at the injection site within 24 hours of immunisation. In most cases, these reactions will resolve within 2 or 3 days without any medical attention.
- ❖ ***Headache, muscle pain, or mild fever*** lasting one to three days may occur approximately a week after immunisation.
- ❖ Serious side-effects resulting from immunization are rare and therefore not worth listing here.

Key Messages on Yellow Fever Vaccine

- ➢ Yellow Fever vaccine protects vaccine recipients from contracting Yellow fever disease.
- ➢ Reconstituted Yellow Fever vaccine must be discarded after 6 hours or at the end of the session.
- ➢ Yellow Fever vaccine should not be administered to pregnant women or persons with symptomatic HIV infection

3.8 Giving more than one vaccine at the same time

If you are giving more than one vaccine at the same sitting,

1. Do not use the same syringe
2. Do not use the same arm or leg for more than one injection.
3. Do not give more than one dose of the same vaccine to a woman or child in one session.

Give doses of the same vaccine at the correct intervals. Wait at least four weeks between doses of OPV, DTP, Hib, and Hep B vaccines.

Table 3.5: Summary of injection sites

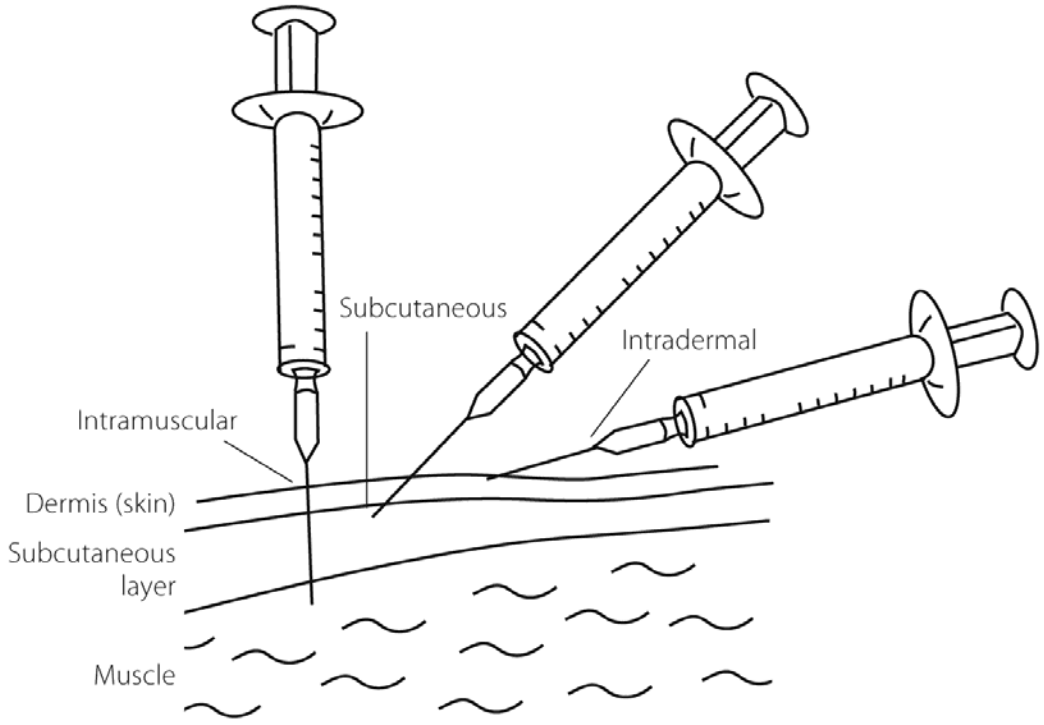
Vaccine	Route of administration	Injection site
BCG	Intra dermal	Left fore arm
DTP (or combination)	Intramuscular	Outer mid-thigh
OPV	Oral	Mouth
Measles	Subcutaneous	Upper Right arm
Yellow fever	Subcutaneous	Upper right arm
Tetanus toxoid	Intramuscular	Outer, upper arm

Intradermal = into the skin.

Intramuscular = into a muscle.

Subcutaneous = under the skin.

Figure 3.4: Illustration of Intradermal, Subcutaneous and Intramuscular Injections



3.9 Southern Sudan National Immunisation Schedule

Table 3.6: Summary of EPI vaccines, doses required and dosage; and site and mode of administration

Vaccine/ Antigen	Dosage	Doses Required	Minimum Interval Between Doses	Minimum Age to Start	Mode and site of Administration	Storage temperature	Comments
BCG	Infants (0- 11 months) – 0.05ml. 11 months andabove – 0.1ml	1	None	At birth (or firstcontact)	Intradermal, Left Fore Arm	$+2^{0}$C and $+8^{o}$C	Use diluent provided by the same manufacture. Discard reconstituted vaccine after six hours or at the end of a session, which ever comes first.
DPT	0.5 ml	3	One month (4 weeks)	At 6 weeks (or first contact after that age)	Intramuscular, Outer Upper Aspect of Left Thigh	$+2^{0}$C and $+8^{o}$C DO NOT FREEZE	Discard reconstituted vaccine after six hours or at the end of a session, which ever comes first.
Polio	2 drops	0+3	One month (4 weeks)	At birth or within the first 2 weeks (Polio 0) and six weeks or firstcontact after 6weeks (Polio 1)	Oral,	$+2^{0}$C and $+8^{o}$C	At static Unit, save the remaining partially used vial for use in subsequent sessions unless: Vaccine expired, has no label or is contaminated, VVM is at or beyond discard point, Vial has been opened for 4 weeks, Vaccines not stored under appropriate temperatures in absence of the VVM. Do not save vaccines opened in the outreach, nor take partially used vials to outreaches
Measles	0.5 ml	2	3 months	At 9 months (or firstcontact after thatage).	Subcutaneous, Right Upper Arm	$+2^{0}$C and $+8^{o}$C	Use diluent provided by the same manufacturer. Discard reconstituted vaccine after six hours or at the end of a session, which ever comes first.
Tetanus Toxoid	0.5 ml	5	TT1 & TT2: One month TT2 & TT3: Six months TT3 & TT4: One year TT4 & TT5: One year	At first contactwith a pregnantwoman or womenof childbearing age(15-44 years)	Intramuscular, Upper Arm	$+2^{0}$C and $+8^{o}$C DO NOT FREEZE	At static Unit, save the remaining partially used vial for use in subsequent sessions unless:Vaccine expired, or frozen, or has no label or is contaminated. VVM is at discard point, Vial has beenopened for 4 weeks, Do not save vaccines opened in the outreach, nor take partially used vials to outreaches

Note: Use a sponge in all immunisation sessions to maintain coldness inside the vaccine carrier

Exercise 3

Complete the table below:

	BCG	DPT (or combination)	Measles	OPV	TT
What diseases does the vaccine protect against					
Type of vaccine					
Number of doses					
Dosage					
Immunization schedule					
Route of administration					
Injection site					
Type of injection					
Contraindications					
Adverse reactions					
Vaccine storage conditions					
Special precautions					

UNIT 4: MANAGEMENT OF COLD CHAIN SYSTEM

4.1 About this Unit

By their nature, Vaccines can only survive under temperature conditions specified by the manufacturers. The cold chain system is therefore important for maintaining the vaccines under the necessary conditions so as to ensure their potency. Vaccine potency once lost cannot be regained even if they are later stored at the right temperature.

This unit explains the management of cold chain system.

Learning objectives

After studying this unit, you should be able to:

1. Define the cold chain system.
2. Describe the cold chain equipment.
3. Discuss maintenance of cold chain equipment.
4. Describe the cold chain monitoring tools.

Performance objectives

After studying this unit, you should be able to perform the following:

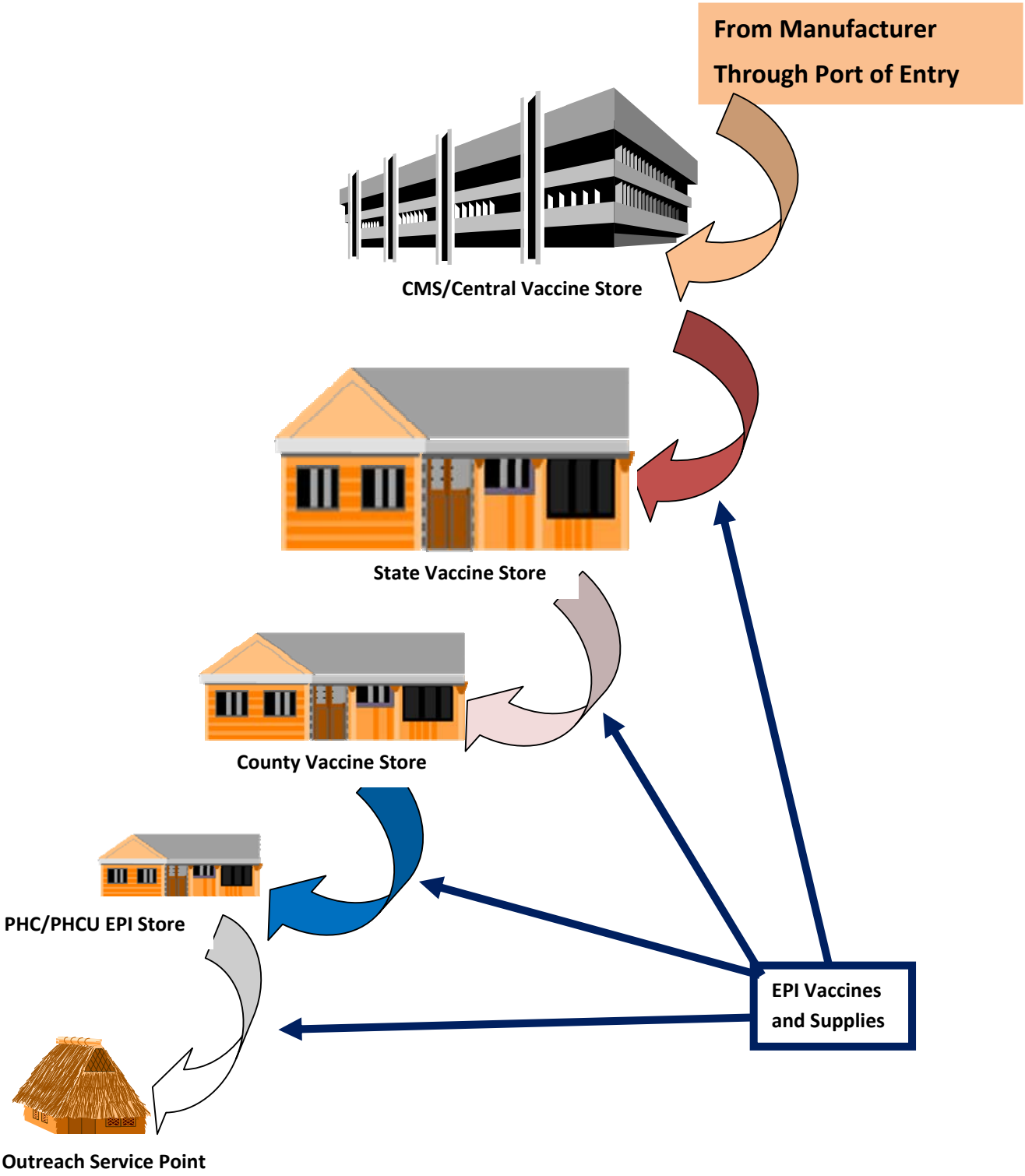
1. Maintain cold chain equipment.
2. Monitor temperatures in the refrigerators.

4.2 The EPI Cold Chain System

4.2.1 Definition of the EPI Cold Chain System

The EPI cold chain is a system of storage and distribution of vaccines at specified temperatures from the manufacturer to the recipient, where it's administered in a potent state. The system involves persons, equipment, vaccines, supplies and procedures as shown in Figure 4.1. In Southern Sudan vaccines are stored at the Central Vaccine Store (CVS), State Vaccine Store (SVS), County store (CHD) and static health units (where there is an EPI refridgerator).

Figure 4.1: The cold Chain System indicating the movement of Vaccines in Southern Sduan



A health worker should maintain the cold chain at the health unit, during transportation to and from the outreach sites and at all times during immunisation sessions.

Always Remember

- Maintaining the cold chain demands constant vigilance
- Vaccines are damaged when they are exposed to heat and some when subjected to freezing

THE COLD CHAIN SHOULD NEVER BE BROKEN

4.2.2 Equipment used in the EPI cold chain system

Different levels of the health care system need different equipment for storage and transportation of vaccines and diluents. The cold chain equipment in the system includes;

a) **Cold rooms:** This is equipment used to generate and control coldness to a temperature suitable for storage of large quantities of vaccines. This equipment is available at the national level for the central vaccine store. The power used to operate the cold rooms is electricity supported by a standby generator.

b) **Freezers:** This equipment is used to generate and control coldness to a temperature suitable for storage of vaccines and freezing of icepacks below 0^{o}C. This equipment is available at the national and State and selected County Cold chain hubbs. The power used to operate the freezers is electricity supported by a standby generator.

c) **Refrigerators:** This equipment is used to generate and control coldness to a temperature suitable for storage of vaccines but also has space where icepack freezing takes place. Refrigerators have different capacities for storing vaccines and for freezing and storing ice packs. In Southern Sudan, the following types of refrigerators are currently being used.

- Gas/electric refrigerators
    1. Electrolux - model RCW42EG and RCW50EG
    2. Sibir - model V240GE/V170GE/V110GE

- Electric refrigerators
    a) Ice lined refrigerators
    b) Chest freezers

- Solar powered refrigerators
    1) Dulas VC150F
    2) Electrolux model RCW42DC
    3) BP model VR50
    4) NAPS model CFS49
    5) Dulas RFVB
    6) Kyocera Excel 2100
    7) PS65

d) **Cold boxes:** A cold box is an insulated container that is lined with frozen icepacks to keep vaccines cold. Cold boxes are used by central (GoSS/MOH/EPI), state (SMOH/EPI) and County vaccine stores staff for transportation of vaccine to the Counties and static health unit levels. Cold boxes have different models with different vaccine storage capacities and cold life (two to seven days depending on the type and weather).

The most suitable cold box for a particular vaccine storage centre is determined by:

- The vaccine storage capacity needed
- The cold life needed, depending on the longest time that vaccine will be stored in the cold box before the temperature goes beyond +8^{o}C;
- The weight, depending on how the box will be transported, e.g. by motor vehicle or bicycle or motorcycle.

Figure 4.2: Picture of a Cold Box

e) **Vaccine carriers:** Like cold boxes vaccine carriers are insulated containers that are lined with frozen ice packs to keep vaccines and diluents cold. They are smaller than cold boxes and easier to carry if you are walking. They have a shorter cold life (8 to 12 hours) than that of cold boxes. Different models of vaccine carriers have different storage capacities.

Vaccine carriers are supplied with a piece of soft foam (sponge) that fits on top of the icepacks in the vaccine carrier. When the carrier lid is open, the sponge keeps the vaccines underneath in a cool state. It also holds and protects vaccine vials during immunisation session.

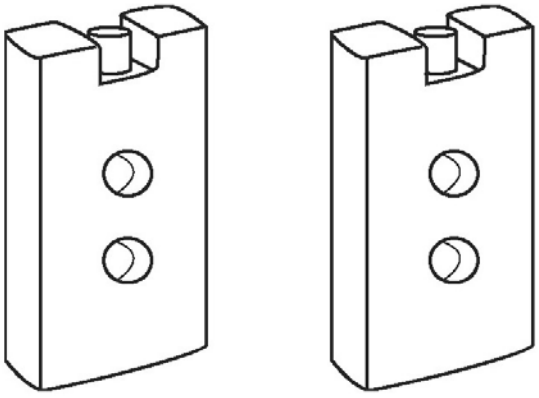
Figure 4.3: Some of the Vaccine Carriers used in EPI

Vaccine carriers are used;

- To transport vaccines and diluent to out reach sites and for temporary storage during health centre immunisation sessions.
- To collect vaccine from the County store.
- To store vaccines when the refrigerator is being defrosted or when out of order.

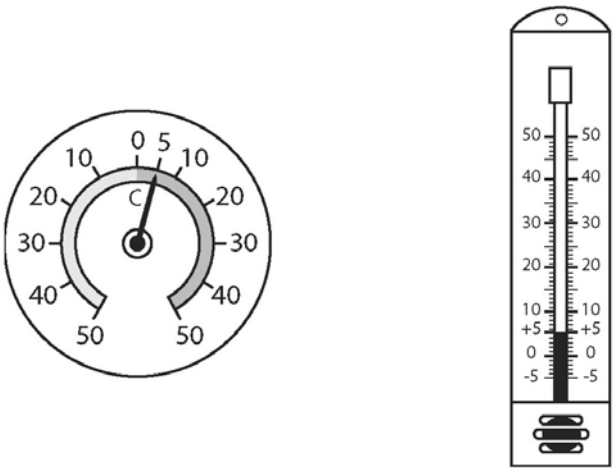
f) **Ice packs:** Ice packs are plastic bottles that are filled with water, and frozen to keep the vaccines at the prescribed temperatures when outside the refrigerator.

Figure 4.4: Illustrations of Icepacks



g) **Thermometers:** Health unit staff use alcohol thermometers (see figure 4.4) to monitor the temperature of vaccines in refrigerators, cold boxes and vaccine carriers. On a stem or bulb thermometer, coloured fluid in the bulb moves up the scale as it becomes warmer, and down the scale as it becomes colder.

Figure 4.5: Alcohol thermometers used in Southern Sudan



4.3 Installation & maintenance of the EPI cold chain equipment.

Managers at all levels should attach high priority to the maintenance of the cold chain equipment. To maintain cold chain, there must be a responsible skilled person at all levels to;

- ❖ Care for equipment
- ❖ Monitor vaccine temperatures
- ❖ Estimate and order vaccine
- ❖ Receive and store vaccine

4.3.1 Kerosene Refrigerator

Elly or some one in UNICEF cold chain to insert description of installation

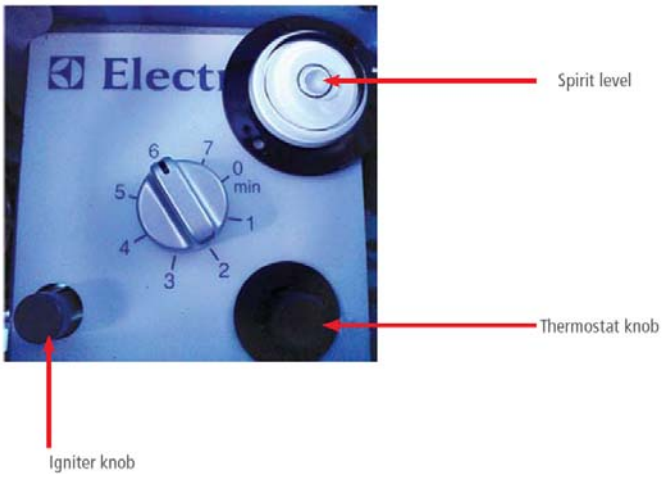
4.3.2 Gas/Electric Refrigerator

A) The RCW42GE or RCW50GE refrigerator

a) Installation instructions

- ► On receipt check that the refrigerator has not been damaged during transportation. If there is any damage, notify the County Cold Chain Assistant (CCCA).
- ► Cleaning is recommended before the first use. Use only mild soap with clean water. After cleaning, dry all parts carefully.
- ► Place the refrigerator in a cool part of the building, away from direct sunlight or heat of any kind. The room must be well ventilated. Never cover the refrigerator or the cooling unit.
- ► There must be at least 30 cm (12") between the refrigerator and the nearest wall. This allows good air circulation around the refrigerator.
- ► To keep the refrigerator dry and for improving air circulation from underneath the box, place it on a table.
- ► The refrigerator must stand levelled, or it will not work properly. The refrigerator is levelled when the air bubble of the spirit level is inside the reference ring.

The control panel for gas and electric operation is placed on the right side of the box.



The thermostat control knob is used for gas and Alternating current (AC) operation. Direct current operation (DC) is not controlled by the thermostat.

Position “7” on the thermostat control knob gives maximum cooling.

At position “0” with AC electric operation, the refrigerator is switched off. With gas operation, the refrigerator is not switched off: the burner continues to burn with a very a small flame. Turning off the gas from the cylinder stops gas operation of the refrigerator.

b) Instruction for gas operation

- Use only propane or butane gas.
- A non-adjustable pressure regulator must be fitted to the gas cylinder. This reduces the gas pressure to the correct operation pressure.
- The operation pressure of the refrigerator is shown on the data plate on the back side of the fridge ("EQUIPPED FOR LP (Low pressure) GAS...mbar")

c) Connecting the gas supply

A hose tube, two hose clips and a pressure regulator are supplied with the refrigerator. Connect the refrigerator to the gas cylinder in the following order:

- Fit the hose tube to the connection union on the refrigerator and to the gas regulator.
- Fix the hose tube tightly at each end using the two hose clips.
- Fit a pressure regulator tightly to the gas cylinder.
- Put soap foam on the connection at each end of the hose tube.
- Turn on the gas supply at the cylinder and pressure regulator, and check for leakage. If bubbles appear in the soap foam at the connections, there is a leakage. Turn off the gas supply, tighten the connection and check again.

Remember

- NEVER check for gas leakage near a naked flame
- Do not smoke while checking for leakage

d) Lighting the burner

- Turn the thermostat control knob in clockwise direction to position "7" (the highest number and maximum cooling).
- Turn on the gas supply.
- Press the flame failure safety device button and keep it pressed for about 5 seconds. This allows gas to flow through the gas line and removes air from the system.
- Keep the safety device button pressed and ignite the burner by pressing the igniter button several times.
- When the gas burner lights, the flame can be seen through the burner window. Keep the safety device button pressed down for another 20 to 30 seconds, to ensure that the flame stays burning.
- If, for any reason, the burner flame extinguishes, while the refrigerator is in operation, the flame failure safety device will automatically cut off the gas supply. Repeat the lighting procedure.
- To switch off the refrigerator, turn off the gas supply at the gas cylinder.

e) Instructions for electrical operation

Electrical operation on AC.

- Check that the power supply voltage is the same as the voltage shown on the refrigerator data plate (220V, 240V or 120V).
- Connect an earthed plug conforming to the local prescriptions to the AC-connection cable of the refrigerator.
- Check that the gas-supply is turned off, if the refrigerator has already been used on gas.
- Plug in the refrigerator.
- Turn the thermostat control knob in clockwise direction to position "7" (the highest number and maximum cooling).
- To switch off the refrigerator, turn the thermostat control knob in anti-clockwise direction to position "0"

Note

Do not switch on gas and electricity at the same time. The refrigerator works on one source of power at a time.

f) Cooling of the refrigerator

- ❖ The refrigerator will take at least 7 hours to cool down to the required temperature of +2^{o}C to +8^{o}C. After the initial two hours, use the thermometer inside the fridge to check the cooling process. If it is not cooling check the position of thermostat and the power source. If it is cooling, check again five hours later to ensure the correct temperature has been attained.
- ❖ Do not put icepacks in the freezer compartment until the fridge has attained the required temperatures.
- ❖ Ensure that the aluminium partition that separates the fridge and freezer compartment is inserted. However, if the cooling capacity is not strong enough to attain the required temperature (at high ambient temperatures of around 40^{0}C), the aluminium partition may be temporarily removed.
- ❖ Do not put vaccines inside the refrigerator compartment until it has reached the required storage temperature of +2^{o}C to +8^{o}C.
- ❖ To get the best results you should proceed as follows: after cooling down, first insert 4 icepacks and wait for these icepacks to be completely frozen then load vaccines inside the refrigerator.
- ❖ When the required temperature has been attained, turn the thermostat control knob in anti-clockwise direction, to a warmer setting position (5 to 4). Keep checking the temperature regularly, and adjusting the control knob if necessary, until you are familiar with the response of the refrigerator cooling to changes in the thermostat setting.
- ❖ When the fridge is functioning and in use, read the temperature using the inside thermometer every day including weekends and public holidays and record it on the temperature chart. Ensure that there is one thermometer at a time in the fridge. The ideal time is 8 am and 5 pm.

g) Icepack freezing

- ❖ Fill the icepacks with cold clean water to the marked level.
- ❖ Load icepacks in the freezer compartment as follows:
  i. Put each icepack on the evaporator.
  ii. Insert the icepack holder in the slits on the bottom side of the evaporator and press it against the icepack.
  iii. Turn the fastener in clockwise direction to keep the icepack holder firm in place. The freezing of the icepacks is faster when firmly placed against the evaporator

  For efficient icepack freezing, the aluminium partition wall should always be inserted in the right position.

B) The Sibir refrigerator

a) Installation of Sibir refrigerator

Step 1: Connect the fridge to power source as described for RCW42EG

Step 2: Level the refrigerator

The refrigerator must be at the correct level during operation. A levelling device called a plumb line is mounted in the fridge compartment of the sibir model V240GE.

To level the fridge:

- ❖ Take the plumb line out of retainer
- ❖ Tilt lever to horizontal position
- ❖ If the plumb line is not in the centre of the brown circle, adjust the position of the refrigerator
- ❖ When the plumb line is in the centre of the brown circle, tilt lever up and store plumb line in its retainer

For the sibir model V170GE and V110GE, the levelling is done using a spirit level, which is placed at the bottom of the fridge compartment.

In the absence of a plumb line or spirit level, you can use a cup or saucer filled to the brim with water and place it on top of the fridge. If water pours, then the fridge is not levelled. Adjust the position of the fridge accordingly.

Note

- ❖ The refrigerator must be at the correct level if it is to work well.
- ❖ There should always be two gas cylinders, one in use and the second as a reserve.
- ❖ Never load a vaccine fridge before it attains temperatures of $+2^0$C to $+8^0$C.

b) Operational instructions

The refrigerator has been designed to allow you to operate it on either Low Pressure (LP) gas or mains electricity. The following paragraphs will explain the various features and provide instructions on operation and maintenance.

c) Control features

All controls are mounted at the front of the refrigerator base and can be reached without opening the refrigerator door. The controls are arranged in sequence as follows:

- Fuel selector switch
- Ignition button
- Gas valve button
- Thermostat
- Flame indicator

d) Starting a Sibir refrigerator

i) Gas Operation

- Check that the refrigerator is level (see 'Levelling Instructions').
- Turn on gas supply.
- Turn the fuel selector to 'GAS'.
- Turn the thermostat knob to maximum setting
- Push in and hold the gas valve button.
- Push the ignition button several times.
- When flame is lit (the pointer moves from red to the green field) hold gas valve button for further 15 seconds to activate safety device for the sibir V240GE model.
- As air may be present in the gas lines at first ignition, it may be necessary to repeat the lighting procedure several times. If, after a few hours, the cabinet is found to be too cold turn the gas thermostat knob to a lower number, if it is too warm turn to a higher number.

To switch off the Refrigerator:

- Turn fuel selector to "0"
- Turn off gas supply
- Clean the refrigerator and leave doors open (see section 4.4.4. - defrosting).

ii) Electric Operation

- Check that the power supply voltage is the same as the voltage shown on the refrigerator data plate (220V or 240V)
- Connect the earthed wire plug to conform to the local prescriptions to the AC connection cable of the refrigerator
- Check that the gas supply is turned off, if the refrigerator has already been used on gas.
- Turn the fuel selector to "ELEC"
- Check that the refrigerator is level
- Plug in the refrigerator
- Turn on the thermostat control knob in clockwise direction position “7” (maximum cooling)
- To stop the refrigerator, turn the thermostat control knob in anti – clockwise direction to position “0”

e) Maintenance Instructions.

In the interest of safety, it is recommended that servicing and replacement of components be carried out by the GoSS or State assigned Cold Chain Technicians/Assistant to ensure proper functionality of the refrigerator.

- Keep the appliance area clear of all combustible materials, and flammable liquids.
- Check of the burner flame daily. A cover with a viewing port protects the burner. Check that the burner flame is blue with no yellow or other discoloration. If you observe any peculiarity in the burner flame, consult the County Cold Chain Assistant (DCCA).
- Provide adequate ventilation for combustion and check it daily. Do not obstruct the air flow for combustion and ventilation!
- If the refrigerator fails and you are unable to locate and correct the trouble, turn off the gas and electric system (put fuel selector in "O"-position). Contact the DCCA giving him model and serial number as found on the data plate and full details of the problem

4.3.3 Electric refrigerators

Electric refrigerators are usually the least costly to run and the easiest to maintain, but they must have a reliable electricity supply. If ice lined refrigerators operate with power continuously for at least eight hours (Four hours in the morning and 4 hours in the afternoon) a day, they can maintain appropriate temperature for 16 hours without power supply. This is only applicable when the fridge is not opened.

The use of ice-lined refrigerators may expose some vaccines to the risk of freezing. To prevent an ice-lined refrigerator from freezing vaccines, set the thermostat to number 1 and cover the thermostat dial with a tape so that it does not get changed.

Figure 4.6: Examples of Electric Freezers/Iceliners

Note

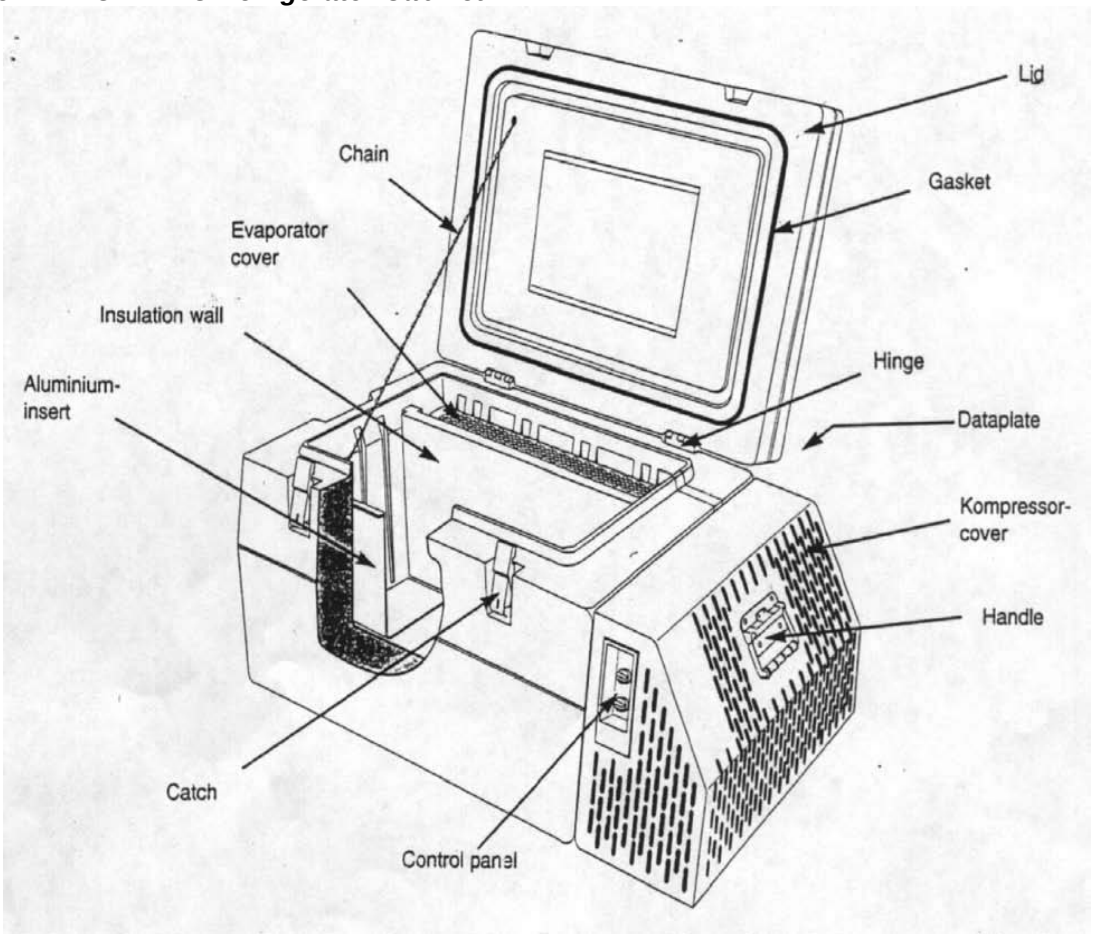
All the vaccines should be stored in the baskets provided with the refrigerator Place Measles,BCG and OPV at the bottom of the fridge.Freeze-sensitive vaccines namely DPT (or DPT-Hep B or DPT-Hep B + Hib),TT and Hepatitis B should be put in top baskets.

4.3.4 Solar refrigerators

The solar refrigerators used in GoSS/MOH/EPI program include:

1. Electrolux model RCW42DC
2. BP model VR50
3. NAPS model CFS49
4. Dulas RFVB
5. Dulas VC65F
6. Kyocera Excel 2100
7. PS65

Figure 4.7: RCW42DC Refrigerator Cabinet



The refrigerator is run by electricity from the solar array during sunlight hours. It runs from the batteries at night and during the day when there is no sunlight. The electricity stored in the batteries is limited.

a) Loading the solar fridge. The refrigerator should be loaded with ice packs in the morning hours between 9.00 am and 12.00 noon as this the time when there is adequate sunlight to charge the batteries. Avoid loading fresh icepacks in the freezer compartment in the afternoon
At the end of a vaccination session, vaccines together with the icepacks should be returned to the fridge compartment. These icepacks will be put in the freezer compartment the following morning when the frozen ones are removed. This method saves on the limited electricity that is stored in the batteries. Put the right number of icepacks in the freezer compartment at a time.

b) Looking after the solar refrigerator Remember the solar refrigeration system will work well if it is properly maintained. The user should be able to carry out the following outlined tasks.

c) What to do if the refrigerator fails to work

1. If the refrigerator is too cold or warm check on the position of the ON/OFF switch and thermostat setting. Adjust where it is necessary. If both are in the right position but it is not working, remove the vaccines, pack them in a vaccine carrier and send them to the nearest Unit with a working fridge and call for the DCCA.
2. Battery charge indicator: If the RED light for overcharge is ON, report to the DCCA immediately. If the RED light indicating NO power to compressor is ON, switch OFF the refrigerator and call for the DCCA.

4.4 Periodic Maintenance of the vaccine storage refrigerators

Regular maintenance is essential to keep the refrigerator working efficiently and avoiding any unnecessary accidents like fire breaking out in case of gas leakage.

4.4.1 Daily maintenance

- If operating on gas, make sure the burner flame is blue.
- If operating on electricity, check with a bulb to ensure that there is electricity by checking twice a day
- If on solar, check on the indicator lights to make sure the refrigerator is working well
- Never put the thermostat setting at maximum setting because it will drain the batteries. When the thermostat is put at maximum setting, the temperatures can go below +2^{o}C and may cause freezing of TT and DPT containing vaccines.
- Make sure there is a standby cylinder for a gas operated fridge implying that an empty cylinder is sent for refilling immediately.

4.4.2 Weekly maintenance

- Check to see if ice has formed on the evaporator and defrost when it is about 5mm thick.
- Check that the refrigerator is level
- Check the vaccine stock and expiry dates.

4.4.3 Monthly maintenance

- Check the cooling unit. If it is not clean inform the County CCA who will use a soft brush to clean off the dirt/dust.
- Clean the inside of the fridge and outside with a dump cloth using mild soap and clean water
- Clean the rubber seal on the edges of the door/lid
- Check if the door/lid is closing tightly, as it should

4.4.4 Defrosting

Defrosting is the method used to remove ice formed on the evaporator (the coldest part of the fridge). Frost will gradually form on the evaporator fins in the freezer compartment. As excessive frost accumulation may reduce cooling efficiency, the refrigerator should be defrosted at regular intervals. For a fridge, which is in good condition and is properly handled, defrosting can be done once a month!

In areas where both the outside air temperature and humidity are high and there is frequent opening of the refrigerator it can be expected that frost build up will be faster. It may be necessary, therefore, to defrost more frequently. It is one of the tasks, which should be done regularly by the user in maintaining the recommended vaccine storage temperature at all levels.

a) When is defrosting done?

It is done when thickness of about 5mm of ice forms on the evaporator.

b) What are the effects of not defrosting?

- Vials loose labels
- failure temperature raises
- fridge compartment becomes wet
- vaccine of proper icepack freezing
- fridge consumes a lot of gas and electricity
- it reduces space

c) Preparations for defrosting

- Have a vaccine carrier (s) or cold box which should be clean without cracks.
- Make sure the vaccine quantity in the fridge fits in the available vaccine carrier(s) /cold box.
- Condition the icepacks i.e. frozen icepacks should be taken out of the freezer compartment for some time.
- Plan to defrost on a day not scheduled for immunisation session.
- Defrosting should be done early in the morning
- There should be a thermometer(s) to put in the vaccine carrier/cold box during packing.

d) Defrosting procedure

Step 1: First read and record the temperature in the refrigerator.

Step 2: Line the inside of the vaccine carrier or cold box with conditioned icepacks to prevent DPT-HepB and TT vaccine from freezing.

Step 3: Pack the vaccines in polythene bags and place them in the vaccine carrier or cold box in order of their sensitivity. Step 4: Put a thermometer in the vaccine carrier/cold box.

Step 5: Put the sponge for the vaccine carrier, then place the cover and close. For a cold box, close the lid.

Step 6: Place the vaccine carrier/cold box in a safe place where it will not be opened unnecessarily.

Step 7: If it is a gas fridge, disconnect the gas regulator from the gas cylinder; for electric fridge switch off from the socket and remove the plug, for a solar fridge (BP) press the defrost button only once, for a solar fridge RCW42 DC put the ON/OFF switch to OFF position.

Step 8: Keep the lid/door of the fridge open until all the ice has melted.

Step 9: Clean the fridge and dry with a clean towel/cloth.

Step 10: Use a mild soap to clean the inside and the fridge cabinet. The lid gasket should be cleaned and rubbed with talcum powder.

Step 11: Put a thermometer inside the fridge, close the lid/door and start it.

Step12: Monitor the temperature until the fridge attains $+2^{o}C$ to $+8^{o}C$

Step13: When the temperature in the fridge is between $+2^{o}C$ to $+8^{o}C$, open the vaccine carrier and return the vaccines to the fridge, packing in order of their sensitivity.

Step 14: Return the icepacks in the carrier to the freezer compartment.

Step 15: Close the door/lid of the fridge.

Step 16: Record on the temperature chart on the column for action taken" defrosting".

Step 17: Put the vaccine carrier(s) in the proper place to dry.

If you need to defrost your refrigerator more than once a month**,** it could be because:

- You may be opening it too often (more than three times daily), or
- The door may not be closing properly or
- The door seal (gasket) may be broken and needs replacement.

If the refrigerator will be out of use for a longer time, clean inside and outside and leave the lid open to prevent unpleasant odours to be formed inside.

Key messages on managing a vaccine refrigerator

- Check and record temperatures of the fridge in the morning and in the evening using an inside thermometer. This should include weekends and public holidays.
- Check to make sure there is electricity for electric fridge. Check to make sure there is gas and the flame is on for a gas fridge. Check the indicator lights on the wall or on fridge for a solar system.
- Check that you have enough gas before breaking off for weekend or for a holiday for a gas fridge. Always have a standby cylinder of gas at the static unit.
- Defrost your refrigerator regularly. Thick ice does NOT keep a refrigerator cool but makes it work harder and use more power or fuel. The evaporator should always be wiped clean.
- Never keep vaccines in the door shelves of the fridge.
- Your refrigerator should be located out of direct sunshine, out of wind (drought) and should not be in a congested room.
- Make sure your fridge is levelled (very important for gas fridges).
- There should be one person in each health centre who has the main responsibility for the refrigerator. However, all health workers in a health centre should know how to monitor the cold chain and what action to take if the temperature is too high or too low (Above $+8^0$C and below $+2^0$C).
- Vaccines, diluents and ice packs should be stored in GOSS/EPI refrigerators. GOSS/EPI vaccine refrigerators should exclusively be used only for EPI vaccines.

4.5 How to monitor and adjust the temperature

4.5.1 Monitoring the temperature in vaccine refrigerators

To monitor the temperature of the main section of a refrigerator you need:

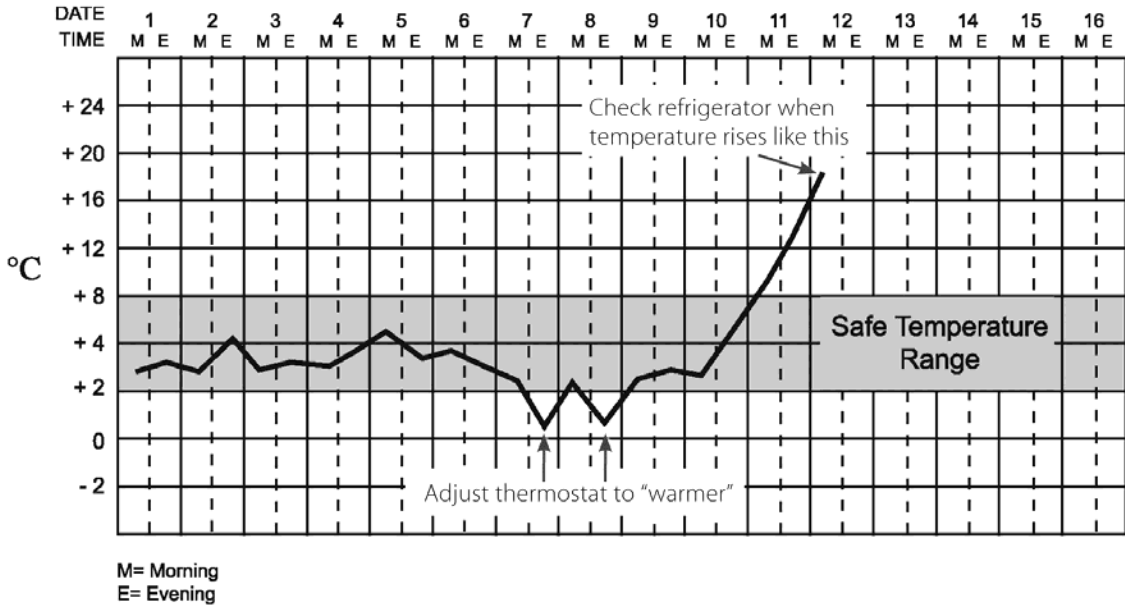
- A thermometer;
- A temperature chart, which should be fixed to the outside of the fridge.

Read the temperature on the thermometer in the main section every morning and afternoon, including weekends and public holidays. Record the temperature on a temperature chart shown in figure 4.8 below. If the temperature is between +2ºC to +8ºC, do not adjust the thermostat.

When a chart has been completed, replace it with a new one. Keep the completed charts in a record book for future reference. **Action should be taken when the temperature goes out of range.**

If the temperature is above or below the safe range, adjust it as elaborated below.

Figure 4.8: Refrigerator temperature Recording chart



4.5.2 How to adjust the temperature of vaccine refrigerators

If the temperature is above +8^{o}C, proceed as follows;

- ❖ Make sure that the refrigerator is working; check the power (Kerosene, Gas or electricity).
- ❖ Check whether the door of the refrigerator closes properly. The seal may be broken.
- ❖ Check whether frost is preventing cold air in the freezing compartment from entering the refrigerator compartment. Defrost if necessary.
- ❖ If the refrigerator is working, turn the thermostat knob so that the arrow points to a higher number. This will make the refrigerator cooler.
- ❖ If the refrigerator is not working, store vaccines in vaccine carrier and arrange transfer to the nearest health facility with a working refrigerator.

If the temperature is below +2^{0}C, proceed as follows;

- ❖ Turn the thermostat knob so that the arrow points to a LOWER number. This will make the refrigerator warmer.
- ❖ Check the freeze sensitive vaccines (DTP, DT, Td, TT, HepB, DTP-HepB, liquid Hib and DTP-HepB+Hib vaccines) for freezing by using the shake test as described under vaccine management

Warning:

- ❖ Do **not** adjust thermostat to a higher (cooler) setting after a power cut. This could freeze the vaccines.
- ❖ Do **not** adjust thermostat to a higher setting when vaccines arrive. This could freeze the vaccines.

4.5.3 What to do when a vaccine refrigerator is out of order

If your vaccine refrigerator stops working, first protect the vaccines and then repair the refrigerator.

Protecting the vaccines

Move the vaccines to another place until the refrigerator is repaired. If you think that the problem will last only a short time, you may use a cold box or vaccine carrier lined with conditioned ice-packs for temporary storage. For a longer duration, use another refrigerator. Always keep a freezer indicator with the freeze-sensitive vaccines to monitor eventual freezing.

Restoring the refrigerator to working order

Check the power, gas or kerosene supply. If there is no power, make other arrangements (e.g. store the vaccine in a household refrigerator) until power is restored. If there is no gas or kerosene, get it as soon as possible.

If a lack of power, gas or kerosene is not the problem, repair the refrigerator or report to your repair technician or supervisor.

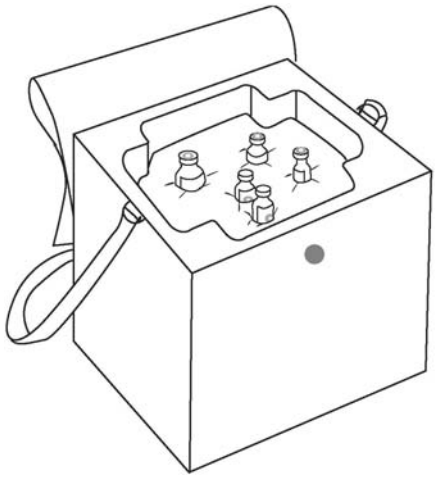
Record the breakdown on the daily temperature recording chart.

4.5.4 Maintaining the correct temperature in cold boxes and vaccine carriers

The temperature in vaccine carriers and cold boxes cannot be adjusted but you can maintain the temperature below $+8^{0}$C if you keep heat out as follows:

- Keep the lid tightly on the vaccine carrier in transit;
- During immunisation sessions, keep opened vials in the sponge of the vaccine carrier (Figure 4.9). The sponge keeps vaccines inside the carrier cool while providing a place to hold and protect vaccine vials in use;

Figure 4.9: Illustration of how to use the sponge during immunization session



- Do not put open vials back inside the carrier after each use: if you keep lifting up the sponge, inside of the carrier will become warm;
- Keep cold boxes and vaccine carriers in the shade. Do not leave a cold box or vaccine carrier in a vehicle that is packed in the sun. Take it out of the vehicle and put it in the shade;

- ❖ Exposure to too much heat such as sunlight and mechanical damage by dropping can cause cracks in the walls and lids of cold boxes. If this happens, the vaccines inside will be exposed to heat. Therefore don't expose this equipment to sunlight or ill treatment.
- ❖ Use the thermometer to check whether temperature in the vaccine carrier is between +2^{o}C and +8^{o}C.

If the ice-packs inside the cold box or vaccine carrier have completely melted:

- ➢ Discard all reconstituted vials.
- ➢ Check VVMs status (see Vaccine Management module) and return the vaccines that can be used to a working refrigerator as soon as possible.
- ➢ If there is no VVM and the vaccine has only been exposed to warm temperatures for a few hours, return the vials to the refrigerator, place them in the "use first" box, and use them before other vials.

Remember

In order to maintain the temperature in cold boxes and vaccine carriers:

- ❖ Place the adequate number of conditioned ice packs in the cold box or vaccine carrier.
- ❖ Keep the cold box or vaccine carrier in the shade.
- ❖ Keep the lid tightly closed.
- ❖ Use the foam pad to hold vials during immunization sessions.

Use Sponges to cover opened vaccine carriers while hold the mixed vials

- ❖ Icepacks placed on shallow trays are no longer recommended for holding vaccine and diluent during an immunisation session. Use the sponge in the vaccine carrier.
- ❖ Always ensure that sponges are kept clean.

4.5.5 Maintaining cold boxes and vaccine carriers

Vaccine carriers and cold boxes must be well dried after their use. If they are left wet with their lids closed, they will become mouldy. Mould may affect the seal of the cold boxes and vaccine carriers. If possible, store cold boxes and vaccine carriers with the lid open, when not being used.

Knocks and sunlight can cause cracks in the walls and lids of cold boxes and vaccine carriers. If this happens the vaccines inside will be exposed to heat.

If a cold box or vaccine carrier wall has a small crack you may be able to repair it with adhesive tape until you can get an undamaged one.

4.5.6 Preparing and freezing of icepacks

The proper freezing and use of ice-packs is essential for good quality of the vaccines. Secondly, always make sure that the ice-packs you have correspond (in sizes and number) to the cold boxes and carriers you are using.

To freeze an ice-pack:

- Fill with water leaving a little air space at the top, and put the cap on tightly.
- Hold each ice-pack upside down and squeeze it to make sure it does not leak.
- Put the ice-packs upright or on their sides in the freezer so that the surface of each ice- pack is touching the evaporator plate, and close the door.
- Gas refrigerators or ice-lined refrigerators with a freezing compartment can freeze up to six large or 12 small ice packs per day. More packs will take longer to freeze.
- Leave ice-packs in the freezer for at least 24-48 hours or until when they are solid hard before using them.
- After the session put the ice-packs back in the freezer.
- Check for any leakages and replace any icepacks, which are leaking.
- Keep the icepacks out of sunlight because they will crack.

Keep extra unfrozen ice-packs that do not fit in the freezer on the bottom part of the main refrigerator compartment to keep this section cold in case of a power failure. When you put these ice-packs into the freezer they will freeze relatively quickly because the water inside already is cold. However, do not store already frozen ice-packs in the refrigerator compartment as this will increase the risk of freezing the freeze sensitive vaccines.

Remember

Every Health facility should have a minimum of 8 standard icepacks:

- A set of 4 in the process of being frozen
- The others in use in a vaccine carrier

A health facility with bigger storage capacity should have more than 8 icepacks

UNIT 5: MANAGEMENT OF VACCINES, DILUENTS AND OTHER EPI LOGISTICS

5.1 About this Unit

Vaccine management includes forecasting/estimation, stock control, handling and monitoring utilization of the vaccines, diluents and related injection safety materials.

The aim of this section is to update managers and operational health workers with the concepts and techniques of vaccine management.

Learning objectives

After studying this unit, you should be able to:

1) Discuss forecasting, ordering, receiving, storage, issuing and distribution of EPI vaccines and other logistics.
2) Describe vaccine-monitoring tools.

Performance objectives

After studying this unit, you should be able to perform the following:

a) Forecast/estimate vaccine and other EPI logistics
b) Order, receive, store, issue and distribute vaccine and other EPI logistics.
c) Monitor vaccine utilization and wastage.
d) Use the vaccine temperature monitoring tools appropriately.

5.2 Estimation of vaccine requirement

Estimation of vaccine requirements is based on three basic methods which include:

a) Target population
b) Previous vaccine consumption
c) Planned immunisation sessions

5.2.1 Estimation of vaccines using the target population

In Southern Sudan, vaccine estimation for the whole country, States and counties is based on target population when forecasting the annual vaccine requirements at the national level. This method is also used for estimating vaccine requirements for Supplemental Immunisation Activities (SIAs) at all levels. The following information is used:

Target population	-	Tp (number)
Targeted coverage	-	Tcov (%)
Number of doses in the schedule	-	Dos (number)
Vaccine wastage rate	-	WR (%)
Wastage factor	-	WF (number)

To calculate the vaccine required for a given target population, you have to set target coverage, consider the wastage factor and doses in the immunisation schedule and use the formula below:

A		B		C		D		E
Annual Target population	X	Doses in the immunisation schedule	X	Targeted Coverage (%)	X	Wastage factor (number)	=	Total doses/ year

S

The required information is obtained as follows;

A) **Target population**

The target population is obtained by multiplying the total population by a nationally standardized proportion. The GoSS/MOH/EPI target population for routine immunization consists of women of childbearing age (15 – 45 years) and children aged 0-11 months. Different age groups are targeted for SIAs as explained in the table 5.1 below.

Table 5.1: Example for calculating the EPI target populations (total population: 500,000)

Target population	% of total population	Number of people		
Birth Cohort	4.4%	4.4/100 x 500,000	=	22,000
Children from 0 to 11 months	4.0%	4.0/100 x 500,000	=	20,000
Children from 0 to 59 months (Polio SIAS)	21%	21/100 x 500,000	=	105,000
Children from 6 months to 59 months (measles SIAs)	19%	19/100 x 500,000	=	95,000
Pregnant women	4.8%	4.8/100 x 500,000	=	24,000
Non pregnant women WCBA	20.2%	18/100 x 500,000	=	101,000
All Women of child bearing age (15 – 45 years)	25%	25/100 x 500,000	=	125,000

B) **Doses in the immunisation schedule**

The immunisation schedule gives the age limits and the number of doses required for the full immunisation of each eligible child and woman for each given antigen. Refer to unit 3 for the National Immunisation schedule.

C) **Targeted coverage**

The targeted annual coverage for each antigen depends on the immunisation action plan/micro-plan at County level. These plans determine the percentage of each group of the target populations to be immunized. The following table is an example of targeted immunisation coverage by antigen and applied strategy.

Table 5.2: Example for calculating the size of the population to be immunized according to the coverage objectives (total population: 500,000)

Vaccine	Target age group	Target population	Immunisation coverage (%)	Strategy	To be immunized
BCG	0 – 11 months	20,000	90	Routine	90/100 x 20,000 = 18,000
Polio	0 - 11 months	20,000	90	Routine	90/100 x 20,000 = 18,000
Polio	0 - 59 months	105,000	100	SIAs	100/100 x 105,000 = 105,000
DPT	0 - 11 months	20,000	80	Routine	80/100 x 20,000 = 16,000
Measles	0 - 11 months	20,000	80	Routine	80/100 x 20,000 = 16,000
Measles	6 - 59 months	95,000	100	SIAs	100/100 x 95,000 = 95,000
TT (WCBA)	15 – 44 Yrs	125,000	25	Routine/ campaigns	25/100 x 125,000 = 31,250

D) Vaccine wastage rate and wastage factor

When immunizations are carried out, the number of vaccine doses used is generally higher than the number of children and women immunized. The number of doses in excess constitutes “lost doses” or vaccine wastage. Vaccine wastage should be taken into account in the estimation of vaccine needs. Knowing the wastage rates helps to determine the wastage factor, which is one of the parameters used to estimate vaccine needs.

There are no standard vaccine wastage rates. Each level can calculate its wastage rates for each antigen based on the following parameters.

A = Initial stock
B = Received stock
C = Issued out to other facilities
D = End of period stock
E = Children vaccinated

a) Vaccine wastage rate $= \frac{\{(A + B) – (C + D)\} - E}{(A + B) – (C + D)} \times 100$

b) Wastage factor: $= \frac{100}{(100 - \text{wastage rate})}$

Example:

If the watage rate of a particular vaccine is = 30%

Then Wastage factor = 100/(100-30) = 100/70 = 1.43

Table 5.3: Wastage factor corresponding to the wastage rates

Wastage rate (%)	5	10	15	20	25	30	35	40	45	50
Wastage factor	1.05	1.11	1.18	1.25	1.33	1.43	1.54	1.67	1.83	2.00

Table 5.4: Example for calculating the annual needs of OPV vaccines for a given target population

Children (0-11 months)		Doses in schedule		Targeted coverage		Wastage factor		Vaccine needs
10,000	x	4	x	90%	x	1.33	=	47,880

5.2.2 Estimation of vaccines using previous vaccine consumption

This method may be used at the State, County and health facility levels when ordering for vaccines for the next supply period. The health worker should know how much vaccines were used in the last month for each vaccine and the current physical stock, the target population to be served in the period of time the vaccines will be used. The amount needed is calculated and filled on the requisition form. To be able to order vaccines required for the unit, the following should be used;

a. Get previous stock = a
b. Count the present physical stock = b
c. Subtract present stock from previous stock (a-b) = (Total doses used)
d. 50% of the usage (c x 0.5) = d reserve
e. Usage plus reserve (c + d) = maximum vaccine stock requirement.
f. Subtraction of present stock from the maximum requirement will give you the required amount of vaccines to order for the next supply period (e – b) = Amount of vaccine to order.

The above can be summarised as follows;

Amount of vaccines to order = Total doses used + reserve stock – physical stock balance

$$= \{ (a-b) + d \} - b$$

In Southern Sudan the Counties and health facilities are expected to keep a maximum stock of six weeks including a reserve of 50%.

Remember

- ❖ Always avoid stocking vaccine for periods longer than six weeks at the health unit level. In the event of having excess vaccines after 6 weeks, use this first before using new stock depending on First in First out (FIFO) or First Expiry First out (FEFO) or Vaccine Vial Monitor (VVM) status.
- ❖ It is better to have more vaccines at a session than not having enough. This calls for monitoring the session sizes so as to have adequate stock for six weeks.

5.2.3 Using Planned Immunisation sessions

This method is used for estimating vaccines for immunization sessions at static sites and outreaches. However, it can also be used to estimate total monthly and quarterly vaccine needs.

First, we determine the number of doses (vials) required for each planned session. The basic principle is to carry a number of vials adequate to cover all expected contacts plus a reserve of 1 vial just in case there was an accident or error in the reconstitution process at the start of the session

Table 5.5: Estimation of Vials needed by each planned immunization session

	Static sessions		**Outreach sessions**	
Antigen/ dose	Expected Contacts	# vials required	Expected Contacts	# vials required
BCG	10	2 (1 + 1 reserve)	5	2 (1 + 1 reserve)
DPT (1, 2 and 3)	30	4 (3 + 1 reserve)	15	3 (2 + 1 reserve)
Measles	10	2 (1 + 1 reserve)	5	2 (1 + 1 reserve)
TT (1 and 2)	20	3 (2 + 1 reserve)	10	3 (2 + 1 reserve)
Total Contacts	**70**		**35**	
OPV (same time as DPT)	30	2 ((1 + 1 reserve)	15	2 (1 + 1 reserve)

To calculate the vaccine vials required in a month, multiply the number of required vials by the planned immunization sessions in accordance with your EPI micro-plan. The product should be the expected vaccine vials required to run all planned sessions.

Table 5.6: Examples of Vaccine estimation
a) For a Hospital running Daily Static Sessions

Antigen/ dose	Expected Contacts	# vials required	# of Session/Month	# vials required
BCG	10	2	20	40
DPT (1, 2 and 3)	30	4	20	80
Measles	10	2	20	40
TT (1 and 2)	20	3	20	60
OPV (same time as DPT)	30	2	20	40

b) For a health facility running 5 EPI clinics every week

	Requirements per Session		Estimation of Monthly needs	
Antigen/ dose	Expected Contacts	# vials required	Monthly Planned Sessions (5 sessions x 4 weeks)	# vials required per Month (Sessions X # per @)
BCG Vaccine	10	2 (1 + 1 reserve)	20	40
BCG Diluents	10	2 (1 + 1 reserve)	20	40
DPT (1, 2 and 3)	30	4 (3 + 1 reserve)	20	80
Measles Vaccine	10	2 (1 + 1 reserve)	20	40
Measles Diluents	10	2 (1 + 1 reserve)	20	40
TT (1 and 2)	20	3 (2 + 1 reserve)	20	60
Total Contacts	**70**			
OPV (same time as DPT)	30	2 ((1 + 1 reserve)	20	40

c) For a health facility running 4 EPI clinics every week

	Requirements per Session		Estimation of Monthly needs	
Antigen/ dose	Expected Contacts	# vials required	Monthly Planned Sessions (4 sessions x 4 weeks)	# vials required per Month (Sessions X # per @)
BCG Vaccine	10	2 (1 + 1 reserve)	16	32
BCG Diluents	10	2 (1 + 1 reserve)	16	32
DPT (1, 2 and 3)	30	4 (3 + 1 reserve)	16	64
Measles Vaccine	10	2 (1 + 1 reserve)	16	32
Measles Diluents	10	2 (1 + 1 reserve)	16	32
TT (1 and 2)	20	3 (2 + 1 reserve)	16	48
Total Contacts	**70**			
OPV (same time as DPT)	30	2 ((1 + 1 reserve)	16	32

d) For a health facility running 3 EPI clinics every week

	Requirements per Session		Estimation of Monthly needs	
Antigen/ dose	Expected Contacts	# vials required	Monthly Planned Sessions (3 sessions x 4 weeks)	# vials required per Month (Sessions X # per @)
BCG Vaccine	10	2 (1 + 1 reserve)	12	24
BCG Diluents	10	2 (1 + 1 reserve)	12	24
DPT (1, 2 and 3)	30	4 (3 + 1 reserve)	12	48
Measles Vaccine	10	2 (1 + 1 reserve)	12	24
Measles Diluents	10	2 (1 + 1 reserve)	12	24
TT (1 and 2)	20	3 (2 + 1 reserve)	12	36
Total Contacts	**70**			
OPV (same time as DPT)	30	2 ((1 + 1 reserve)	12	24

5.3 Estimation of injection safety materials

All EPI vaccines with the exception of OPV are administered by injection. Of these vaccines, BCG and measles have to be reconstituted before being administered. The Ministry of Health, WHO and UNICEF recommend that all vaccine orders be bundled with auto-disable syringes (for mixing and administration) and safety boxes.

The term bundling refers to supplying a set of vaccines, auto-disable syringes (for mixing and administration) and safety boxes in corresponding quantities. Bundling does not necessarily mean that the items are actually packaged together in the same container. However, managers at all levels should ensure that health workers get the adequate quantities of vaccines, injection materials and safety boxes. At all levels, the estimation of injection safety materials is made based on the following;

a) The number of children under one year of age and the number of women of childbearing age.

b) The anticipated contacts (the number of children and women) targeted for vaccination

c) The number of doses of each vaccine according to the immunisation schedule per child/woman (e.g., 1 dose of BCG, 3 doses of DPT containing vaccines, 1 dose of Measles and 2 doses of TT).

d) The total number of vials of each freeze dried vaccine (Reconstitution syringes: one per vial of vaccine carried to each session)

e) Safety boxes (1 box for 100 used syringes and needles)

To calculate the required injection materials for a given target population, the same method applied for estimation of vaccines is used plus a 10% expected wastage rate.

Table 5.7: Calculation of AD syringes, and safety boxes

A		B		C		D		E
Target population	X	Doses in the immunisation schedule	X	Wastage factor	X	Coverage rate (%)	=	Total ADs for administration
Total doses for each vaccine	/	Doses in a vaccine vial	X	Wastage factor			=	Total ADs for reconstitution
Total Ads	+	Total mixing syringes			/	100	=	Safety boxes

Table 5.8: Example of calculating the annual needs of ADs for a given target population to receive injectable vaccines e.g. Measles vaccine.

Children 0 – 11 months		Doses in schedule		Immunisation coverage		Wastage factor		Estimated needs
8,000	X	1	X	90%	X	1.11	=	7,992

Assignment

Estimate the requirements for a given target population for the 1st and 2nd year for A-D syringes, reconstitution syringes and safety boxes in your own County for DTP containing vaccine. Use your County data (target population, growth rate, planned coverage rate) and fill in the boxes of the table below.

Use the available data in your County following the example indicated below. Target population -10,000 Growth rate -2.5% Planned coverage -80% Some of the above data are already inserted in the table below. Continue the exercise and fill other empty boxes.

Item		Period	
		1st Year	2nd Year
a) Number of children under one year of age		10,000	
b) Planned coverage (%)		80	
c) Number of children targeted for vaccination (a x b)			
d) Number of doses of each vaccine per child		3	
e) Estimated wastage factor for vaccines		1.11	
f) Number of doses required (c x d x e)			
g) Doses for buffer stock (f x 25%)			
h) Total no. of doses (f + g)			
i) Number of doses per vial		10	
j) Total number of vials (h ÷i)			
k) Number of A-D syringes needed= number of doses +10% wastage			
l) Reconstitution syringes if applicable (j + 10%)			
m) Safety boxes [(k+l) ÷100]			

It is important to ensure that one has adequate space for storing ADS, safety boxes, vaccine carriers, icepacks and other supplies.

5.4 Receiving vaccines and injection safety materials

The health worker should find out how much vaccines are needed, make sure the fridge is clean, be certain of the expiry dates of the available stock and there is adequate energy for the EPI fridge. There should also be clearly identified dry and clean space for safe storage of the injection safety materials.

- When receiving the vaccine, the health worker should:
- Check and ensure the types and amounts of vaccines and diluent are the same as what was ordered or find out why if there is any difference. Clearly articulate when the difference will be corrected
- Check that the expiry date on each vial has not passed. Do not accept the vaccine if the expiry date has passed,
- Put the vaccines in the appropriate refrigerator compartments as quickly as possible.
- Leave the cold box or vaccine carrier open to dry out.
- Enter the source, amount, expiry date and batch number of each vaccine received in the Vaccine and Injection Materials ook if Stock Control cards or Book if provided.

The health worker at a health facility level should not:

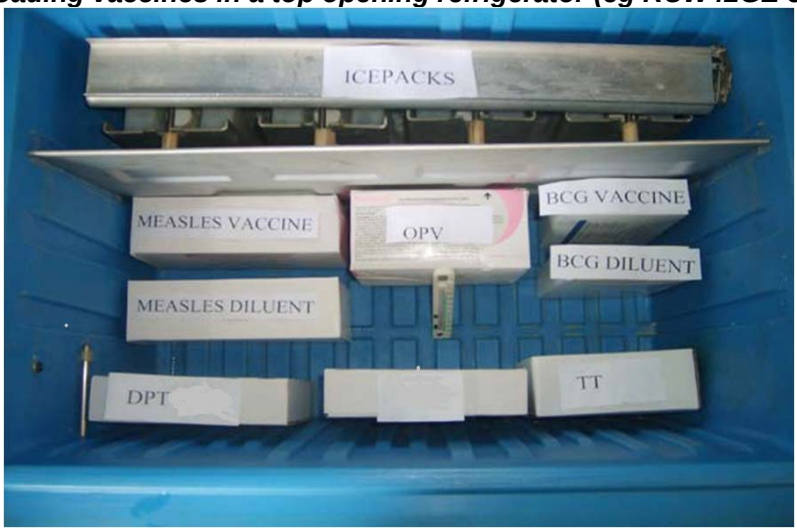
- ❖ Accept to keep vaccines in excess of 6 weeks.
- ❖ Vaccines without matching diluents
- ❖ Receive the vaccines if delivered at a temperature above +8^{o}C.
- ❖ Mix the old stock of vaccine with the new stock.

5.4.1 The order of arranging vaccines on the shelves in the refrigerator.

Identify whether your refrigerator is top door or side door opening. The type of fridge will determine how vaccines are placed (or stored).

Vaccines should be kept on shelves or positions in the refrigerator according to their order of sensitivity.

Figure 5.1: Loading vaccines in a top opening refrigerator (eg RCW42GE or RCW50GE)



When storing vaccines in a top or side opening refrigerator, it is important to follow the rules below:

1. The temperature reading in the fridge to store the vaccine should be reading between +2°C to +8°C.
2. Store vaccines neatly in rows. Leave space of at least 5 cm between rows of vaccines to allow air circulation.
3. Keep returned usable vials that have been taken out of the refrigerator in a special box labeled "returned". Have another small container for partially used vials of OPV, DPT and TT. Use these vials first in the next session.
4. When you receive new vaccines, arrange them in the refrigerator in order so that the old stock is in front and therefore used first or **"FIFO".**
5. Put all vaccines sorted out by types in the fridge, according to their dates of expiry and use vaccines with a first expiry first or **"FEFO"**
6. Check vaccines expiry date and do not use any vaccines, which have expired. Remove the vaccines, which have expired from the refrigerator, record them in the vaccine and injections material control book or vaccine stock cards as wastage and discard them.
7. Store vaccines neatly in the order of their sensitivity where OPV, measles and BCG are packed next to the freezer compartment. DPT (or DPT-Hep B or DPT-HepB+Hib), and TT should be packed on the row furthest from the freezing compartment of the refrigerator as indicated in the figure 5.1 above. Leave space of 5 cm between rows of vaccines to allow air circulation.
8. Store diluents needed for the next planned immunization session next to its corresponding vaccine in the refrigerator, a day before the planned immunization session.
9. Freeze and store frozen ice packs in the freezer compartment.

Note: The fridge in Figure 5.1 has a freezer compartment that holds four ice packs at a time and they freeze approximately in 2 days (48 hours).

Remember

The EPI refrigerator should be exclusively used for EPI vaccines. Food, laboratory specimen and reagents, veterinary drugs, medicines, blood and drinks like water, milk and beer should never be kept in the refrigerator. This will necessitate frequent opening of the refrigerator which will cause temperature raise and spoil vaccine. It can also lead to fatal errors like insulin or ergometrine being mistaken to be a vaccine and given to children.

Figure 5.2: Loading vaccines in a Side Opening Refrigerator (Sibir)

When storing vaccines in a side door or upright refrigerator, it is important to follow the rules below:

1. The temperature reading in the fridge to store the vaccine should be reading between $+2^0$C to $+8^0$C.
2. Store vaccines neatly in rows on refrigerator shelves. Leave space of 5 cm between rows of vaccines to allow air circulation.
3. Keep returned usable vials that have been taken out of the refrigerator in a special box labelled “returned”. Have another small container for partially used vials of OPV DPT and TT. Use these vials first in the next session.
4. When you receive new vaccines, arrange them in the refrigerator in such a way that the old stock is used first or “FIFO”.
5. Put all vaccines sorted out by types in the fridge, according to their dates of expiry and use vaccines with a first expiry first or **“FEFO”.**
6. Check vaccines expiry date and do not use any vaccines, which have expired.

Remove the vaccines, which have expired from the refrigerator, record them in the vaccine and injections material stock control cards (or book) as wastage and discard them.

7. Store polio vaccine on the shelf near or inside the freezer compartment.
8. Store measles and BCG vaccines on the shelf next to the one of Polio vaccine if the refrigerator has shelves.
9. Store DPT (or DPT-HepB or DPT-HepB+Hib), and TT vaccines on the shelf immediately below the shelf containing measles and BCG vaccine.
10. Store diluent next to its corresponding vaccine in the refrigerator, a day before the planned immunization session.
11. Keep ice packs filled with water on the bottom shelf. They help to keep the temperature constant.
12. Freeze and store frozen ice packs in the freezer compartment.

Remember

- ❖ Never store DPT(or DPT-HepB or DPT-HepB+Hib) and TT close to the coldest part of the fridge or else they will freeze.
- ❖ Never keep vaccines on the door or door shelves of the refrigerator.

When preparing to deliver vaccines to a Payam, a health unit or for an outreach/static immunisation session, the health worker should:

- Make sure there are adequate stocks of vaccines, diluents and injection materials based on the expected vaccination contacts.
- Make sure the cold box or vaccine carrier is clean and not cracked.
- Make sure there are frozen icepacks.
- Put the diluent in the fridge the day before use for delivery to the outreach/static immunisation session.
- Estimate vaccines to deliver depending on the supply period for the health unit (usually one month) and estimated session size for outreaches.

5.4.2 How to pack vaccines in a vaccine carrier

- Place 4 conditioned icepacks around the inside walls of the vaccine carrier
- Get polythene bag (white or black), pack polio vaccines as you check expiry date, label and colour of the VVM quickly, and then put them in the bag and place at the bottom of the vaccine carrier.
- Next pack BCG and measles vaccines and their pre-cooled diluent in the same way in the vaccine carrier.
- Place DPT (or DPT-HepB or DPT-HepB+Hib) and TT vaccines that are already in polythene bags and place on top of the BCG and measles vaccines.
- Where possible, place a thermometer in the vaccine carrier.
- Place a sponge on top of the vaccines in the vaccine carrier.
- Close the lid of the vaccine carrier.

5.4.3 Transportation of vaccines

In order to ensure that cold chain safety procedures are maintained all through transportation of EPI vaccines

- ❖ Check and be sure that the cold box/vaccine carrier has an intact rubber seal.
- ❖ Make sure that the cold box/vaccine carrier is securely closed.
- ❖ Ensure availability of reliable transport to deliver the vaccines
- ❖ The supply requisition and issue vouchers or waybill forms should accompany the amount of vaccine to be delivered or issued to the unit.

5.5 Diluents

Freeze dried vaccines are supplied with their respective matched diluent. Diluents vary in their composition even if they are for the same vaccines. Diluents are not sterile water for injection. This is a common misconception. Diluents may contain:

- ➢ Stabilizers that ensure heat stability of vaccines,
- ➢ Agents that kill bacteria (Bactericides) to maintain the sterility of the reconstituted vaccine,
- ➢ Chemicals to assist in dissolving the vaccine into a liquid,
- ➢ Buffers to ensure the correct pH (acid-alkali balance).

In practice, the supply, transportion and storage of diluents should be bundled with the vaccine to ensure that there is no vaccine without diluents or diluents for no vaccine. It is the responsibility of health workers and vaccinators to ensure constant matching of diluents with their vaccines.

Storage of other medical products in the EPI refrigerators can cause tragedies if mistaken for diluents. Tragedies have been reported to occur, related to reconstitution of freeze-dried vaccines with insulin, muscle relaxant and other wrong medicines stored in EPI fridges. Health workers and vaccinators should ensure that no such products are stored in the vaccine refrigerator or cold boxes.

Diluents should be handled with the same care as vaccines, and vaccination staff should be trained to know the proper way to reconstitute each of the vaccines.

Recommendations for diluents

- o Diluents should be stored and distributed together with the matched vaccine vials they will be used to reconstitute.
- o Diluents must NOT be frozen.
- o They must be cooled to below +8°C before reconstitution (to prevent vaccine shock due to sudden change in temperature).
- o Diluents for other types of vaccine or from other manufacturers must NOT be used because they might contain different components. It is a requirement that vaccines always be accompanied by diluents from the same manufacturer.
- o Distilled water for injection should NEVER be used as a substitute for diluent.

5.6 Recording of vaccine and Injection safety materials

In stock management, all operations should be recorded in order to monitor proper vaccine utilization. The recording helps to monitor the movements (receipts and issues) at all storage levels. All EPI vaccine stores should use the Vaccine and Injection Materials Stock Control cards/books to keep detailed records of vaccines and injection materials received and issued out.

Figure 5.3: EPI Vaccine and Injection Material Stock Control Card/ Book

EPI HEALTH UNIT VACCINE CONTROL BOOK/STOCK CONTROL CARD

VACCINE:..... **MONTHS**.....

RECEIVED						ISSUED						
DATE	NAME OF UNIT	STOCK AT HAND	DOSES RECEIVED	BATCH NUMBER	EXPIRY DATE	DOSES ISSUED	BATCH NUMBER	EXPIRY DATE	DOSES USED	DOSES WASTED	DOSES RETURNED	TOTAL BALANCE

5.6.1 Guidelines on filling of the Vaccine and Injection Materials Control Book.

The Vaccine and Injection Material Stock Control Book/Card is a very important information tool. It keeps all the information on vaccines and injection materials which are received and issued out at national, State, County and peripheral health facility storage centres. In order to ensure effective use of the Vaccine and Injection Material Stock Control Book/Card, the health worker/storekeeper/records assistant should follow the guidelines below;

- The Vaccine and Injection Material Stock Control Book/Card should have the name of the storage centre
- Each type of vaccine and injection material is recorded on separate pages of stock control cards.

Information on the vaccine received/issued out is entered immediately in columns on each page as described above (refer to figure 5.3 above)

How to fill the Vaccine and Injection Material Stock Control Book/Card

A. "Received" section

Column 1: ***Date*** - Record the actual date after receiving OR issuing the vaccine and injection materials.

Column 2: ***Name of unit*** - Record the name of the unit where vaccines and injection materials are received from OR being issued/delivered to.

Column 3: ***Stock at hand*** - Record the physical count of the vaccines and injection materials found in the refrigerator/store.

Column 4: ***Doses received*** -Count and record the actual doses/pieces of the new stock of vaccines OR injection materials received.

Column 5: ***Batch Number*** - Read and record the batch number of every vaccine, diluent and injection materials received.

Column 6: Expiry Date – Read from vaccine and diluent (vial or ampoule) and injection materials received. Record the expiry date. If the items received expire on different dates, then record them separately.

At this point, add the physical count of the old stock found in the fridge to the new stock received and record the total amount in the column of balance.

B. "Issued" section

Column 7: ***Doses/pieces issued*** – Record doses/pieces taken out of the fridge/store and issued out for static or outreach immunisation session.

Column 8: ***Batch Number*** - Read and record the batch number of every vaccine, diluent and injection materials taken out of the fridge/store for immunisation sessions or issued to another health facility.

Column 9: ***Expiry Date*** -Read and record the expiry date of every vaccine and diluent vial and injection materials taken out of the fridge/store for immunisation sessions or issued to another health facility.

Column 10: ***Doses used*** - Using the tally sheet for every immunisation session, count the number of children/ women immunised and this will give you total number of doses used which should be recorded at the end of the session.

Column 11: ***Doses wasted*** - Total doses in opened vials minus total number of the vaccinated children and women equals doses wasted.

Column 12: ***Doses returned*** - Total doses in vials received per vaccine minus total (doses used and doses wasted) at the end of the session gives total doses to be returned in the refrigerator (in complete vials). However, when the immunisation session is conducted at the static unit, doses returned include the partially used vials of OPV and TT. Refer to

Multi-Dose Vial Policy (MDVP) discussed in section 5.8.1.

For example Measles vaccine:

Doses received = 50
Doses used = 35
Doses wasted = 5
Doses returned = 50 – (35 + 5) = 10 doses (1 vial)

Column 13: ***Balance*** - Enter the physical count of the returned doses of vaccine/pieces of injection materials immediately on arrival at the health facility and balance the stock.

Column 14: Remarks – In this column, you may write comments on the condition of the vaccines received, issued or discarded e.g.VVM in stage two,lack of diluent,broken vials,vaccine vials without label, transfer of vaccines due to cold chain failure.

Remember

- Record vaccines and injection materials received as soon as they are put in the refridgerator/store.
- At the time of issuing for the static or out reach sessions, record the amount issued without waiting for the teams to come back.
- Balance the vaccine control book every time you receive or issue vaccines and injection materials and on returning from the out reach or static session.
- Record the balance of doses of the open vials of OPV and TT used at the static session using the tally sheet(s).
- Match diluents with the vaccines (BCG & measles) from the same manufacturer and should be in equal numbers well indicated in the Vaccine and Injection Materials Control Book.

5.7 Cold chain and vaccine monitoring tools in health units:

The purpose of cold chain and vaccine monitoring tools is to keep track of the temperature to which vaccines and diluents are exposed during transportation and storage. The following tools are used for monitoring cold chain system: thermometers, temperature monitoring charts, VVM and freeze tag.

5.7.1 Storage temperatures of the vaccines

All vaccines are heat sensitive and need to be stored in cold conditions. Some of them (e.g. BCG, measles, OPV) can be kept in freezers, as freezing does not harm them. Liquid vaccines containing adjuvants such as aluminium salts (e.g.DPT, DPT-HeB or DPT-HepB+Hib, TT) must not be frozen.The injection of a vaccine, which has been previously frozen,may result in reactions and reduced immune response. The recommended vaccine storage temperatures are as shown in the table below.

Table 5.9: Recommended temperatures and duration of storage of EPI vaccines

<table>
<tr><th rowspan="2">Vaccine</th><th colspan="4">Level and duration of storage</th></tr>
<tr><th>Central store up to 8 months</th><th>State Vaccine Store Up to 3 Months</th><th>County Vaccine Store Up to 6 weeks</th><th>Health unit store up to 6 weeks</th></tr>
<tr><td>OPV & Measles</td><td>15^0C to -20^0C</td><td>15^0C to -20^0C</td><td>$+2^0$C to $+8^0$C</td><td rowspan="2">All vaccines at $+2^0$C to $+8^0$C</td></tr>
<tr><td>BCG, DPT (or DPT combinations) and TT</td><td colspan="3">$+2^0$C to $+8^0$C</td></tr>
</table>

Note: In Southern Sudan the vaccine storage time at the County and health unit level is 6 weeks.

5.7.2 Temperature monitoring charts

Temperature monitoring charts are used to record the fridge temperatures that are taken daily by the health workers. Health workers should keep one thermometer inside the fridge to monitor the temperatures. The thermometer should be placed in the middle compartment for optimal temperature recording. In case of a Sibir fridge, the freezing compartment with OPV and measles should have its own thermometer and temperature recorded separately from the fridge compartment.

When the fridge is functioning and in use, read the temperature using the inside thermometer every day including weekends and public holidays and record it on the temperature chart shown in Figure 5.5. The ideal time for temperature reading and recording is 8 am and 5 pm.

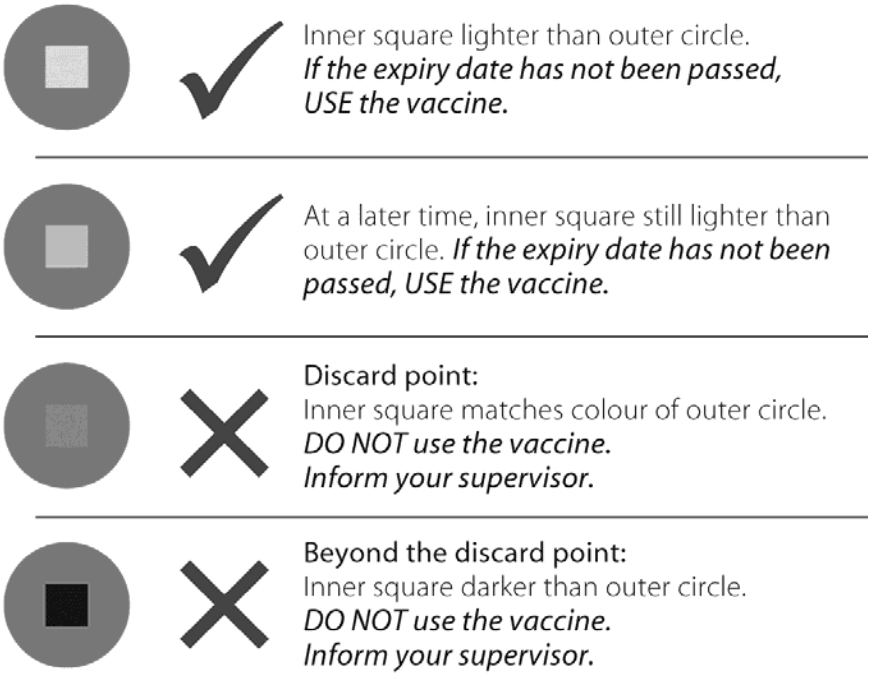
Note: Always remember to make comments on any action taken e.g. defrosting, change of gas cylinder, receiving vaccines etc.

Figure 5.10: EPI temperature monitoring Chart for Southern Sudan

5.7.3 Vaccine vial monitor

A Vaccine Vial Monitor (VVM) is a label on a vaccine vial which is made of heat sensitive material that changes colour when exposed to heat over a period of time (see figure 5.11). Health workers/ Vaccinators should check the VVM colour before they use a vial to see whether the vaccine has been damaged by heat. The VVM provides guidance on the use of each individual vial of vaccine.

Figure 5.11: How to read a vaccine vial monitor (VVM)



The point to focus on is the colour of the inner square relative to the colour of the outer circle.

Rule 1: If the inner square is lighter than the outer circle, the vaccine should be used.

Rule 2: If the inner square is the same colour as, or darker than, the outer circle, the vaccine should be discarded.

Commonly asked questions about the VVM

Qn: Does the VVM immediately change colour when it is exposed to temperature above $+8^{o}C$?

Ans: No, The VVM reflects the heat stability of the vaccine to which it is attached and does not, therefore, undergo an immediate colour change with a brief exposure to moderate heat.

Vaccines have a level of heat stability, which enables them to withstand temperatures above $+8^{o}C$, outside the cold chain, for a limited amount of time. The rate at which the VVM changes colour reflects the rate at which the potency of the vaccine changes with heat exposure.

Qn: If the vaccine is left at room temperature, how long will it take the VVM to change from "start point" to "discard point?"

Ans: This depends on the vaccine type, room temperature and can vary greatly, according to the place, season and time of the day.

Qn: If the vaccine is returned to a refrigerator after being outside the cold chain, will the colour change reverse?

Ans: No. The VVM colour change is irreversible as, indeed, is the damage to the vaccine. The VMM indicates the total, accumulated heat exposure, which the vaccine has been subjected to.

Qn: If the vaccine inside the refrigerator freezes, will the VVM register any change?

Ans: No, The VVM is not affected by freezing temperatures so it cannot give any information about freezing.

Qn: How does the VVM cope with variations in heat tolerance between different types of vaccine?

Ans: VVMs are manufactured in specific batches for each type of vaccine. Each monitor is designed to mimic the exact sensitivity of the vaccine to which it is attached.

Qn: What testing and quality control procedures are used to ensure that the VVM will perform correctly?

Ans: Each batch of VVMs is tested twice to ensure that the monitors will change colour correctly in response to heat exposure. The first test is conducted at the factory before shipment and the second by the vaccine manufacturer before dispatch.

Qn: Why should a VVM be used?

Ans: The VVM enables the health worker to know whether vaccine has been damaged by heat and reduce wastage.

Remember

- VVMs do not measure exposure to freezing temperatures (for freeze-sensitive vaccines).
- A VVM not at discard point does not exclude the possibility that the vaccine was frozen. Before use, make sure that the freeze-sensitive vaccine with good VVM has not been frozen.
- In case of cold chain failure, use the VVM status to decide whether to use or discard the vaccines.
- Never use vaccine whose VVM status has reached discard point.

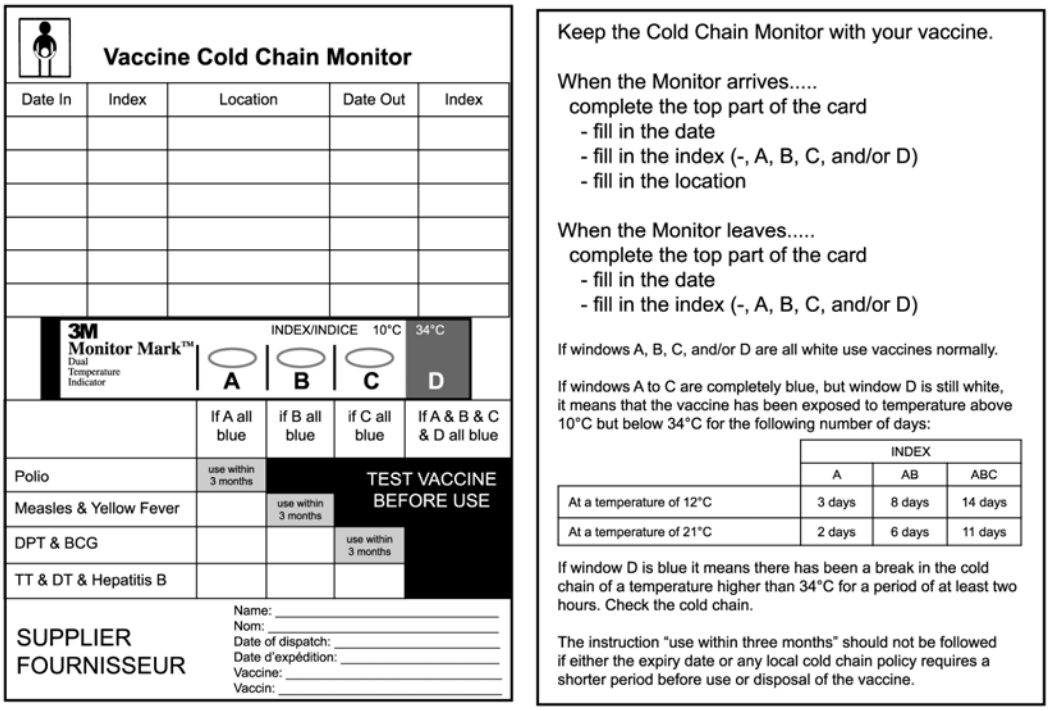
5.7.4 Vaccine Cold Chain Monitoring Card

A vaccine cold chain monitor is a card (different colour background cards exist for different language versions) with an indicator strip that changes colour when vaccines are exposed to temperatures that are too high. The vaccine cold chain card is used to estimate the length of time that vaccine has been exposed to high temperatures.

Manufacturers pack these monitors with vaccines supplied by WHO and UNICEF.

Usually the cold chain monitor is only used for large shipments of vaccine. The same card should remain at all times with the same batch of vaccine. The change in color is cumulative and relates to heat exposure over the whole life of the shipment and not to a specific point in the cold chain.

Figure 5.12: Vaccine cold chain monitor card



5.7.5 Freeze indicators

a) Freeze Watch

A freeze indicator is an irreversible temperature indicator which shows if a product, such as vaccine, has been exposed to freezing temperatures in blue. It consists of a white backing card and a small vial of coloured liquid, all contained in a plastic casing. If the freeze indicator (Freeze Watch^{TM}) is exposed to temperatures below 0ºC for more than one hour, the vial bursts and releases the coloured liquid, staining the white backing card.

The freeze indicator is used to warn of freezing and is packed with vaccines that are sensitive to freezing temperatures: DTP (or DPT containing combinations) and TT.

Every refrigerator storing vaccines should have a freeze indicator (Freeze Watch^{TM}). It is strongly recommended that one freeze indicator be placed in each cold box during vaccine transport and distribution. This is critical in places subject to low temperatures.

Keep the freeze indicator with freeze-sensitive vaccines in the refrigerator. In an upright (front-opening) refrigerator, keep it on the middle shelf, where the freeze-sensitive vaccines and diluents are kept. In a top-opening refrigerator, affix it to the basket in the middle of the refrigerator — **not to** the side wall, where freezing can occur.

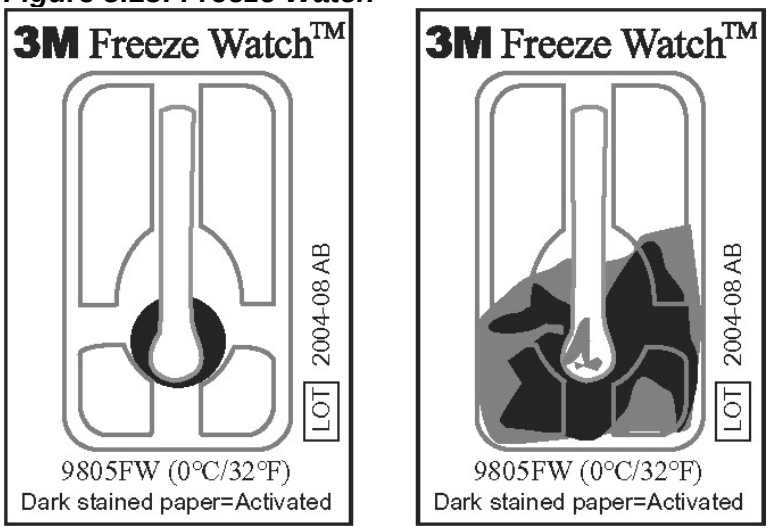
Follow the steps below to read the freeze indicator:

If the indicator paper is stained, your vaccines have been exposed to freezing temperatures.

If the indicator paper shows no colour, remove the indicator from the refrigerator. Shake or tap the edge of the indicator three times on a hard surface. If the paper becomes stained, your vaccines have been exposed to freezing temperatures. If tapping does not cause colour staining in the indicator, put it back into the refrigerator.

1. If the freeze indicator is activated — showing a stain on white background paper — you should perform the shake test on all of the freeze-sensitive vaccines in the refrigerator to determine which ones should be discarded

Figure 5.13: Freeze Watch™



Not activated
Vaccines OK

Activated
Do the shake test for freeze-sensitive vaccines

b) Freeze-tag

Some programmes are using another type of freeze indicator called the Freeze-tag[tm]. It consists of an electronic temperature measuring circuit with associated LCD-display. If the indicator is exposed to a temperature below 0°C for more than 60 minutes the display will change from the “good” status into the “alarm” status as indicated on the picture below. The indicator is used to warn of freezing and is packed with DTP, DPT-HepB, DPT-HepB+Hib, TT and DT vaccines as well as with hepatitis B. Shelf life is 5 years.

Figure 5.14: Illustration of the Freeze-Tag™

Vaccines OK

Do shake test

5.7.6 The shake test

Shake test is a method of testing suspected freezing of DPT (or DPT containing) and TT vaccine vials. After freezing, the vaccine no longer has the appearance of a homogenous cloudy liquid, but tends to form flakes which settle at the bottom of the vial after shaking. **Sedimentation is faster in a vial which has been frozen than in a vial, from the same manufacturer, which has not been frozen.**

The test should be conducted for all vaccines suspected to have been frozen or where temperature recordings show negative temperatures.

Shake Test Procedure

Step 1: ***Prepare a frozen control sample:***

Take a vial of vaccine of the same type, batch number and manufacturer as the vaccine you want to test. Freeze the vial until the contents are solid, (at least 10 hours at -10°C) and then let it thaw. This vial is the control sample. Mark the vial clearly so that it is easily identifiable and will not be used by mistake.

Step 2: ***Choose a test sample:***

Take a vial of vaccine from the batch that you suspect has been frozen. This is the test sample.

Step 3: ***Shake the control and test samples:***

Hold the control sample and the test sample together in one hand and shake gently for 10-15 seconds.

Step 4: ***Allow to settle:*** Leave both vials to settle.

Step 5: ***Compare the vials:***

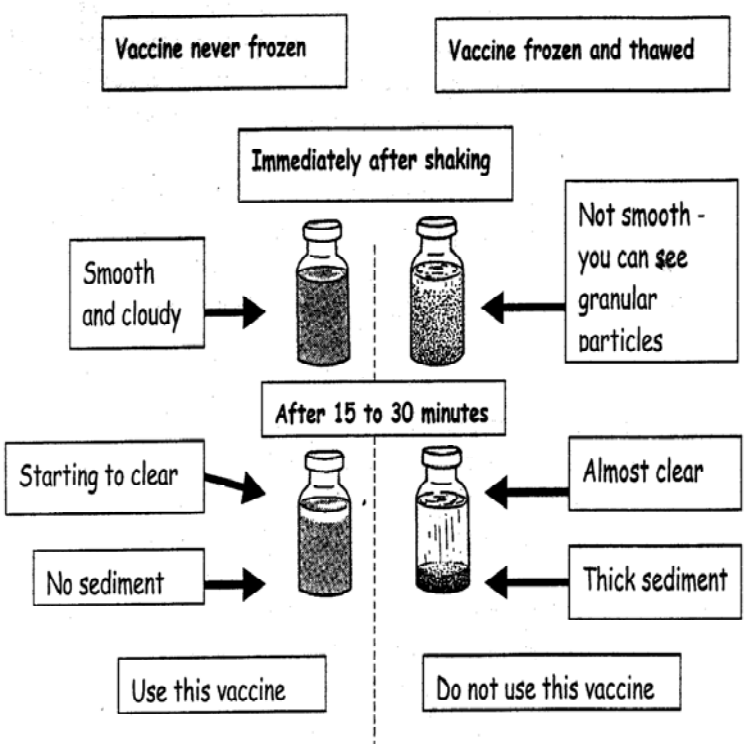
View both vials against the light to compare the sedimentation rate. If the test sample shows a much slower sedimentation rate than the control sample (milky appearance), the test sample has most probably **not been frozen** and can be used. If the sedimentation rate is similar and the test sample contains flakes, the vial has probably **been damaged** by freezing and **should not be used**.

Note

Note that some vials have large labels, which cover the vial contents. This makes it difficult to see the sedimentation process. In such cases, turn the sample and reference vials upside down and observe sedimentation taking place in the neck of the vial.

If the test procedure indicates that the test sample has been damaged by freezing, you should notify your supervisor immediately. Identify and separate all vaccines that may have been frozen and ensure that none are distributed or used.

Figure 5.15: Illustration of Shake test for freezing of Vaccine



Note

Frozen samples can and should be used for shake tests only when testing the same vaccine from the same manufacturer and the same lot number. A new sample is needed for each manufacturer and batch (lot) number.

5.8 Monitoring vaccine utilisation and wastage

There are many factors affecting proper vaccine utilization thus leading to unnecessary wastage. The main causes of vaccine wastage are as indicated in table 5.10 and every effort must be made by everyone handling vaccines to minimize vaccine wastage especially the avoidable causes.

Vaccine Wastage at Cold Stores

Vaccine stores should focus on vaccine handling performance. Vaccine wastage at the primary store occurs in unopened vials, which is expressed as proportional vaccine wastage.

$$\text{Proportional Vaccine wastage in unopened vials} = \frac{\text{Number of doses discarded}}{\text{Start balance + No of doses received}} \times 100$$

Vaccine Wastage at Service Level

Vaccine wastage rate at service level should be monitored against the immunisation coverage for the same reporting period. Any changes in both trends should therefore be carefully analyzed and monitored.

Remember to report on Vaccine utilization in the Monthly immunization reporting forms used.

Note: Vaccine wastage reduction strategies **should Never** compromise immunisation coverage. Whatever measures are taken to reduce the vaccine wastage, they should not compromise immunisation coverage. If selected approaches to reduce vaccine wastage results also lead to reducing immunisation coverage, consider other approaches.

Table 5.10: Causes of vaccine wastage

Avoidable Causes	Unavoidable Causes of Vaccine Wastage
■ Expired vaccine ■ Doses spoilt for one reason or another {VVM reached discard point, breakdown in the cold chain, frozen DPT (or DPT containing combinations) and TT, etc.} ■ Sterile procedures have not been observed. ■ Vaccine without diluent (BCG and Measles) ■ Doses from vials broken during transport and handling ■ Vials unaccounted for due to other reasons ■ Power failure ■ Low turn up for an immunisation session ■ Damage due to excessive heat or cold ■ Loss of labels	❖ Opened and not finished vials of vaccine at the end of the outreach and static immunization sessions ❖ Reconstituted vaccine remaining after six hours or at the end of the immunisation session leading to contamination ❖ Doses given to non targeted age groups (children above one year receiving routine antigen) ❖ Vaccine batch recall due to production and quality control errors

5.8.1 The Multi Dose Vial Policy

In an effort to reduce the vaccine wastage, the Ministry of Health/GoSS adopted the WHO recommended policy for use of opened multi-dose vaccine vials (Multi-Dose Vial Policy or MDVP).

This policy guides health workers and vaccinators on what to do with opened vaccine vials that remain at the end of an immunisation session (both at static and out reaches or mobile clinics).

The policy applies only to OPV, DPT (liquid DPT-HepB or DPT-HepB+Hib) and TT vaccines and states that:

1. Multiple-dose vials of OPV, DTP (liquid DPT-HepB or DPT-HepB+Hib), and TT from which one or more doses of vaccine have been removed during an immunization session at **a static immunization site (health facility)** may be used in subsequent immunization sessions for up to a maximum of 4 weeks, provided that all of the following conditions are met:
    - The expiry date has not passed.
    - The vaccines are stored under appropriate cold chain conditions (between $+2^0$ and $+8^0$ C.).
    - The vaccine vial septum has not been submerged in water.
    - Aseptic technique has been used to withdraw all doses.
    - The vaccine vial monitor (VVM) is attached and has not reached the discard point.
    - The vials have been marked with the date they were opened (in order to track the 4-week use-period).
2. Multiple-dose vials of OPV, DTP (liquid DPT-HepB or DPT-HepB+Hib), and TT vaccines from which one or more doses of vaccine have been removed during **an outreach immunization session** MUST BE DISCARDED at the end of the day (or session)

Policy is not applicable to BCG and Measles vaccines

Reconstituted vials of BCG and Measles vaccines MUST BE DISCARDED at the end of each immunization session or at the end of six hours (whichever comes first).

All Vaccines

In this policy, an opened vial of any vaccine **MUST BE DISCARDED** immediately if:

- Sterile procedures have not been followed OR
- The presence of floating particles or there is a change in the appearance of the vaccine suggesting that it may have been contaminated OR
- It is suspected that the vaccine has been contaminated OR
- It is suspected that the vaccine in the vial has been exposed to unacceptably high temperatures (or has been frozen in the case of DTP and TT)
- If the vaccine vial monitor on a vial shows that the vaccine has been exposed to unacceptably high temperature (stage 3 or 4)

Note

- Opened vials that are kept after an immunization session at a health facility must be dated (the date the vial is opened is to be written on the label). The vial will be kept in a special box marked “returned” in the refrigerator. This vaccine should be used before any others during the next session.
- Do not store reconstituted vaccine in the refrigerator (discard after session).

5.8.2: Vaccine management report

Every health facility in Southern Sudan providing routine immunization should be able to prepare monthly reports on vaccine management. In the reporting period (Month), GoSS/MOH requires a report on:

i. Inventory of vaccine stocks (with details for each antigen)

❖ Quantity in stock at the beginning of the reporting period (month)

❖ Quantity received during the period (month)

❖ Quantity distributed to other health facilities in a reporting period

❖ Quantity in stock at the end of the period (details by batch should be provided)

❖ Review the trend of stock per antigen: number of days of shortage or over-stocking.

Based on the above data, the in charge of immunisation in a health facility prepares a report indicating:

- Vaccines available for immunisation activities (quantities in stock and consumption period to be covered).
- Shortages or over-stocking of antigens, according to the minimum and maximum stock levels defined.
- State in which vaccines are received and priorities to be attached in subsequent vaccine distribution.
- State in which vaccines are distributed and indicators of vaccine used (rate of meeting vaccine needs, rate of vaccine use, rate of vaccine wastage) for each lower level unit.
- Cold chain availability (number of days of inadequate cold chain temperature, number of days of cold chain breakdown, etc.).

The above periodic report on vaccine management should be submitted to the County Health Department. It will be used as an EPI management tool to facilitate not only the follow-up and control of vaccine stock, but also the monitoring of immunisation activities carried out by the health facilities. The analysis of the report should enable the programme to identify, on time, possible problems (imminent danger of shortages or expiry, interruption or slow down of activities, wastage, etc.) and suggest appropriate solutions. It is important to give feedback on the report, which should include what support could be given from the upper level or the immediate supervisor.

5.8.3 Vaccine utilization monitoring

i) Vaccine utilization reporting

Vaccine utilisation monitoring is used in many immunization programs to monitor vaccine usage and wastage in all health facilities on a monthly basis. In the current system, the minimum data that need to be collected at service level is derived from the the Vaccine and Injection materials control book or Stock Control cards namely:

- Start balance (Balance carried from previous reporting period)
- Doses received (Total doses received in the reporting period
- Doses given to other health centres in the reporting period
- Balance at the end of the reporting period. This is obtainable from the vaccine and injection material control book or simply the physical stock count.
- Number of children immunized obtained from the health facility reporting form for the corresponding period.

ii) Calculating vaccine usage at service level.

Vaccine usage can easily be calculated as follows:

$$\text{Vaccine Usage (Rate)} = \frac{\text{Number of Children immunized}}{(\text{Start balance} + \text{Doses received}) - \text{End of Month Balance}} \times 100$$

Vaccine wastage can easily be calculated from Vaccine usage rate:

Vaccine wastage (rate) = 100% - vaccine usage rate

iii) Review the vaccine usage and wastage of all vaccines.

Discuss with staff the various causes and possible practical solutions to reduce wastage. Document causes and solutions and put on file for future reference.

While it is good to reduce vaccine wastage, it is desirable that immunisation coverage is increased first!

Exercise 4

1. Calculate the amount of vaccines needed for Nyirol Primary Health Care Centre for the month of August if the amounts of vaccines used in July are DPT 320, Polio 300, BCG 120, Measles 200, and TT 180 doses. Write down your answers.

   Present stock: DPT-HepB+Hib 60, Polio 20, BCG nil, Measles 100, TT 80.

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2. Why is the shake test done?

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3. Describe the shake test procedure

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Case study REDUCING VACCINE WASTAGE

Ibrahim was the only health worker in a remote health centre serving a small population. He kept the centre clean and tidy and was well organised.

He prepared everything before clients started coming for his weekly immunisation sessions. He always packed and took the vaccine he thought was needed for the session from the refrigerator. He reconstituted the BCG and measles vaccines. He then opened one vial of each of the other antigens and put them in the sponge pad.

The turn up for his weekly immunisation sessions was always low. He often immunised one or two children for DPT and OPV. There was hardly any child for BCG and measles vaccines.

Hassan was good at keeping records and his records revealed that his wastage rate was 80% of his vaccines.

Question

What could Hassan do in order to reduce the vaccine wastage?

Discuss your answers with your supervisor

UNIT 6: PLANNING, ORGANIZING AND CONDUCTING AN IMMUNIZATION SESSION

6.1 About this Unit

In order to serve clients effectively and efficiently, proper planning of the session is necessary. Well organized and conducted immunisation sessions will motivate clients to attend subsequent sessions.

This unit explains how to plan, organize and conduct an immunisation session at the static or outreach service delivery point. It describes the tasks that the health worker must perform prior and on the day of the immunisation session to ensure a quality session.

Learning Objectives:

After studying this unit, you should be able to;

1 Describe the steps in planning an immunisation session
2 Outline activities carried out when organising an immunisation session
3 Describe activities carried out when conducting an immunisation session
4 Outline the activities you carry out at the end of the immunisation session

Performance objectives:

1 Draw a plan for an immunisation session
2 Prepare for an immunisation session
3 Organise an immunisation session
4 Conduct an immunisation session
5 Conclude an immunisation session

6.2 Planning for an immunisation session

6.2.1 Preparing for static and outreach immunisation sessions

Immunisation sessions can be static or outreach.

6.2.1.1 Static immunisation sessions:

Static immunisation sessions are those held at health facilities with a vaccine storage facility. Such facilities are usually equipped with a fridge to store EPI vaccines. In addition it should have dry storage space for immunisation equipment and related immunization supplies. The facility should be able to:

- Provide regular delivery of vaccinations on specified days of the week and hours of the day. However, such facilities may give vaccinations whenever eligible clients come.
- Have a defined catchment (service) area within which outreach posts should be located

6.2.1.2 Outreach immunisation Sessions:

Outreach immunization sessions refer to immunizations held in a location outside of the Static immunization facility. Such locations may be in a Praimary Health Care Unit without a fridge or in community sites such as school, community meeting halls or churches but may also be under a tree with a good shade. In outreach immunization, health workers go out and return on the same day after the session. Outreach sessions are held periodically, usually at an interval of once a month. Successive outreach sessions in a community should be held in the same place (for example, the school), on the same day of the week and at the same time, to maximize the likelihood that parents/caretakers of children will remember to attend. Immunisation session must be arranged in such a way that clients who attend for the first time return on the next visits to receive subsequent doses. The community must be consulted prior to changing the location or timing of the outreach immunization session.

Details on planning for an outreach session will be discussed in section 6.3.2

The preparations for an outreach session include:

- Scheduling days and times for sessions, and honouring the appointments.
- Selecting an appropriate outreach venue in consultation with community leaders that is convenient and comfortable for health workers and clients.
- Giving advance information to the community mobilisers on the days and time for immunisation.

Note: The mobilisers should make announcements in the community 2-3 days prior to the outreach session using a megaphone if available, hand written notices in public places and announcing in social gatherings and places of worship.

- Making sure that vaccines, supplies and equipment are available.
- Sending skilled and knowledgeable health workers for the session.
- Arranging transport (vehicle, motorcycle or bicycle), fuel and allowances for health workers and mobilisers.

6.2.2 Scheduling immunisation sessions

Immunisation services should be scheduled so that people can use them. If people are not coming to sessions, you may need to change days, frequency, location or timing. If on the other hand, too many people are attending, you may need to increase days, times or create a new outreach site.

6.2.2.1 Estimating the number of sessions per week or month.

Calculate the number of sessions you need per week or month as described in the following box:

How often should you hold immunisation sessions?

1. Calculate the annual target population. For children this is the number aged less than 1year. If you do not know the actual number of children under 1 year, assume it to be 4% of the total population.

   For example: if an area has a total population of 25,000 multiply 25,000 by 4% to obtain the annual target population (1,000 children)

2. Calculate the monthly target population by dividing the annual target population by 12.

   For example: divide 1,000 by 12 to obtain the monthly target population (84 children).

3. Calculate the average number of contacts per month. A contact is each time a child attends immunisation session. Seven contacts are required for a child to be fully immunised. In other words, each child has to visit the immunisation centre Seven times before he or she completes the schedule (Twice while in mothers womb for TT, BCG/OPV at birth, 3 DPT/OPV visits and the seventh time at nine months for measles vaccination).

   To calculate the average number of contacts per month, multiply the monthly target population by 7.

   Assignement: multiply 84 by 7 to obtain the average number of contacts per month (588 contacts)

4. Calculate the required maximum number of sessions per month by dividing the average number of contacts per month by the number of children that can be served by the health centre staff in a session. Depending on the number of staff, use previous year's performance and the availability of vaccines, supplies and equipment, to determine the average number of contacts (number of children immunised per session). For planning purposes, this number has been put at 70 in Southern Sudan. But this number could be 50, 30, 20 or less. In South Sudan context, less than 50 children would be considered poor immunization performance as there are many children who have not beein receiving vaccination

   Assignment: Divide 588 by 70 to obtain the maximum number of sessions per month

After you have calculated the number of sessions per week or month, discuss with clients and other community members which days, location and timing would be most convenient for them.

6.2.2.2 When to hold immunisation sessions

- Try to schedule sessions at a convenient time for parents.
- If possible, organize an immunisation session to coincide with a market day when mothers are coming to the market or places of worship or any other important events in the community if it is agreeable.
- At the same time, a major event in the community can be an opportunity to inform people about immunisation.

While setting immunization days, keep in mind the following:

- Employed parents may be able to bring their children to the health centre only in the early morning, late afternoon or weekends.

- A market day may be a convenient time for shoppers to visit the health centre but this may not be true for vendors.
- Make sure that health centre staff will be available to give immunisations on the proposed days and times and that you will have the vaccines and other supplies that you need on those days.
- Always remind the community about the days and times when immunisations will be given.

By scheduling sessions you can estimate your vaccine needs more accurately. However, you should never deny services to people who cannot come for immunisations on the scheduled days and time. Immunisation is given at any given opportunity.

6.2.3 Selecting a venue for the session

Arrangements for and at the venue for static or outreach site will affect how you do your work and how quickly clients finish the immunsation process. The space that you set up for immunisation should be:

- In a clean and comfortable waiting area, with space where clients can sit before being immunized. The waiting area should not be directly exposed to sunlight, rain or dust
- Convenient for the health worker who is preparing vaccines and immunizing
- Easily accessible to clients and arranged in such a way that they are not crowding around the immunisation station/table
- Effectively providing guidance to clients through the entrance, the vaccination station/table and the exit by means of signs, the arrangement of chairs, tables, ropes or other items.
- Quiet enough for the health worker/vaccinator to provide interpersonal and group health education to parents /care takers.
- Adequate for all immunization session activities starting from screening, registration, weighing, immunizing, recording/tallying and final checkpoint.
- The site should also have:
    i. A table where to place vaccines and injection equipment
    ii. A chair on which a parent can sit while holding a child for immunisation
    iii. A chair for the health worker
    iv. A place of convenience/toilet

The place where you give immunisation during an outreach visit may be in a building or in the open air. If in a building, it should be well lit and well ventilated. If it is in the open air or in a hot climate, it should be under the shade. Avoid sites that are dusty where vaccines can be contaminated.

For the best results, the dates and time of the immunization sessions should be determined in consultion with community leaders and clients. A community consultative meeting is the desired process rather than using opinion leaders alone.

6.3 Organisation/arranging of an immunisation site.

6.3.1 Arranging space for immunisation session

If you provide other services during immunisation sessions you need space and equipment for them as well. Set up a separate station for each of these services, which may include:

- Treatment
- Antenatal care
- Family planning
- Health education

6.3.2 Basic equipment and supplies needed for a static or outreach immunisation session

Provide a table in a cool place to hold the equipment you use while giving immunisation. On the table, you should put:

- Plastic sheeting to cover the table to be used for vaccination
- A vaccine carrier with vaccines, "*conditioned icepacks"*, a sponge and thermometer in which to place vaccines and keep them cold
- Cotton swabs in a clean container
- Clean water in a clean container for cleaning injection sites
- A tin of Vitamin A and a pair of scissors
- Auto Disabling syringes and needles (ADS)
- Immunization tally sheets,
- A pen or a well sharpened pencil
- Calender to assist the health worker/vaccinator in giving appointments for the next visit,
- Child health (or immunization) cards and TT cards
- Child register

Near or under the table you should have:

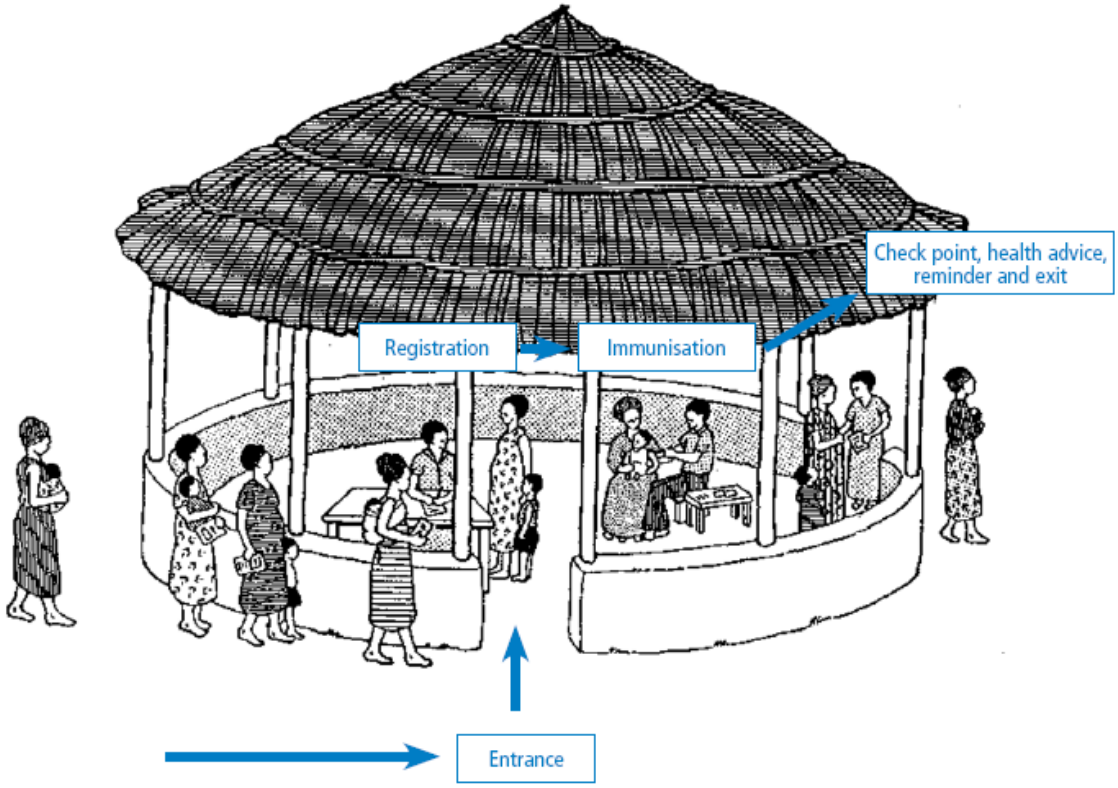
- Safety boxes for used syringes and needles
- Container/plastic bag to hold used swabs and shells for Vitamin A
- Paraffin and a match box
- Water for hand washing, bowl and soap.
- Weighing scale and washed weighing pants

Members of the community should provide you with tables, chairs and other furniture and can help you to set up the outreach site. The above list of equipment or items should be used as a checklist to guide the service provider to prepare adequately for immunization sessions

Note:

Auto Disable Syringes and needles should be used for provision of ALL injectable vaccines

***Figure 6.1**: Client flow at an Immunization Session*



6.3.3 Estimating, and selection of vaccines and diluents for use at an immunisation session

The number of vaccine doses packed for the session will depend on the:

- Expected turn up (estimated at 70 contacts) and the previous session's experience.
- The social mobilisation done prior to the immunization session.
- Venue and day of immunisation. If the day of immunisation coincides with the market day or any other event in the community or health facility, the turn up may be high.

Use the table below to estimate how many vials you will need for a session.

Table 6.1: Estimation of vaccines and diluent needed for a session

	Static sessions		**Outreach sessions**	
Antigen/ dose	Expected Contacts	# vials required	Expected Contacts	# vials required
BCG	10	2 (1 + 1 reserve)	5	2 (1 + 1 reserve)
DPT (1, 2 and 3)	30	4 (3 + 1 reserve)	15	3 (2 + 1 reserve)
Measles	10	2 (1 + 1 reserve)	5	2 (1 + 1 reserve)
TT (1 and 2)	20	3 (2 + 1 reserve)	10	3 (2 + 1 reserve)
Total Contacts	**70**		**35**	
OPV (same time as DPT)	30	2 ((1 + 1 reserve)	15	2 (1 + 1 reserve)

It is important to note that this table provides for one extra vial of vaccine and diluent as a reserve for each session

Remember to pre-cool the diluent at least 24 hours before the day of immunisation. Use the diluent that came with the vaccine from the same manufacturer.

While packing the vaccines in a vaccine carrier, check if they are safe to use. Before you use any vaccine, check for the following:

1) The labels of the vaccine and diluent. If the label is not attached, discard the vials of vaccine or diluent
2) The expiry date. You must discard vials and diluents if the expiry date has already passed.
3) The vaccine vial monitor (VVM). If it indicates the vaccine has reached the discard point discussed in unit 5, you must discard it immediately.
4) If you suspect DPT (or DPT containing) or TT vaccines to have frozen, carry out a shake test that was discussed in Unit 5 under vaccine management.
5) Check the condition of the vials or ampoules. Check for evidence of cracks, breakage or signs of visible contamination

6.3.4 Steps in selecting and packing vaccines for use at the static site:

Step 1: Partially used vials of OPV, DPT and TT vaccines that were saved from the previous static immunisation session should be checked for possible contamination, VVM colour change to discard point, expiry or has been opened for more than four weeks.

Step 2: Unopened vials that have been out of the refrigerator before for an immunisation session.

Step 3: The old stock whose expiry date has not passed and the VVM is indicating “use soon” OR the vaccine which is about to expire.

For the outreach session, follow steps 2 and 3 only as above.

Remember to keep the vaccine carrier in a shade and keep its lid closed all the time.

Keep opened vials in the sponge pad of the carrier during sessions

Pack vaccines in the vaccine carrier according to the guidelines provided in Unit 4 section 4.5.4

6.4 Conducting an immunisation session

6.4.1 Registering and screening children and women of childbearing age for immunization

The purpose of screening a client is to find out what immunisations he or she is supposed to get and whether there is any reason not to give that immunisation. You should know the standard immunisation schedule for children and women, how to recognize contraindications, and other information on which to base your decisions.

If the client has come to the health centre for reasons other than immunisation, such as treatment or antenatal care, find out about these too as part of the screening process. If a client is ill, give her or him help as soon as possible but make sure that you immunize the client before treatment for children who are outpatients. If the child is very ill and requires admission, s/he should be treated and immunized before discharge from the healthy facility.

If a child with suspected measles or any other communicable disease comes to the health centre, immediately isolate her or him from others. Treat the child and vaccinate him or her on discharge. Also immunise children with suspected measles with measles vaccine unless it has been laboratory confirmed.

It is also important that the clients are registered to keep their profile for record purposes.

6.4.1.1 How to assess whether the infant is eligible for immunisation

i) Determine the infant's age. Is this the right time to give him/her an immunization ?

Look at the child's immunisation card to determine his/her age. If he or she does not have one, ask the parent how old the child is and what immunisations he or she has had. Check the child register, where you may find records of a child's earlier immunisations. If the mother does not know the infant's age, estimate it by asking if the infant was born during a notable community event, for example during a certain season or celebration. The count of teeth could also help in determining the age of children less than 1 year (Age in months = number of teeth plus 6). This will give you a better idea of the infant's age. Children 12-23 months of age and who are not fully vaccinated, should still receive the missing doses .Such doses should be tallied separately (see Unit 10).

ii) Determine the number of routine doses for each antigen the infant has already received.

Look at the infant's immunisation card to see which vaccines he/she has already received. If the infant does not have an immunisation card, ask the mother which vaccines he/she has already received. Check the register where you may find records of the infant's earlier doses of vaccines. If the mother/caretaker does not know if the infant has been immunized or there is no record in the immunisation register, give doses of all eligible vaccines (See Table 6.2 below). A scar on the infant's right upper arm indicates he/she has received BCG vaccine. If the infant does not have the scar and you cannot determine whether a dose of BCG has been given, immunize the infant with BCG vaccine.

iii) Has sufficient time elapsed since the last dose?

None of the following vaccines should be given less than four weeks apart: OPV, DPT (or DPT containing vaccine). If the interval between doses is less than four weeks the child is not adequately immunized.

iv) Determine all vaccines for which the infant is eligible. Decide which vaccines the infant is eligible to receive according to the national schedule

Table 6.2: Summary of the Immunisation schedule

Age of administration	Vaccine
At birth or in the 1st two weeks of life	BCG and OPV 0 (zero)
At 6 weeks (one and half months old)	OPV 1, DPT (or DPT-Hep or DPT-HepB + Hib) 1
At 10 weeks (two and half months old)	OPV 2, DPT (or DPT-HepB or DPT-HepB + Hib) 2
At 14 weeks (three and half months old)	OPV 3, DPT (or DPT-HepB or DPT-HepB+Hib) 3
At 9 months	Measles

Note: Vitamin A may be given every 6 months for a child aged 6-59months or at 9 months along with the measles dose.

If a child is visiting the immunization session out of the scheduled dates, follow the following general guidelines:

- If the infant is eligible for more than one type of vaccine, the vaccines may all be given at the same session, but at the recommended different vaccination sites.
- Never give more than one dose of the same vaccine (antigen) at one time even if the child has not received the previous doses
- If the delay between doses exceeds the minimum delay, do not restart the schedule. Simply provide the next needed dose in the series. For example, an 18 month old who has received only BCG, OPV1, and DPT1 should receive OPV2, DPT2 (or DPT-HepB+Hib2), and measles vaccines. Inform the mother of the importance of bringing the infant back to the health facility after four weeks time to receive OPV3 and DPT3 (or DPT-Hep B+Hib3) vaccines

Remember to screen the mother or female caretaker of childbearing age for their TT vaccine eligibility and administer it if due.

6.4.1.2 How to screen women of childbearing age for TT immunisation

i) Determine if the woman is at the right age for tetanus toxoid

In Southern Sudan, Tetanus toxoid is given to women of child bearing age in the age range of 15-44 years. At all immunisation sessions, especially outreach, you should offer routine TT immunisation particularly to pregnant women.

ii) Assess a woman's eligibility for TT immunisation.

First ask if the woman has a TT vaccination card. If she has one, determine how many doses she has already received, how much time has passed since the last dose and what she is due to receive according to the national TT schedule

If the woman does not have a record, ask her if she has ever received a dose of TT in the past on the left or right shoulder.

- ***If she says NO***: give the first dose of TT and an appointment for the second dose one month later, and give her a new TT immunisation card.

- ***If she says YES***: ask how many doses she has received in the past and give the next doses according to the schedule. Take into account any dose given in SIAs.
- ***If she cannot remember or does not know,*** give her a dose of TT and an appointment for the next dose in a months time in which she should bring all possible health cards where TT immunizations may have been documented and re-assess at that visit.

Recording TT doses

Any TT dose given should be recorded on an immunisation card that is kept by the client. Explain to her the importance of keeping the TT card safely.

Other issues to consider

Qn: Can I give different vaccines at the same time?

A: All the EPI vaccines are safe and effective when administered at the same time but when this happens, they should be given in different sites.

Qn: Should I immunize even though the child or woman has received one or more doses of the vaccine in a campaign or outbreak response?

A: Yes, campaign doses supplement but don't replace the routine doses

Qn: Is there a contraindication to immunisation?

A: Yes, but very rare. You should immunize every eligible child and woman, except in the following rare situations:

- Do not give the second or third dose of DPT(or DPT-HepB+Hib) vaccine to a child who has had a severe reaction (anaphylaxis) to an earlier dose. Severe reactions include a convulsion or shock within three days after the injection.
- Do not give BCG vaccine to a child with signs and symptoms of AIDS.
- If a child is very sick, admit, treat and immunize at the time of discharge

Remember:

a) There are rare contraindications to EPI vaccines. It is safe to immunize children and women even if they are ill. You can immunize children and women affected by:
   - Minor illnesses, including colds, diarrhoea and fever;
   - Allergy, Asthma;
   - Malnutrition.

b) You can immunize premature infants and non breast-feeding children.

c) If a parent strongly objects to an immunisation for a sick child, do not give it but try to treat or refer for treatment.

d) All children admitted in health facilities not previously immunised, must be immunized before leaving the health facility.

6.5 Completing the child register

All health facilities providing immunization services should keep a child register in which information about every child who comes to the facility for child health services is written. This helps health workers to keep track of the immunisations and other services they give to each child. Child registers are also useful in identifying immunization missed opportunities and drop outs. The child register can also be used during a coverage survey if all the data is well recorded.

Table 10.1 shows a sample of a child register. Filling the child register will be discussed in unit 10.

When a client arrives at a health centre or outreach site, the first thing you should do is welcome the client, greet and provide a seat then register her or him. Request for a Child Health Card.

Remember:

Remind parents/ caretakers to always safely keep and bring their child heath cards every time they visit a health facility or outreach session

Fill in all the blank spaces except for services provided, that should be completed after the services have been given.

If a client does not have an immunisation card you should provide one and record on it the person's name, address and birth date. More information is added when the client is screened. Do not write down the date of an immunisation until it has been given. Instead mark the space with brackets "( )". Fill in the date after the antigen has been given.

A sample of a child health card is provided in unit 10.

6.6 Preparation and administration of vaccines

6.6.1 Preparation of vaccines

- Wash your hands with soap and water to prevent contamination before handling syringes and needles; and administration of vaccines.

  Even after thorough washing, some micro-organisms remain on your hands so be cautious during preparation and administration of vaccines.
- Check the vaccine and diluent vial labels as discussed in section 6.3 of this unit
- Clean the site of injection using cotton wool swab and cool boiled water. Do not use antiseptic/detergent for cleaning the injection site

6.6.2 Reconstituting vaccines

BCG, Measles and when introduced DPT-HEP B+ Hib vaccines must be reconstituted before they can be used. Follow the steps indicated below to reconstitute vaccines

How to reconstitute BCG and measles vaccines

Step 1: Wash hands thoroughly and drip dry them.

Step 2: Inspect the vaccine vial or ampoule, it must be intact and must have a label. Discard any vial without a label

Step 3: Check the label to ensure that the vaccine is not expired. If the vaccine is expired, discard

Step 4: Check the vaccine vial monitor (VVM) to ensure that the vaccine has not reached discard point.

Step 5: Flick or tap the vial or ampoule with your finger to ensure that all the vaccine powder is at the bottom of the vial as shown in the illustration below.

Figure 6.3: Tapping the vaccine vial to settle contents to one side

Step 6: Open the vial or ampoule. The centre of the metal cap is pre-cut so that it can be easily removed

Step 7: Inspect the diluent vial or ampoule. The diluent for reconstituting vaccines is usually packed in vials or ampoules, which are glass or plastic bottles that you open by breaking off their pointed tops. Make sure the ampoule is not cracked.

Step 8: Read the label on the diluent ampoule or vial. Make sure that you are using the diluent the manufacturer sent with the vaccines and it is not expired.

Do not use water for injection or sterile water to reconstitute vaccines. Each vaccine has its own matching diluent; therefore, it must not be reconstituted with anything else other than the diluent it came with.

Step 9: Use pre-cooled diluent for reconstituting vaccines.

Step 10: Open the vial or ampoule of the diluent as indicated in figure 8.4.

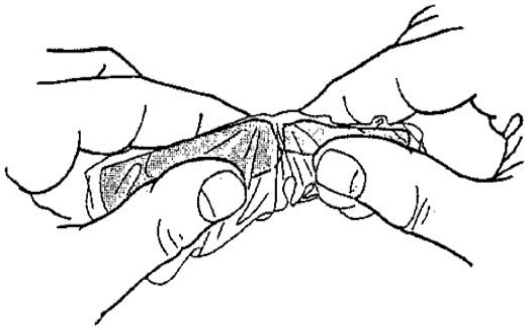


Figure 6.4: Opening diluents packed in an ampoule

Step 11: Use the AD 5 ml syringe and needle for reconstituting measles vaccines. Use the AD 2 ml syringe and needle for reconstituting BCG vaccines

Step 12: Draw-up 5 ml (all contents of the pre-cooled diluent) and inject into vial with measles vaccine.

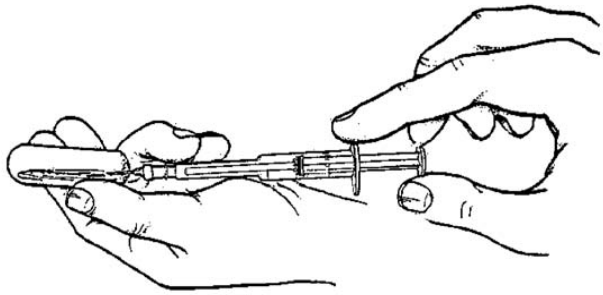


Figure 6.5 Taking diluents from an ampoule

Step 13: Do not shake the measles vaccine vial

Step 14: Using the same mixing syringe and needle, quickly draw and flush back in the vial twice without removing the needle.

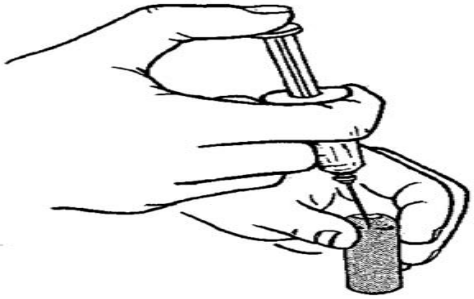


Figure 6.6: Emptying the vaccine diluent into the vaccine vial

The above procedure will also be followed to reconstitute pentavalent vaccine where powdered Hib vaccine is supplied with liquid DPT –HepB vaccine. The only difference will be that:

- DPT–HepB vaccine is the diluent for powdered Hib vaccine
- Both vaccines have a VVM attached , so check for the condition of the VVM on both vials (DPT-HepB vial and Hib vial)
- 2ml AD syringe is used to reconstitute the vaccines

Note: One vial of diluent mixes one vial of vaccine (measles or BCG or DPT-Hep B+Hib once introduced)

Figure 6.7: Using the Sponge Method to keep vaccines during an immunization session

General points to remember

- Never take two vials of the same antigen out of the vaccine carrier at the same time.
- Do not mix vaccines until mothers and children are ready for the immunisation.
- Mix one vial of the vaccine at a time.
- Keep opened vaccine vials in the sponge
- Open the vaccine carrier only when necessary.
- Keep the vaccine carrier in a shade
- Replace the lid/cover if working in a dusty place to avoid possible contamination

6.6.3 Administration of vaccines

When giving immunisations during a session, every vaccine must be given according to the specified technique, route of administration and standard site. This section provides instructions for positioning the client and administering EPI vaccines.

Always use an AD syringe and needle to administer each injectable vaccine. Check the condition of the AD syringe and needle before use to ensure that the paper wrapping must is intact/completely sealed.

6.6.3.1 How to administer BCG vaccine

BCG vaccine is injected intradermally on the outer part of the Left forearm.

Steps in administering BCG vaccine

- Load the syringe with BCG vaccine with the appropriate dose (0.05 mls for infants less than 11 months or 0.1 Mls for children above 12 months).
- Ask the parent to free the child's arm from its clothing, to position the child on his or her lap, and to hold the child firmly
- Hold the child's arm with your left hand so that:
  - your left hand is under the arm;
  - your thumb and fingers reach around the forearm and stretch the skin tight.
- Hold the syringe in your right hand, with the bevel of the needle facing up towards you.
- Lay the syringe and needle almost flat along the child's arm.
- Insert the tip of the needle just under the skin-insert only the bevel and a little bit more.
- Keep the needle FLAT along the arm, so that it goes into the top layer of the skin only. Keep the bevel facing up.
- Do NOT push too far and do NOT point down or the needle will go under the skin. If BCG is injected under the skin, an abscess or enlarged glands may result.
- To hold the needle in position, put your left thumb on the lower end of the syringe near the needle, but DO NOT touch the needle.
- Hold the plunger end of the syringe between the index and middle fingers of your right hand. Press the plunger in with your right thumb.
- Inject the vaccine and remove the needle.

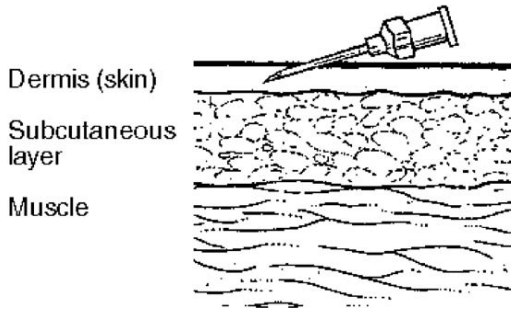


Figure 6.8: BCG needle in an intra-dermal position

If you have injected BCG correctly you will see a clear, flat-topped swelling on the skin at the injection site, like a mosquito bite. The swollen skin may look pale with 'orange peel-like' appearance.

When an intradermal injection is given correctly, the plunger is hard to push.

If the vaccine goes in easily you may be injecting too deep. In this event, proceed as follows:

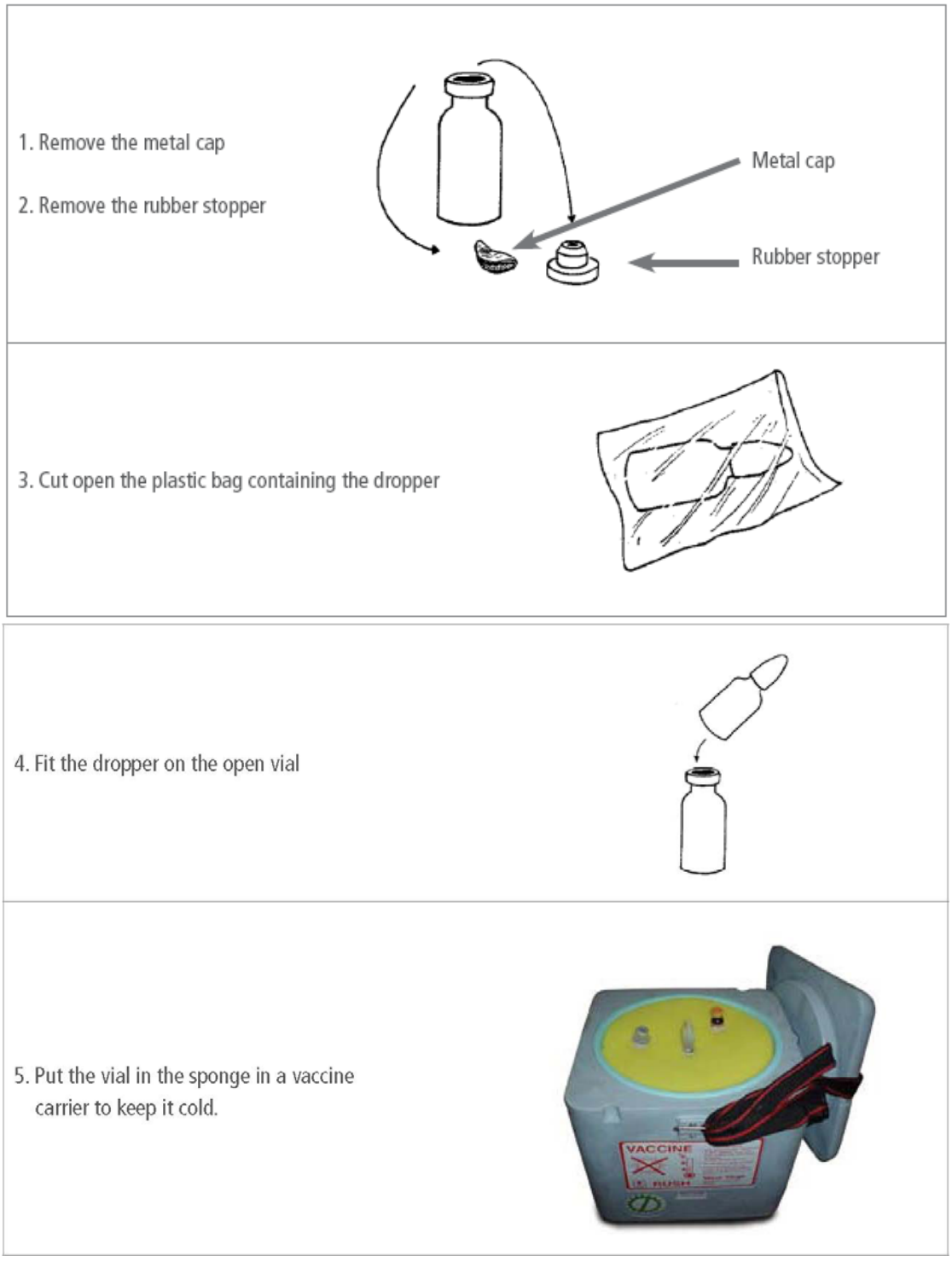
- Stop injecting immediately, correct the position of the needle, and give the remainder of the dose but no more.
- If the whole dose has already gone under the skin, count the child as being injected. Do NOT repeat the dose.
- Ask the parent to return with the child if any side-effects such as abscesses or enlarged glands appear.
- Advise the caretaker to look out for a scar. If the scar doesn't appear within 3 months time, the child should be returned for a repeat dose.

6.6.3.2 How to administer OPV Vaccine

Open the OPV Vial

To open a glass vial, remove the cap, fix the dropper and put the bottle in the sponge in a vaccine carrier to keep it cold as illustrated in Figure 6.9.

Figure 6.9: Opening a glass vial of OPV



Position the child

Ask the parent/guardian to hold the child firmly, with the head supported and tilted slightly backwards.

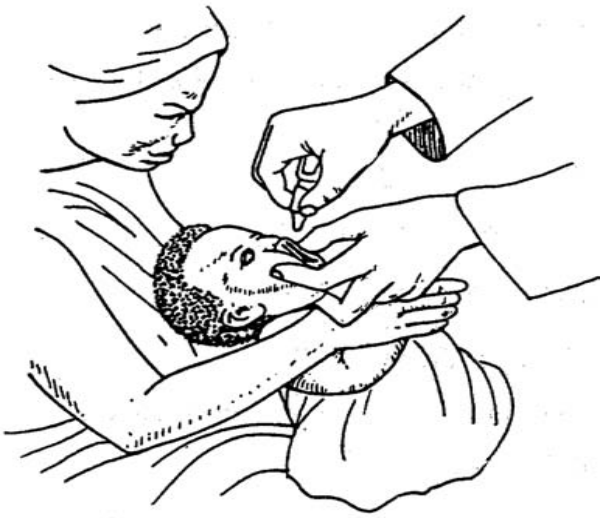
Administer the OPV

1. Load the plastic dropper with the vaccine.
2. Open the child's mouth by gently squeezing the cheeks between your fingers. This makes the child's mouth open.
3. Hold the dropper over the child's mouth at an angle of 45°. Squeeze two drops of vaccine from the dropper on to the child's tongue.

Note:

1. If the child spits the vaccine out, give another dose.
2. Remember to give OPV first before any injections because after injections, the child will be crying and will spit or vomit the oral polio vaccine.

Figure 6.10: Giving OPV, showing how to hold the dropper at an angle



6.6.3.3 How to administer DPT (or DPT-Hep B+Hib B) vaccine

a) Draw 0.5mls of vaccine using an AD syringe.

b) Ask the parent to remove any clothing from the child's left leg so that the thigh is bare.

c) The child should sit on the parent's lap as indicated in the figure 6.11 below:

- The parent's left arm should be around the child, supporting her or his head and holding the outside arm.
- The child's inside arm should be tucked around the parent's body.
- The parent's right hand should hold the child's legs firmly.

d) Clean the site for injection with cool boiled water.

e) Insert the needle at 90 degrees into the upper outer aspect of the left thigh. NEVER inject into the buttock. Quickly push the entire needle down into the muscle. Inject the vaccine slowly to reduce pain.

Figure 6.11: Holding a child for DPT (or DPT-Hep B+Hib) vaccination

The buttock should not be used as an immunisation site for children or women because there is a risk of injury to the sciatic nerve, which can cause paralysis.

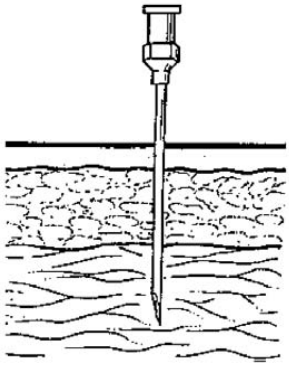


Figure 6.12: Needle position for DPT(or DPT-HepB+Hib) injection

6.6.3.4 How to administer the measles vaccine

- Load the syringe with a 0.5 ml dose of reconstituted measles vaccine.
- Remember to put the vial back into the sponge in a vaccine carrier after drawing the required dose (See figure 6.7).
- Ask the parent /caretaker to hold the child to expose the Right upper arm and instruct her or him to hold the child well to restrict movement
- Clean the site with a cotton-swab moistened with cool boiled water.
- With the fingers of the left hand, gently pinch up the skin on the left outer upper arm.
- Hold the syringe at an acute angle to the child's arm.
- DO NOT TOUCH THE NEEDLE. With the right hand, push the needle into the pinched up skin, push the plunger slowly and inject the 0.5 ml of vaccine sub-cutaneously. To control the needle, support the end of the syringe with your thumb and finger while you push the needle in.

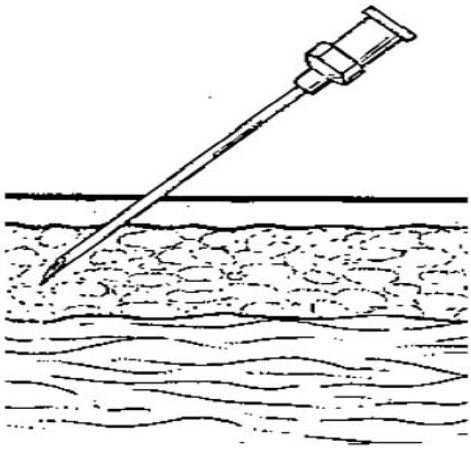


Figure 6.13: Needle position during measles vaccination

- **Caution:** Avoid injecting measles vaccine into a vein or muscle.
- After vaccine administration,
  - Withdraw the needle and discard the syringe and needle into the provided safety box immediately. **Do not attempt to re-cap the needle.**
  - Apply gentle pressure on the injection site using dry cotton swab to avoid both vaccine coming back and bleeding. **Do not massage or rub the injection site**

Give the mother/caretaker the following health advice:

- Do not rub or put anything on the injected site.
- Child may develop a low grade fever, local pain and mild rash after getting measles vaccine. In case of any fever, apply tepid sponging. If it persists, seek medical advice.
- The immunised child should keep around the immunisation post for approximately 15 minutes.
- For any concerns regarding immunisation, report to the nearest health facility for further advice.

Key point to remember about measles injection

- Measles vaccine is administered subcutaneously
- Do not reconstitute the vaccine until clients have arrived and you are ready to immunize.
- Do not use reconstituted measles vaccine after six hours.

8.6.3.5 How to administer the TT Vaccine

Step 1. Hold the TT vial between the thumb and middle finger.

Step 2. Shake the vial so that the sediment at the bottom mixes completely with the liquid. If the vaccine is not well mixed the correct dose cannot be given.

If you suspect that the vaccine has been frozen and thawed, carry out the shake test.

Step 3. Remove the centre of the metal cap on the vial.

Step 4. Draw 0.5ml of TT vaccine using the ADS. Pull the AD until you feel a click

Step 5. Ask the client whether she prefers her immunisation to be in her left or right arm

Step 6. Clean the injection site using a swab and clean water. Put your finger and thumb on the outer part of the woman's upper arm.

Step 7. Use your left hand to squeeze up the muscle of the (given) arm and then give the vaccine intramuscularly.

Step 8. Place a swab on the injection site and request the client to hold firmly the injection site to prevent any bleeding. **Do not massage the injection site**

Step 9. Put the used syringes and needles in the safety box. **Do not recap the used syringe and needle.**

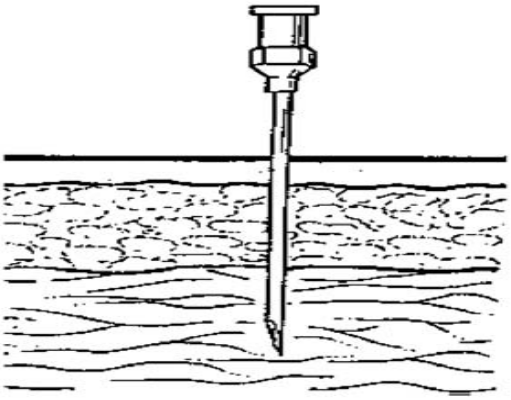


Figure 6.14: Needle position for Tetanus Toxoid Vaccination

Remember to wash hands before administering vaccine to every client when ever necessary.

To avoid infection and injuries from unsafe injection practices;

- Use the appropriate injection technique.
- Handle used syringes/needles carefully to avoid needle-stick injuries.
- Dispose of used syringes and needles properly after the session by burning, burying or use of incinerator.

Table 6.3: Summary of vaccines administration

Vaccine	Dose	Mode of administration	Site of administration
BCG	0.05 ml (up to 11 months, 0.1ml after 11 months)	Intradermal	Left forearm
OPV	2 drops	oral	Mouth
DPT or DPT-HepB+Hib	0.5 mls	Intramuscular	Outer upper aspect of left thigh
Measles	0.5 mls	Subcutaneous	Right upper arm
TT	0.5 mls	Intramuscular	Upper arm

6.7 Completing the Client's immunisation card

Write down the date against each vaccine administered or Vitamin A given (in the bracket made during registration and screening)

- Mark or indicate the date on the client's card for the next dose of vaccine/visit, and tell the parent when and where to return for the next dose.
- Explain to the client the importance of keeping the immunisation card safely. (It is a document that helps to keep track of the infant's health and immunisation status and will help the health workers know how to treat the infant in future).
- Ask the parent or caretaker to always take the child health card every time the child is taken to a health facility, whether the child is being taken for immunization services or not.

6.8 Communicating with parents/caretakers/clients during and after the immunisation session

People may come to a health centre or outreach site for some reason other than to seek immunisation. For example, a woman may have a sick child or may be worried about her pregnancy or a rumour she heard in the community about immunisation services. Respond to the client's concerns at the outset, by giving advice or providing treatment, then screen and, if appropriate, immunize.

Find out whether people have any particular concerns about immunisations and answer these questions straight away. For example, if a woman believes in false rumours that tetanus toxoid is a contraceptive, she will not care about anything else you have to say. Talk to her about her concern. .

Therefore:

- Welcome and greet the parents, caretakers or clients.
- Treat them with respect.
- Listen to the person; allow him/her to ask questions.
- Explain carefully and clearly in simple language all the important messages/information you wish to communicate.

Guide to talking to parents, caretakers and clients about immunisation at a session

1. Thank the parents, caretakers and clients for coming to the immunisation session and for their patience if they had to wait.
2. Explain in simple terms the vaccines you have and will be giving to their children and the diseases you will protect against.
3. Describe the likely side effects and what to do in case they occur.
4. To each parent or caretaker or client, the number of visits a child still needs in order to be fully immunized; the number of doses a woman receiving tetanus toxoid has to receive and how many visits are remaining to complete the schedule.
5. Explain the importance of completing the immunisation schedule and in particular, emphasize the importance of completing all the doses before the 1st birth day of the child.
6. Write the dates for the next visit on the card, and tell the parent/caretaker/client this date as clearly as possible. Also give the time and location for the immunisation session and be specific. Name the day and the date, time and venue e.g.Tuesday, 16th August 2011. Say how many weeks ahead the date is, e.g., "four weeks from today". If calendars are not commonly used, give other reference points as reminders, for instance market days or other community events.
7. If the parent/caretaker/client cannot come, on that date, discuss the alternative dates and time.
8. Remind the parent or caretaker or client to always bring the immunisation cards to the health facility or outreach session.
9. If the infant or woman of childbearing age has missed some doses, do not scold the parent or caretaker or client, but explain why it is important that an infant or woman needs to be fully immunised and that you will be giving any missing doses during the session.
10. Inform the parent or caretaker or client of upcoming Supplemental Immunisation Activities (SIAs) for TT, OPV or measles if any.
11. Ask if they have any questions.If possible,repeat each of the messages more than once.At times the noise in busy clinics and delays to start the session affects the attention of parents.Therefore,repeating the messages more than once increases the likelihood of parent/caretaker/client remembering some of the messages given. Each of these messages should be given more than once.

    Also, the likelihood of remembering these massages is increased if different health workers give them, for example the one giving immunisations and the one tallying/recording at the exit point. Check clients' understanding by asking questions.
12. Congratulate and thank those who have completed the immunisation schedule

Advice to parents on side-effects:

- The BCG sore is normal. Do not put anything on it. It heals by itself and a scar develops.
- Fever may occur after some injections. This is normal, tepid sponge and bathe baby.
- Soreness may occur at the injection site. It will disappear after three or four days.
- A rash may develop following an injection of measles vaccine. This is normal.
- If an abscess develops after an injection, consult a health worker.
- Return to the health centre if a side-effect seems serious or continues for more than 3 days.

6.9 Concluding the session

6.9.1 Taking care of the vaccines

At the static unit, return opened/partially used vials of OPV, DPT (or any liquid DPT containing Vaccine) and TT into a clearly labeled section of the vaccine fridge. Discard reconstituted vials of BCG, measles and DPT-HepB+Hib. (Apply multi dose vial policy as discussed in unit 5).

Returning unopened vaccine vials to the refrigerator

- If the icepacks are still frozen, the temperature readings are within normal range (+2^{0}c to +8^{0}c) and the VVM is clear, mark the unopened vials with "X" and return them in the refrigerator so that they will be used first during the next session.
- Put the ice packs from the carrier into the freezer, and check and record the temperature of the refrigerator to ensure that it is also reading +2^{0}c to +8^{0}c.

At the outreach

At the end of the session, all partially used/opened vials used in an outreach session should be discarded. Check the temperature to make sure that it is between +2°C and +8°C. Put empty used opened vials in a separate container to carry them back to the health centre for safe disposal.

Leave the immunisation session site clean

- Do not leave empty or opened vials at the site
- Do not leave paper wrappings or swabs – used or un used at the immunisation site
- Do not leave any syringes or needles at the site. As soon as they have been used, single-use syringes and needles should be placed in a safety box and disposed of at the end of the session as described in Unit 7.
- Clean the site yourself or ask the community members to assist you under your supervision.
- At the out reach, return tables, chairs and other equipment to their owners.
- Thank the local people who have helped to organise the session and remind them when you will return.

Cleaning the vaccine carrier

After taking care of its contents wipe the carrier dry with a clean cloth and check it for cracks. If it has cracks, return to the County Health Department or State MOH for replacement.

Filled safety boxes must be disposed of safely as discussed in Unit 7. The unused safety boxes must be returned to store for proper custody.

Note:

Do not leave ANY syringes and needles at an outreach site. Leave the outreach site clean and tidy.

6.9.2 Completing an immunisation tally sheet

Health workers should tally each immunisation they give on the tallysheet provided by the GoSS/MOH EPI program (refer to Unit 10).

At the end of an immunisation session, count the number of **0**s tallied on the tally sheet for the day in question. This indicates the total number of immunisations you have given with each vaccine by dose.

The completed tally sheets should be safely kept in order to be used to compile the Immunization report at the end of the month.

FIELD PRACTICE DESIGN – VISIT TO IMMUNIZATION SESSION

During the Health Facility visit to an immunization session, the immunization in practice trainees should look out or observe the following:

1. Reception for the caregivers of children brought for immunization
2. Arrangement of immunization session
3. Waiting time for caregivers
4. Assessment (screening) of clients
5. All data collection tools (Immunization cards, Tally sheets, Monthly records, Immunization Register etc.)
6. Vaccine administration techniques (observe for checking of VVM and expiry date of vaccine, dose of vaccine, site, route, injection safety etc)
7. Interpersonal communication between health workers and clients and key messages.
8. Follow up appointment written on the card and clearly communicated to parents as not all of them are able to read what is written on the card.
9. Observe whether the vaccinator gives return visit dates with reminder events to assist mothers to remember their next visit dates
10. Data management (Tally sheets, immunization registration, monthly immunization reporting and DPT/Drop out Monitoring Chat)

Also observe and conduct

1. Waste Management(disposal of needles and syringes, use of safety disposal box, burn and bury site or method used)
2. Conduct exit interviews on 5-10 caregivers and ask them the following questions
    - *What vaccines did the child receive?*
    - What side effects they should expect following the vaccination?
    - *Were they told when to come back?*
    - *Do they like the services they received?*
    - *Would they recommend to others to come there?*

Role Play or Drama illustrating communication at immunization Sessions

The following two plays show an exchange between a health worker and a client highlighting some of the common problems in "communication". After you read both plays, ask yourself about the quality of the "communication" involved in each. Then you will want to review the "Communication Checklist" on the effective communication behaviors to be practiced by health workers.

The Health Worker (HW) and Mrs. Margaret, Scene 1

HW:	Baby Taban! *(Shouts towards the row of seated women)* . . . Baby Taban!!
Margaret:	Yes Nurse? *(she stands up and moves towards the procedure table with her baby)*
HW:	Don't you listen? Why do you come here then? Show me your card!
Margaret:	*(becomes uncertain of what to do and stands in front of the procedure table)*
HW:	Just sit down! Don't waste my time; I have many children for immunization today.
Margaret:	*(sits down and gets her baby ready for injection)*
HW:	*(writes on the card and then gives the baby an injection without any regard for the baby or the mother; he writes on papers on his desk, ignoring the mother)*
Margaret:	Please . . . I do not know the injection you gave my child and if I am to bring her back for another immunization.
HW:	Look, are you stupid? Bring that your card. Everything is in this card. You have to be reading this card properly and make it your Bible or Qur'an. You see I have already marked the injection I gave your baby on the card.
HW continues:	The card also contains the immunization schedule as follows *(head down he reads the information from the card as rapidly as possible):* At birth……..BCG & OPV0 At 6 weeks……DPT1 & OPV1 At 10 weeks……..DPT2 & OPV2 At 14 weeks……..DPT3 & OPV3 At 9 months……..Measles and vit.A
Margaret:	Please Nurse…
HW:	Madam! No questions. You are wasting my precious time. I have told you that I am always very busy in this clinic. Who's next? Baby Laku!

The Health Worker (HW) and Mrs. Margaret, Scene 2

HW:	Baby Taban, please, come this way.
Margaret:	Yes Nurse (she stands up and moves towards the procedures table with her baby)
HW:	Please sit down. How are you and how is your baby today? May Isee your card?
Margaret:	Fine sister! (Sits down and gets her baby ready for vaccination). I do not have a card. Today is my first day.
HW:	Don't worry. I will give you a card. (Health worker takes the card out and records all the necessary information and directs Mrs. Margaret to get her child ready for vaccination). Mrs. Margaret can I confirm that your child's name is Taban Dele, and he is 6 weeks old.
Margaret:	Yes, Nurse. Thank you.
HW:	I am going to give your child a vaccine on his left forearm and some drops into his month. The vaccine in the forearm protects your child against tuberculosis, which give children a chronic cough. The drops prevent polio, that disease which can make children lame for the rest of their lives. The small injection causes some pain but not so much to bear. It may give a small lump that will last only a few weeks. You should keep the injection site dry and do not dress it (HW gives the injection on the left forearm of the child). The drops do not cause any problems.
HW Continues	It's good that you have started the immunization. The first doses are finished now. However, you will need to come back at least 3 more times in order to complete. When your child completes the immunization schedule, I will tell you not to come again for the subsequent sessions.
Margaret:	Thank you Nurse. I am so happy you are not angry with me.
HW:	Mrs. Margaret, why would I be angry with you? You have done nothing to annoy me.
Margaret:	Ah! You know the other mothers told me that because I did not bring my child immediately after birth, the nurses were going to shout at me. Thank you very much.
HW:	Records the vaccine given and tells Mrs. Margaret the date, place and time of the next vaccinations. The HW also explains that to be fully immunized the child needs to complete several visits before the child's first birthday. Your next visit will on this same day, 2nd Monday of the month, in four weeks time.
HW continues:	Do you have any more questions or health issues, which you would like me to explain further?
Margaret:	Yes, Nurse. What should I do if I miss my child's immunization appointment on the 2nd Monday of the next month?
HW:	Mrs. Margaret, I know it is not always easy to keep all the appointments, but you should try as much as possible to keep the immunization appointments. When you miss the appointment, your child will not get the maximum protection against the dangerous childhood diseases. But if you fail to keep an appointment, just come our Primary Health Care Centre and I will immunize your child. At the Health Centre we give immunizations every time a child is due for her subsequent dose.
Margaret:	Thank you Nurse, (smiling). I will make sure I do not miss any immunization appointment.
HW:	Bye-bye Mrs. Margaret, see you after 4 weeks time.

Exercise 6

1. Arranging space

You are a health worker visiting a friend who works at another health centre. On the day you arrive, everyone in the health centre is involved in an immunization session.

Two large tables have been placed near the door, which is the major source of light in the room. A health worker sits at each table, one registering women and children, the other checking immunization cards and speaking to each parent as he or she leaves, explaining what to do if an immunized child becomes fussy or feverish and when to return for the next immunization.

At the other end of the room, where it is rather dark, two health workers are screening and immunizing clients. The vaccines and immunizations equipment are on a narrow shelf on the wall. The parents are queuing quietly in the middle of the room, waiting their turn.

Discussion

Your friend asks for your advice on how to arrange the immunization area after the session. What do you say?

2. Case study

Reducing vaccine wastage

Nana is the only health worker in a remote health centre serving a small population. She keeps the centre clean and tidy and is well organized.

She prepares everything before people come to her weekly immunization sessions. She takes the vaccine she thinks she will need out of the refrigerator. She reconstitutes the BCG, measles and yellow fever vaccines. She opens one vial of each of the other vaccines and puts them all in a cup of ice.

At most sessions there are only a few clients. It frequently happens that she immunizes one or two children with DPT, OPV and that no one needs BCG or measles vaccine.

Nana's careful record keeping shows that she is wasting more than 80% of her vaccines.

Discussion Question

What can she do to reduce the wastage?

3. What immunizations, if any, is each of the following clients due to receive?

a) A newborn.

b) A 10-month-old child who has had BCG, OPV0-3, and DPT1-3.

c) An 8-month-old child who has had BCG, OPV0-3 and DPT1-3.

d) A 6-week-old child who has had BCG and OPV0.

e) A 5-week-old child who has never been immunized.

f) A 20-year-old woman who has never received a tetanus toxoid immunization.

g) A 4-week-old child who received BCG at birth but has no scar.

h) A woman who received TT2, 8 months previously.

i) What immunizations can you give on the same day to an 11-month-old who has never been immunized?

j) Should you give measles vaccine to a child who was immunized with this vaccine during an outbreak in the previous month?

4. The written date

Health workers Stephen and Musa run outreach immunization sessions once a week in a town neighborhood. Musa registers clients, weighs the children and decides which vaccine or vaccines a client should have. He then writes the date in the corresponding space or spaces on each client's immunization card.

Musa examines the card and gives the vaccine or vaccines indicated by the written date.

One day three children with measles came to the health centre for treatment. Stephen examines their immunization cards and finds that they all have a date written for measles immunization. He asks the parents whether their children were immunized with measles vaccine on the dates indicated. One mother says she left without her child getting the injection because she was late for an appointment in town. One father says that he did not know his child needed two immunizations on the day in question: she received DPT3 (injection in the thigh) only and immediately went out of the immunization cueue. The third parent cannot even remember what happened.

Discussion Questions

a) What do you think happened?

b) How could the problem be prevented?

5. The Medical Officer of Yei County

In Yei County, the Medical Officer, Dr. Barnabas is managing the immunization programme.

One day, he visits a county hospital and is shocked to find 19 children with measles, some of them severely ill. He asks the hospital staff for information on the immunization histories of the children.

- 15 had not received measles vaccine.
- Of the 15 who had never been immunized, 5 had never been to a health centre or other health facility before being hospitalized.
- 10 of the 15 had gone to a health centre for a measles immunization but had not received it because the health workers would not immunize children with colds or diarrhoea.
- The remaining 4 out of the 19 children had received measles immunization in the same health centre and had been at the right age for this.

Discussion Questions

a. Which of these cases of measles could have been prevented? How?

b. What should the Medical Officer do to reduce the number of measles cases in the county?

Answers to exercises

1. The vaccination room should have adequate light and when possible even a room with two doors for entrance and exit (figure 6.1). The health workers preparing and giving doses of vaccine should have adequate light. The parents should have a space with a shade to sit. For detail refer to Section 6.2 in this module.
2. Vaccinators should prepare for vaccination sessions a head of time like preparing the icepacks, make sure the diluents are inside the refrigerator at the same compartment with the vaccines to be reconstituted, there is adequate number of child health cards, tally sheet vaccine and others (refer to bundling). However, Vaccines should not be taken out of the refrigerator and opened until the clients are there for immediate vaccination. Specifically, reconstituted vaccines get damaged easily by heat and light and reconstitution should not be done when the vaccinator is not ready to administrator the vaccine.
3. **What immunizations**
   a. BCG and OPV0
   b. Measles and vitamin A
   c. No vaccination today, measles after a month
   d. DPT1 and OPV1
   e. BCG, OPV1 and DPT1
   f. TT1
   g. BCG
   h. TT3
   i. BCG, DPT1, OPV1, measles and vitamin A
   j. Yes, the supplemental dose does not replace the routine
4. **The written date**
   a. Both health workers do not talk to parents, Stephen registers children and writes dates without informing the parents what he is writing and for which vaccine the children are eligible. Musa also reads the card she does not talk to parents and at the end the parents does not know what vaccine was given, when they should come back and so on.
   b. Both health workers should communicate to the parents, inform them for which vaccine their children are eligible today and in subsequent visits, what side effects they should expect and what they should do, when and where is the next appointment and they should keep the card. The most important point the two health workers should do is write the date of vaccination only after giving the dose of vaccine not before vaccination.
5. **The medical officer**
   a. All of the 19 cases could have been prevented, the 10 children were denied of immunization because of false contraindications, 4 were vaccinated, but it may be because of poor cold chain management or other reasons they could not develop immunity and contracted measles. The 5 who had never been to the health facility is because there was limited mobilization of the community for vaccination.
   b. He needs to organize a training for health workers, particular emphasis should be given to contraindications and false contraindications, cold chain management and community mobilization

Homework questions for integrating the learnings in the module

1. Develop a checklist for an immunisation session at the static and outreach

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2. Your Primary Health Care facility serves a population of 4,000. How many 10 – dose/ 20 dose vials of each antigen do you need if you have an immunisation session once a month?

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3. You are starting an immunisation outreach service in a remote area with a total population of 2,500. You do not want to hold sessions with less than 20 children and 20 women. How many times a month should you go to the area for a session?

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4. How many syringes and needles of each kind do you need for an immunisation where you expect?
   a) 20 children and 20 women
   b) 30 children and 30 women
   c) 12 children and 12 women
   d) 6 children and 6 women

5. What do you check for on the vaccines and diluent vials or ampules and why?

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UNIT 7: INJECTION SAFETY AND WASTE MANAGEMENT

7.1 About this Unit

This unit describes how to ensure safety of injections, equipment needed during the delivery of immunisation services and management of immunisation waste materials.

Learning objectives

After studying this unit, you should be able to:

1. Describe injection safety.
2. Describe steps in giving a safe immunisation injection.
3. Discuss procedures and methods of managing sharps and other injection material waste.

Performance objective

After studying this unit, you should be able to perform the following:

1. Give a safe injection.
2. Dispose sharps and wastes using appropriate method.
3. Develop an injection safety supervision checklist.
4. Carry out support supervision on injection safety and waste management

7.2 Definition of a safe immunisation injection

A safe immunisation injection is one where a potent vaccine is administered by a skilled health worker using the right procedure, at the right site, using correct diluent and administering the correct vaccine and dose using sterile syringes and needles.

Definition of a safe injection:

According to the WHO, a safe injection is one that does not:

- Harm the recipient
- Epose the health care worker to any avoidable risk
- Result in waste that is dangerous to the community

Factors that contribute to unsafe injections in EPI

- Re -use of single use disposable syringes and needles for administration and reconstitution of vaccines
- Using wrong diluent (diluent that does not match the provided vaccine)
- Vaccine administered by unskilled health workers
- Not preparing the recipient before giving the injection.
- Inappropriate disposal of injection materials that allows public to access used or partially destroyed injection equipment

7.3 Recommended types of injection equipment.

The GoSS/Ministry of Health, EPI program Policy on the equipment to administer injectable vaccines is as follows:

- Auto – Disable Syringes (ADS) will be used for administering and reconstituting vaccines.
- Where ADS for reconstituting vaccines are not available, standard disposable syringes will be used.

WHO — UNICEF — UNFPA joint statement on the use of auto-disable syringes in Immunisation services.

"The auto-disable syringe which is now widely available at low cost presents the lowest risk of person-to-person transmission of blood-borne pathogens (such as HepB or HIV) because it cannot be reused.The auto-disable syringe is the equipment of choice for administering vaccines, both in routine immunisation and mass campaigns."

7.3.1 Characteristics of ADS

These are syringes and needles designed with a mechanism that "locks" the plunger after a single use. The lock automatically prevents the syringe from being used for a second time (the syringe becomes disabled after one use).

It is impossible to use them more than once, and they present the lowest risk of person - to-person transmission of blood - borne pathogens.

7.3.2 How to use ADS

Below are general steps to follow when using ADS. These steps must be refined depending on the specific ADS you are using.

Directions for use

The ADS must only be opened when the health worker is ready to administer the vaccines.

a) Check that the package is undamaged and unopened, discard if damaged or opened

b) Peel open from the end of the package to remove the syringe.

c) If the needle is not fixed to the syringe, attach a needle by pulling it firmly onto the syringe tip with a twisting motion.

d) Remove the needle shield (cap) without touching the needle. Do not move the plunger, and do not try to eject air into the vial, as this will disable the syringe.

Note:

Do not move plunger to draw or expel air into the syringe. The syringe automatically becomes disabled.

e) Pick a vial and invert it; insert the needle ensuring that the needle tip is in the vaccine.

f) Pull the plunger back slowly to fill the syringe, plunger will automatically stop at 0.05 or 0.1ml mark for BCG syringe and 0.5ml mark for other syringes. You will hear a "click"

Note:

Keep the needle tip in the vaccine at all times to avoid drawing in air into the syringe.

g) Some syringes lock below the 0.5 ml mark. Therefore to remove air bubbles from such syringes, keep the needle in the inverted vial, holding the syringe upright, and tap the barrel. Then carefully push the plunger back to dose mark.

h) Remove the needle from the vial.

i) Administer the injection according to the technical guidelines.

Note:

After the injection, plunger will automatically lock thus disabling the syringe.

j) Dispose of the used syringe and needle without recapping the needle in a safety box.

7.3.3 Advantages of ADS

- They are used once, hence can only be used for one client.
- They eliminate the patient-to-patient disease transmission caused by the use of contaminated needles and syringes
- They save time for health workers from the heavy work of sterilization

7.3.4 Estimating ADS syringe requirements

It is important to ensure that you have a sufficient stock of ADS for use during immunisation sessions both static and outreach. Estimation of required injection materials is given in Unit 5 (section 5.3).

7.3.5 Setting up the immunisation work area to minimize risk injury

Health workers should plan the layout of their work-space so that:

- The vaccine carrier is in the shade.
- Tally sheets can easily be used.
- The person giving doses of vaccine is between the child and all needles or sharp objects.
- The person giving doses of vaccine can see the entrance hole of the safety box when discarding needles. Some people may stand when giving doses of vaccine. Those who sit may want to place the safety box on the floor.
- The health worker can dispose of used needles without putting them down or moving too far.
- Only one child at a time is in a health worker's workspace.
- Each person giving doses of vaccine has his or her own safety box, especially at busy site
- The children are positioned correctly for injections. Unexpected motion at the time of injection can lead to accidental needle stick-injuries. To prevent this, position the child securely before giving the injection.
- Have the mother sit and place the child on her lap. Make sure one of the mother's arms is behind the child's back, and one of the child's arms wraps around the mother's side.

- The mother may tuck the child's legs between her own to secure them, or she may hold the child's legs.
- Health workers cannot hold the child because they need both hands to give the injection.
- Always tell the mother to position and hold the child firmly when you are ready to give the injection

7.3.6 Simple ways to ensure safe immunisation injections

For all immunisation injections, always use the following procedures:

- Wash hands before preparing vaccines and giving injections. Cover small cuts on hands before administering the vaccines.
- Use a new ADS and needle for every child.
- Inspect the packaging very carefully. Discard a needle or syringe if the package has been punctured, torn or damaged in any way.
- Do not touch any part of the needle. Discard any needle that has touched any un sterile surface.

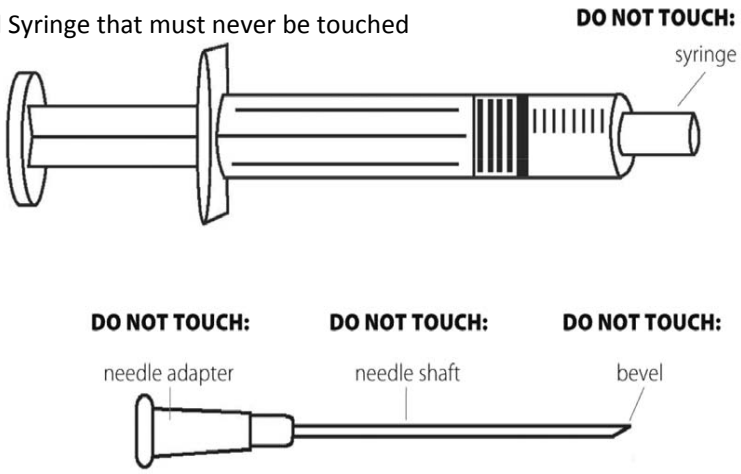
Figure 7.1: Illustration of wrongly touching a vaccine needle

You should not touch parts that come into contact with the vaccine or the child or client namely:

- Shaft of the needle
- Bevel of the needle
- Adaptor of the needle
- Adaptor of the syringe
- Plunger seal of the syringe

The diagram below shows the parts of the syringe and needle that should never be touched

Figure 7.2: Parts of a needle and Syringe that must never be touched



Remember:

- If you touch any of these parts, discard the syringe and needle and get new sterile ones.
- Swab the injection site twice with clean water. Swabing must be in one direction
- Avoid giving injections at a site of skin that is compromised by local infection e.g. chickenpox or scabies or abscess.

7.4 Needle stick injuries

Needles frequently injure health workers and can transmit hepatitis B, hepatitis C, HIV, or other blood borne infections.

Needle stick injuries may occur when:

- Health workers recap needles or walk while carrying opened syringes and needles
- Clients and children are not positioned securely while they receive injections
- Proper disposal practices are not observed

7.4.1 How to prevent needle stick injuries

Needle-stick injuries can be prevented by handling syringes and needles safely.

i) Collect used syringes and needles at the point of use in a safety box. The safety box must be placed close (arms length) to the person giving vaccinations.

ii) Do not recap needles after administering an injection or reconstituting vaccine

iii) Do not carry used syringes and needles around the immunisation area or work site.

iv) Hold the child firmly. Anticipate sudden movement during and after injection.

v) When ready to vaccinate draw up the vaccine, inject the vaccine, and put the syringe in the safety box without putting it down.

vi) Close the safety box securely when it is three-quarters full. Do not open or empty used safety boxes

vii) Burn or incinerate to prevent access to used needles.

viii) Do not manually sort out used needles and syringes.

Figure 7.3: Unsafe collection of used needles and Syringes

Remember: Always use a safe box to collect all syringes and needles used at immunization sessions

Table 6.1: Examples of incorrect immunisation practices and possible severe reactions following immunisation

Incorrect practice	Possible severe reactions or infections following Immunisation
a) Non-sterile injection. Reuse of disposable syringe or needle b) Contaminated vaccine or diluent	Infection such as local abscess at injection site, sepsis, toxic shock syndrome, or death Blood-borne infection transmitted such as hepatitis B, HIV
c) Reconstitution error ➢ Inadequate shaking of vaccine ➢ Reconstitution with incorrect diluent ➢ Medicines substituted for vaccine or diluent e.g. insulin, ergometrine ➢ Reuse of reconstituted vaccine at subsequent session	 Local abscess Vaccine ineffective Severe reactions or death
d) Injection at incorrect site ➢ BCG given subcutaneously ➢ DPT or DPT-HepB+Hib or TT too superficial ➢ Injections into buttocks	 Local reaction or abscess, ineffectiveness Local reaction or abscess, ineffectiveness Sciatic nerve damage
e) Incorrect vaccine transportation/ storage ➢ VVM colour change at discard point ➢ Clumping of adsorbed vaccine (frozen vaccines?)	 Local reaction from frozen vaccine Vaccine ineffective Anaphylaxis (shock)
f) Contraindications ignored	Severe reaction

7.5 Sharps waste management

7.5.1 Why is it important to handle sharps waste properly?

Sharps waste can cause serious health and environmental problems. Unsafe disposal can spread some of the very same diseases you are working so hard to prevent and poses a siificant risk to the community such as;

- Leaving used syringes and needles in the open or on the ground exposes the community to needle-stick injuries. Most frequently, children are the unfortunate victims of needle-stick injuries and Hepatitis B and C virus transmission from hap hazardous disposal of needles.
- Throwing used needles and syringes in a river spoils water used for drinking and washing.

7.5.2 Immediate disposal of injection equipment at the injection administration site.

All used needles and syringes should be placed in a safety box (see Figure 6.4) immediately after use. These containers are water and puncture –proof.

Figure 7.4: Safety box ready for safe handling of sharps waste

Description of commonly used dafety boxes for immunization sharps handling

- A five-litre safety box can hold about 100 used syringes and needles.
- The safety box should be closed at the end of the immunisation sessions or when the safety box is three-quarters full (do not wait for the safety box to fill up).
- Do not transfer used syringes and needles from safety boxes to other containers.
- Find a safe place to burn and bury the filled safety box (see next section).

Note:

Never put the following material in a safety box.

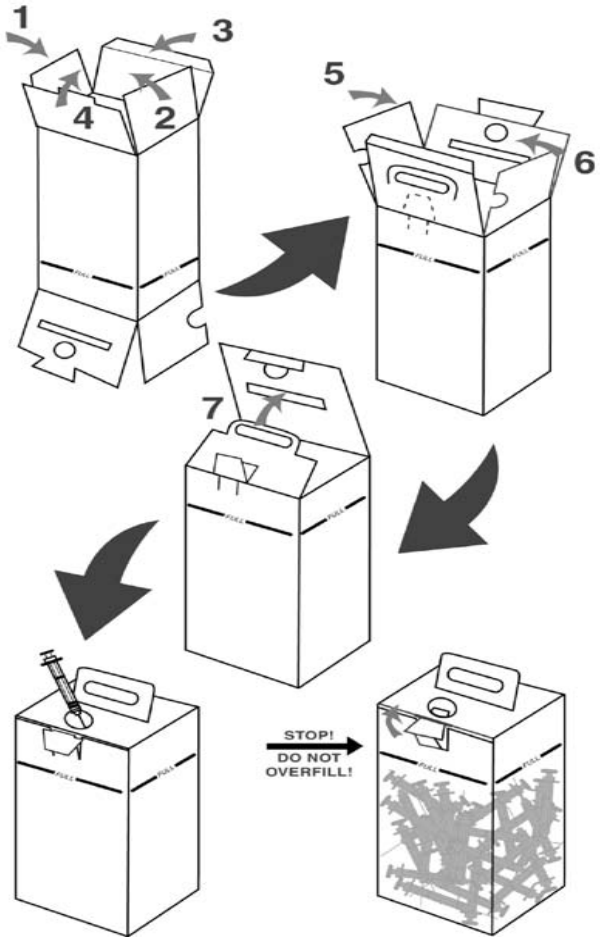
- Empty vials
- Discarded vaccine vials
- Swabs

Discard filled safety boxes with other medical waste

How to assemble the safety box

Safety boxes require proper assembly before use. Many come with picture instructions printed on the side as shown in Figure 6.5 below;

Figure 7.5: Step by step illustration of assembling a safety box



Caution:

To ensure safe handling of the safety box:

- Don't handle or shake the safety box more than necessary.
- Never squeeze, sit or stand on safety boxes.
- When the box is not in use, close the opening on the top.
- Take extra care when you are carrying the box to the disposal site. Hold the box by the top (by the handle provided) above the level of the needles and syringes.
- Keep safety boxes in a dry, safe place out of reach of children and the general public, until they have been safely disposed of.
- Train everyone who will handle the box how to do it safely. Do not ask untrained staff to handle the box.

7.6. Procedures for disposing of sharps waste and injection equipment

a) After each injection, immediately place the syringe and needle in the safety box or sharps container. Do not recap the needle.

b) Place the safety box within reach of the health worker.

c) When three quarters full, the safety box should be destroyed as close as possible to the immunisation session site, and as soon after the session as is practical.

d) Never empty the safety box before disposal or in preparation for re-use of the safety box

Used syringes and needles must never be dumped in open areas where people might step on them or children might find them.

Figure 7.6: Examples of bad safety box disposal

Improper disposal of used syringes and needles places health workers and the community at high risk of needle stick injuries.

Dumping used needles and syringes in the open tempts people to pick them for reuse.

7.7 Methods of final disposal of safety boxes

In Southern Sudan, two methods are commonly used to destroy filled safety boxes. These are:

i) Open burning in a pit

Although it is not the best method of disposing of filled safety boxes, this method is by far the most commonly used. Where this method is to be used, health workers are requested to:

- Choose an unused area of the compound to be the burning site. The area should be as far from buildings as possible, at least 25 – 30 meters from the wards or residential buildings, it should be an area where people will not dig to plant crops or construct pit latrines
- Clear the selected area and fence it off.
- Dig a pit measuring 7ft long by 3ft wide and 4ft deep for burning and burying (see the illustration in figure 6.7 below)

Figure 6.7: Recommended dimensions of the pit for burning safety boxes

- Choose a trained staff member or person to supervise the burning.
- Place the filled safety boxes in the pit. Sprinkle a small amount of kerosene and ignite the materials. Where there is no kerosene, mix paper, leaves, or other flammable materials among the boxes to help them burn.
- Warn people to stay away and avoid smoke, fumes, and ash from the fire
- Burn until all boxes are destroyed. Do not empty the safety boxes at the time of burning.

Figure 7.8: Picture of an Open Burning Pit

ii) Incineration:

Incineration can completely destroy syringes and needles. Fires burning at temperatures higher than 800˚C kill microorganisms and reduce the volume of waste to a minimum. Properly functioning incinerators ensure the most complete destruction of syringes and needles. They produce less air pollution than fires burning at lower temperatures. Some hospitals have on-site incineration.

The compound in which incineration takes place must be secure. Staff members conducting the incineration should wear protective wear (safety glasses, face masks, gumboots and heavy duty gloves).

iii) Other safety box disposal methods

a) Burning in a metal drum

To burn in a metal drum or container (see Figure 6.8)

- Choose a burning site in an unused area as far from buildings as possible. The area should be fenced and cleared.
- Place four bricks on the ground in a square pattern.
- Put a metal screen or grate on top of the bricks.
- Remove both ends of a 210-litre (55-US gallon) steel drum. This will allow air to flow through the drum and contents will burn better. If a metal drum is not available, you can build a cylinder from a metal sheet, bricks, or clay. A chimney may be added to the removable top of the drum or container.
- Place the drum on top of a metal screen or grate.
- Put the filled safety boxes into the metal drum. Mix paper, leaves, or other flammable material with the safety boxes to help them burn.
- Sprinkle a small amount of kerosene, if available, on the boxes and other material in the drum.
- Place a fine metal screen over the top of the drum to reduce flying ashes.
- Put wood, paper, or other flammable material under the drum and ignite the material.
- Warn people to stay away and to avoid smoke, fumes, and ash from the fire.
- Allow the fire to burn until all of the safety boxes have been destroyed.
- Once the fire is out and the residue at the bottom of the drum has cooled, carefully collect the residue. Bury it in an unused location. Cover with at least 13 cm of soil. If possible, seal the residue pit with cement once it is full.

b) Encapsulation

A specially made **safety pit** is another option to dispose of used syringes and needles that are loose. A safety pit is usually 2-3 metres deep and one metre in diameter so that it can be lined with a locally made concrete pipe. The pit has a concrete lid with a service hole through which safety boxes are passed. Used syringes and needles may also be directly dropped through the service hole or metal pipe and into the pit (see Figure 6.9).

Figure 7.8: Illustration of a metal drum

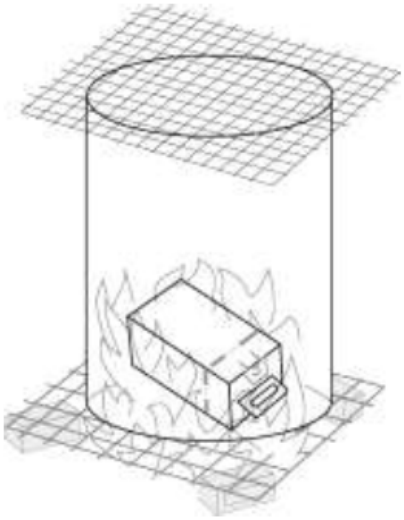
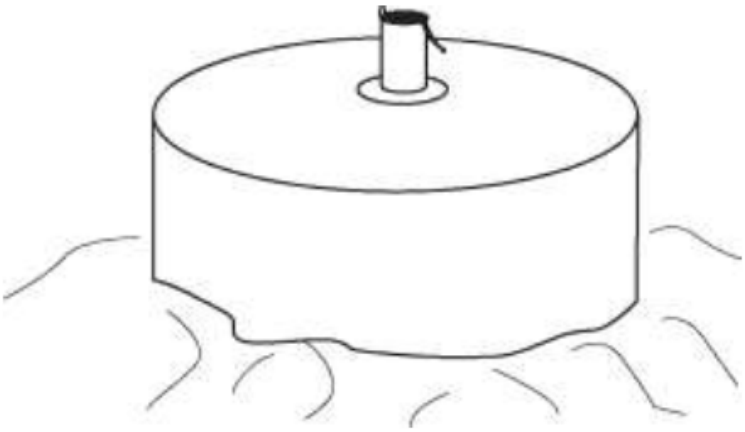


Figure 7.9: Illustration of a safety pit



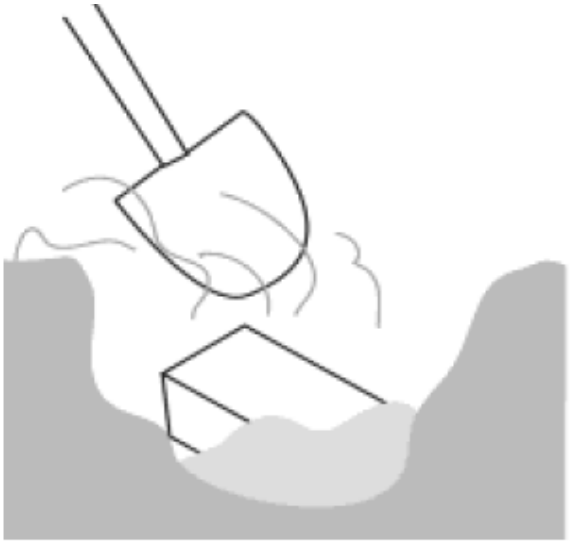
c) Burry in a safe disposal pit

Used injection equipment may be buried in a disposal pit.

- Choose the site carefully and dig a pit large and deep enough for bulky boxes (see Figure 6.10).
- Choose a site where people will not dig or establish latrines in the future.
- Fence off and clear the area.
- Dig a pit at least two metres deep. Make sure that the material will not escape from the pit, for example, during the rainy season.
- Take the filled safety boxes to the pit site just before burying. Do not open or empty the boxes.
- Place the filled safety boxes in the pit.
- Cover the boxes with at least 30 cm of soil. If possible, cover the site with concrete when the pit is full.

Make sure a qualified staff member supervises the process. Do not leave this vital task to unqualified people.

Figure 7.10: Illustration of safety box burial pit



7.8 Supervision and evaluation of injection safety

Supervision and periodic evaluation of injection practices are vital to ensure safety. Supervision visits should be made to each health centre at least monthly to look at injection safety practices and stock levels of injection materials. All injection-related adverse events should be monitored, investigated and reported immediately for action.

Key messages:

To reduce the risk of transmitting infections:

- Do not re - use contaminated syringes and needles including mixing syringes
- Always use a new needle and a syringe every time an immunization injection is given.
- The practice of loading several syringes with vaccine in an anticipation of large turn up should never be practiced.
- Always use a new sterile needle and syringe to reconstitute each new vial of measles or BCG vaccine or DPT - Hep B +Hib. Then discard the mixing syringe and needle in a safety box immediately.
- Needles designed for single use do not automatically prevent needle stick injuries
- All single -use syringes and needles including ADS must be properly disposed after the session either by burning or use of incinerators where they exist.

Figure 7.11: Unsafe Immunisation practices

Overfilling the safety box

Recapping the needle

Leaving the needle inside the vial

Touching the needle

Disposing of used needles in an open cardboard box

Exercise 7

1 What is a safe injection?

2 List simple ways to follow in order to ensure safe immunisation injections.

3 How can you prevent needle stick injuries?

Discuss your answers with your supervisor.

UNIT 8: PLANNING FOR IMMUNIZATION SERVICES DELIVERY

8.1 About this Unit

This unit explains how to plan for delivery of immunisation services at State, County and health facility levels (both PHCC and PHCU). Special planning issues for delivery of immunisation services at static and integrated outreaches and planning for the hard to reach populations using the Reaching Every County or Reaching Every Child (REC) strategy are also included in this unit.

Learning objective

By the end of this session, participants should be able to:

1. Describe the planning process of immunisation services at County, Health facility and community levels.
2. Discuss guidelines for delivery of immunization services.
3. Explain the Reaching Every County/Child (REC) strategy.
4. Discuss strategies for reducing immunisation drop out rates in their catchment area.
5. Discuss strategies for reaching missed children and women of childbearing age with immunisation services.
6. Outline steps you will take to involve the community in planning for immunisation services.

Performance objectives

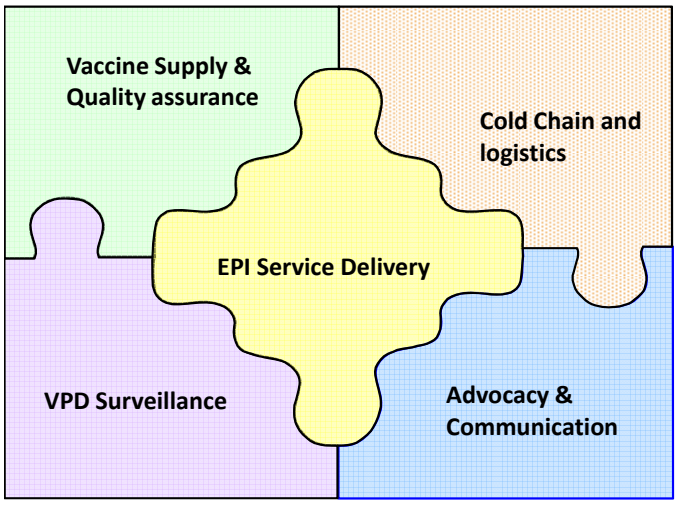
By the end of this session, participants should be able to perform the following:

1. Develop a work plan for delivery of immunisation services in their catchment area.
2. Involve communities in planning for the delivery of immunization services.

8.2 Planning for immunisation services at State level

Planning for the delivery of immunisation services at state and county level should be integrated in the overall health sector planning process. However, the state/county EPI manager should always have a plan that addresses the five operational components of immunisation systems indicated in the figure 8.1 below:

Figure 8.1: Operational components of Immunisation Systems



a). Vaccine supply and quality assurance

The state level EPI plan should articulate the following:

- Forecasting vaccine needs at all levels.
- Vaccine utilization monitoring.
- Immunisation safety including adverse events following immunization.

b). Cold Chain and Logistics

State EPI Plan should include the following activities:

- Monthly requisitioning of vaccines, injection materials, gas and other supplies from GoSS/MOH level
- Receiving, storage and distribution of vaccines, injection materials and other supplies to HSD or lower level health facilities.
- Quarterly preventive and emergency cold chain maintenance activities.
- Regular and alternative power supply to cold chain equipment
- Waste disposal – paraffin for burning filled safety box.
- Transport – maintenance and servicing vehicles/motorcycles and fuel

c). Service delivery

Service delivery is a function of county and health facility levels. However, the state EPI manager should have the micro-plan for:

- Routine immunisation services in the state clearly articulating delivery strategies (static, outreach or mobile services). Good state EPI managers should plan for routine immunization delivery support activities namely
    - Immunization services delivery audits
    - Supportive supervision
    - Mobile clinics in under served areas
- Supplemental Immunisation Activities (SIAs) or campaigns

d) Vaccine Preventable Diseases Surveillance

To achieve surveillance targets, plan for the following:

- Routine data collection, compilation, analysis, interpretation and dissemination
- Production and distribution of data collection tools
- Collection , storage, transportation of specimen to the laboratory and feedback
- Active case search
- Investigation and response to VPD outbreaks

e) Advocacy and communication

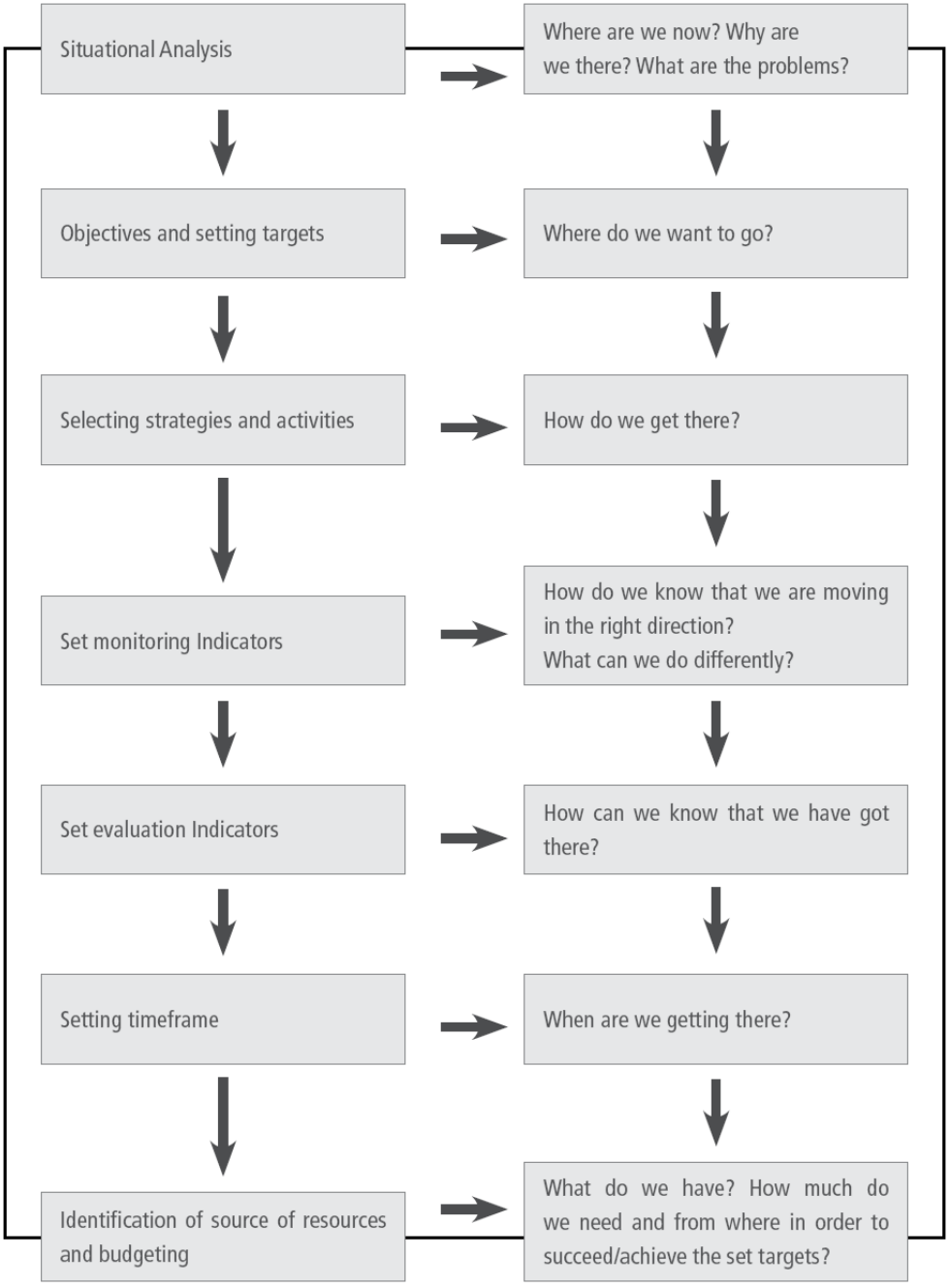
In order to increase and sustain demand for immunisation services, plan for the following:

- Interpersonal Communication (IPC)
- Political and media advocacy campaigns
- Information, Education and Communication (IEC). Mainly plan for the production, distribution and display of IEC materials

- Grass root social mobilization
- Community involvement and participation
- Behaviour change communication
- Men involvement in immunization activities

In order to address priority areas that will contribute to improved performance in the delivery of immunisation services at all levels, it is recommended that all stake holders must be involved in the planning process – health workers, community leaders and Non –Governmental Organisations (NGOs) providing services within that catchment area.

While developing the state EPI plan of action, the process should consist of steps illustrated in the flow diagram below.



8.2.1 Situation analysis

a) *Review of the catchment area.*

This should provide current information on immunisation services for the catchment area. It should include information like:

- The target populations - children under one year and women of childbearing age.
- Infrastructure indicating the number of static units,outreaches,human and other resources, Counties, payama, Bomas, Villages and the respective village health committees, available and can be used for the delivery of health/immunization services.

b) *Performance Review*

Use the data collected in the previous planning period – Financial Year (FY) or quarter to assess your performance and plan for appropriate interventions. The following should be reviewed:

- Immunisation coverage achieved against the set targets by antigen. Calculation of immunisation coverage and drop out rate is discussed in unit 9: Monitoring EPI performance
- Drop out rate with emphasis on DPT-1 for access to DPT-3 for utilisation/ quality of immunisation services (REC Approach)
- Reasons for good or poor performance, possible challenges and innovations
- Identify possible solutions to obstacles identified

Use Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis to identify reasons for success and failure.

The situational analysis thus helps to identify the needs, the problems, their causes, their effects and potential solutions

8.2.2 Selecting priorities

From the above analysis, identify needs and problems that are considered as priorities. (Those you think that if not addressed, you will never reach where you want to go). Priorities should be identified from each component of immunisation system mentioned above, and they should address the following areas:

- Improving the quality of immunisation services
- Increasing accessibility to immunisation services
- Reducing drop out rates
- Reducing missed opportunities
- Sustaining good immunisation coverage
- Identifying and targeting the usually un reached populations
- Monitoring and follow up

8.2.3 Setting objectives and targets

Set specific objectives that are quantifiable, realistic and achievable over a specified period of time, usually, annually. Setting objectives and targets provides the implementers with something to work towards to, like attaining the set coverage at the end of the FY.

It also provides a basis for regular assessment to gauge how far the implementation process has gone towards attaining the set targets.It therefore provides an incentive to collect the relevant data for analysis and interpretation in the assessment process.

8.2.4 Selecting strategies and activities

The strategies and activities you select should enable you achieve the formulated objectives. They should be pertinent and feasible. The current strategy that aims at ensuring that every child under one year of age and women in the child bearing age is reached with immunisation services is the REC strategy.

REC Strategy

The benefits of immunisation will not be realized until such a time when every child and woman of childbearing age in the community has been reached with doses of vaccinations as stipulated in the Southern Sudan immunisation schedule.

The REC Strategy has been identified as one of the approaches to achieve this goal. REC approach aims at improving organization of immunisation services so as to guarantee sustainable and equitable immunisation for every child/ woman of childbearing age.

The RED approach uses two indicators namely:

i. DPT (or DPT containing atigen) 1 coverage as a measure for accessibility
ii. DPT (or DPT containing atigen) 1–3 drop out rate as a measure for quality of services utilization

In the Southern Sudann context, DPT1 coverage less than 90% indicates poor access, while drop out rate more than 10% implies poor utilisation of immunization services. The table below can be used to categorise performance of the counties or health facilities if data is available:

Table 8.1: REC categories and proposed actions

Category	DPT I Coverage	DPT 1-3 drop out	Implication on service delivery	Action Required
1	> 80%	<10%	Good access, good service delivery,	❖ Strengthen good practice, ❖ Consolidate achievements, ❖ Document and share best practices, ❖ Validate data, and ❖ Recognize and reward good performers
2	> 80%	≥ 10%	Good access, poor service delivery	▪ Train health workers, ▪ Screen children at OPD to reduce missed opportunities, ▪ Register and track drop outs, ▪ Review regularity of outreaches, ▪ Review planning for logistics to avoid stock outs ▪ Improve inter personal communication

3	≤ 80%	< 10%	Poor access and good service delivery	❖ Review static/outreach functionality (transport, staff, logistics, locations and timing of outreaches etc), ❖ Re-map the catchment area to identify under served communities, ❖ Increase social mobilization, strengthen support supervision, give a feedback to the local leaders
4	≤ 80%	≥ 10%	Poor access and poor service delivery	Review EPI service delivery at all levels: ➢ accessibility, static/outreach functionality (transport, staff, locations of outreaches, logistics – vaccines and gas etc) ➢ social mobilization and give a feedback to the local leaders ➢ strengthen support supervision ➢ • data collection, analysis and utilisation Re-map the catchment area to identify under served communities,

In order to Reach Every County/Child (REC) or all women of child bearing age, five operational components have to be planned for

i) Re-establishing and operationalizing outreach vaccination sites

Outreach is an essential strategy of routine immunisation in all areas where populations are under-served, whether urban or rural, near or remote. Every health facility and their target population should be mapped out and a session plan showing how every community within the target area will be reached should be developed.

Ensure regular outreaches especially for under-served communities. Re-open those that may have closed for one reason or another.

ii) Supportive supervision-site training by supervisors

Supportive supervision builds the capacity to carry out safe, good quality immunisation services by providing regular on site training, focusing on problem-solving, facilitating teamwork and providing leadership and support to empower health providers to improve and monitor their own performance. It also offers the opportunity to integrate supervision of other health interventions, e.g., IMCI and Malaria. The visits should be regular with more visits arranged to poorly performing health facilities.

iii) Strengthening links between community and service delivery

Strengthening the link between community and services can only be achieved through the involvement and effective empowerment of communities in the management of services. This will create awareness, stimulate demand thus increasing utilization for the service and encourage community participation. Regular meetings between the community and service providers are essential.

iv) Monitoring for action

Monitoring for action entails a systematic and continuous process of collection and analysis of data. Use the available HMIS tools to calculate coverage, identify areas with low coverage, high drop out rates and monitor disease trends. The information should be used for planning and management action at health-facility, County and State levels.

v) Planning and management of resources

Planning should be systematic and have a problem solving approach – analysing the situation of achievements and barriers; available human, material and financial resources, prioritising and setting realistic targets. In order to manage resources efficiently, plan and deploy resources according to the situation analysis, objective and most appropriate strategies, taking into account needs and availability. It is important that resources are distributed on the basis of equity (needs) and not equally.

The implementation of the 5 operational components of the REC approach can not be effective without proper logistics support, which includes vaccine and cold chain management, injection materials, transport and safe disposal of wastes.

8.2.5 Setting timeframe

Each activity included in the plan should be time bound with a specific time frame for implementation.

8.2.6 Identification of resources, their sources and budgeting

This is a key step in the planning process as it guides you to know which resources you need and their sources. Having identified strategies and activities, a realistic budget should be made. Timely acquisition of resources will help you to implement your activities as per plan.

8.2.7 Monitoring and evaluation of the plan

In order to monitor the progress towards achieving the set targets, accurate data collection, compilation, and analysis is paramount. Therefore, it is a pre-requisite to ensure availability of data collection tools at the primary source of data collection (immunisation service delivery point). These are mainly EPI tally sheets, Child Health or Immunization regiters, TT Immunization registers and Monthly Immunization Summary or reporting forms. In summary, monitoring the progress in implementing the planned activities is by regular support supervision, meetings and reviews of reports like: monthly and quarterly reports. In addition use supervisory visit reports.

The action to be taken will be based on data analysis where issues of poor access, poor utilisation, or both have been identified.

EPI performance Monitoring is discussed further in unit 10.

8.3 Planning for immunisation services at County and Health Facility levels

The key to improving immunization services is a county plan, which aims to provide immunization sessions to reach every infant and woman in the county. Making such a plan needs teamwork, with close collaboration between county and health facility staff.

In this section, the steps leading to a good quality immunization plan for a county is described.

8.3.1 Planning for immunisation services at Health facility

Every health facility should make its own work plan showing how every village or community will receive Immunisation services throughout the year. The plan can be regularly revised based on data obtained through regular monitoring and problem-solving activities (as discussed in unit 9). At this level the planning team must:

i) Review the target populations to be covered and set targets. Every year, the State, County and health facilities should project their target populations using data from Census Bureau of Southern Sudan. Such data could be adjusted using the Polio NIDs outputs

ii) Map the catchment area showing Payams, Bomas/Villages/Locations, roads, and high risk population areas, natural barriers that affect easy access to immunisation services like rivers, swamps or hills. It should show the location of the health facility and the existing outreaches; also indicate structures like schools, or places of worship or private clinics.

iii) Review performance by Payam/Boma, with special emphasis on identifying problem areas. Aanalyze causes of the problems and find possible solutions (issues of vaccine and immunization supplies, staffing, or transport, flooding of rivers, and community demand).

iv) Determine the underserved populations.

v) Identify activities to address the bottlenecks.

vi) Identify areas that will be served by the static unit i.e. the health facility catchment area. Determine the type of immunisation strategy that will benefit that community, those that will need outreaches or mobile teams (as shown in figure 8.2) and the resources that will be needed and their sources – personnel, transport, allowances, supplies and logistics.

vii) Budget for the resources needed to implement the plan.

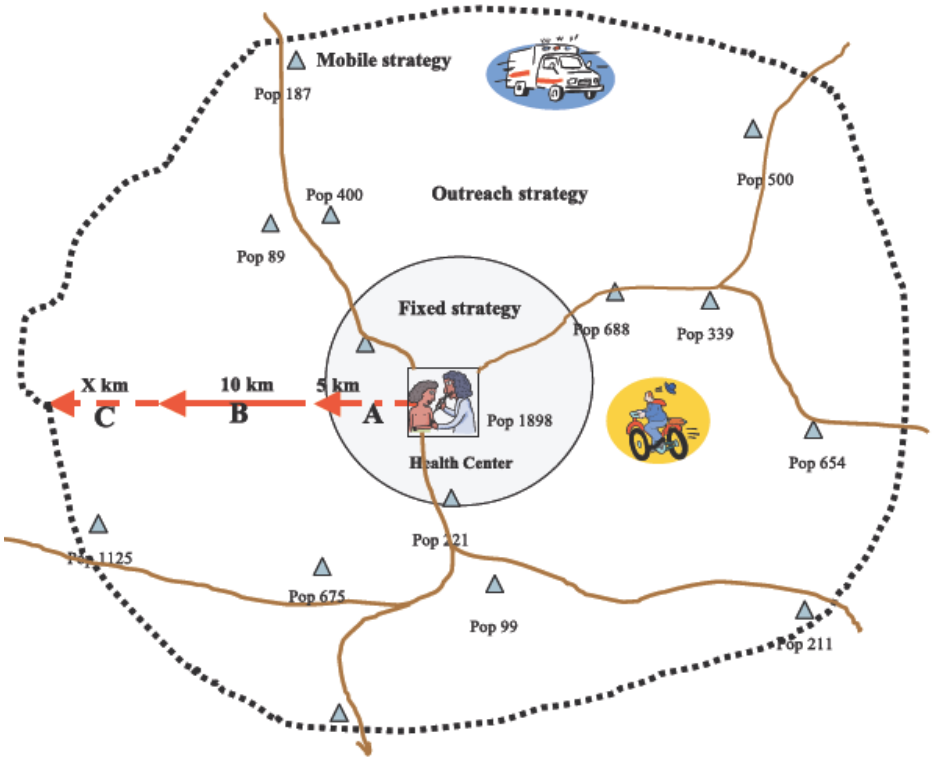


Figure 8.2: Mapping of Health Facility Catchment Population

Key

A. Communities living within a radius of 5km from the health facility should get their services at static unit (fixed strategy).

B. Communities living in a distance of between 5 to 10 km should be served by an outreach and the team will need transport – motor cycles or bicycles; and

C. Communities living in a distance beyond 10km from a health facility should be served by a mobile team and the team will need a vehicle or motorcycle.

Table 8.2: Guidelines to determine the immunisation strategy

Type	Definition	Area served	Advantages	Disadvantages
Fixed (static) site	Delivery of vaccination services in a health facility with a fridge on a regular basis.	Distance which mothers can travel to reach service point without much difficulties. Usually within approximate distance of 5 km	Reliable regular service, staff available all the time, low cost, no transport or allowances are needed	Cannot reach much of the population especially in rural areas
Outreach	• Delivery of vaccination services away from a health facility but at a point agreed upon between healthy facility and community members. • Health facility staff carry the needed equipment to the "outreach site"	• Within the health facility catchment area where Health facility staff can easily visit in a day • Approx. 5 to 10 km depending on geographic barriers	• Regular service • Can reach populations beyond the reach of fixed site	• Needs good communication with community members • Higher costs (transport, more than one person per site) • Sites are not fully equipped
Mobile team	• Delivery of vaccination services in areas beyond the "outreach area" (normal catchment area of a Health facility) • More than one site visited per session • Health facility staff carry all the needed equipment to the "mobile site"	• Area beyond the outreach site catchment • Especially for difficult to reach areas/populations • May be conducted over several days	• Can reach difficult to reach areas/ populations, previously un reached • If transport is adequate, can include other interventions like ITN distribution and treatment of minor illnesses	• High costs (transport, fuel, staff allowances etc) • Less reliable • Subject to availability of extra resources

Once the annual plan of action for immunization is completed (illustrated in Table 8.3), it should be integrated with the health services plan for the facility to determine the total resources needed to deliver the minimum healthcare packge. It is desirable that each session should have a defined community laison person through whom all communications about the planned session are made to the community. Where possible, a phone contact should be established with the community liason person for ease of communication whenever re-scheduling or there are delays in sessions start time.

Most importantly, the annual plan for immunization should be translated into short duration action plans (either monthly or quarterly) to guide everyone involved in service delivery. Specially, this helps to ensure that the health facility immunization plan is implemented. Table 8.4 illustrates an example of a quarterly plan of action for routine immunization services delivery.

8.3.2 Compiling the health facility services map to form a county Plan

The completed Health facility immunization services micro-plan should be submitted to the county level so that it is integrated to form a county immunization services plan (Illustrated in figure 8.3 and table 8.5). It should contain a schedule of all outreaches and mobile immunisation sessions. A copy of health facility immunization plan should be available at the Health facility for routine reference.

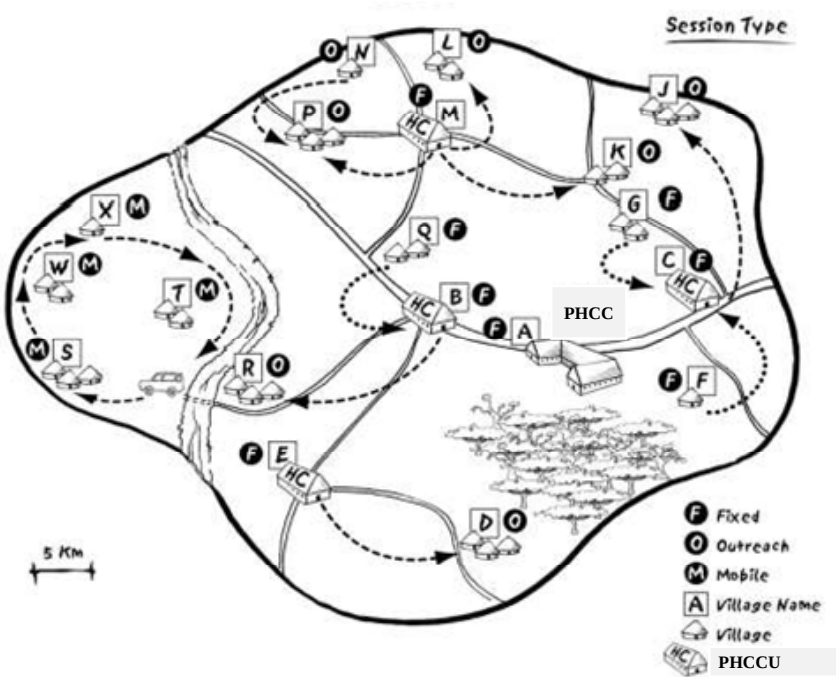


Figure 8.3: A county Immunization Sessions Mapping

Check the quality of your County EPI plan

Quality of planning element	Yes	No
Are all Bomas covered by the session plan and workplan with at least four sessions per year?		
Are all temporary settlements, minorities, underserved groups covered by the session and workplan with at least four sessions per year?		
Is there any overlap/double booking (e.g. mobile team scheduled to be at two places at the same time)?		
Is there enough staff time to implement all the planned sessions? If not, can some sessions be combined?		
Is it clear who will consult with communities and inform them of the date/place of next sessions?		

Note:

Primary Health Care facilities (PHCC or PHCU) that have not yet been established as static units (i.e. without a fridge) can conduct static sessions by collecting vaccines and other supplies from a nearest health facility with a fridge.

8.3.3 Planning for outreach services

- Outreaches should be organised periodically, at an interval of once a month: DPT (or other DPTcombinations), OPV and tetanus toxoid vaccines require an interval of at least a month between doses.
- Every Boma should have at least one outreach per month.
- For very large Boma, plans should be made to have more than one outreach to cover the whole Boma equitably.

At the health facility level, the planning team should:

- Map out the target areas that a health facility should serve for each outreach session planned.
- Know the size of your target population i.e. children under one year, pregnant and non-pregnant women in each planned outreach catchment. This will help you plan for adequate resources required for each component of the package.
- Estimate the expected number of clients for each outreach session to adequately plan for the resources required, allowing for buffer stocks to avoid stock-outs. Where previous turn up records are available, use them to estimate the likely attendance for future sessions.

During the planning and budgeting for the delivery of immunisation services, the following should be planned for:

Personnel: Ensure that personnel are available for the outreach sessions and are informed in advance of their task (1 or 2 trained health workers, and Boma mobiliser, preferably selected by the sub-chief). Plan for their allowances

Transport: Mobilise the appropriate transport requirements. The form of transport (vehicles, motorcycles, bicycles, boats or donkeys) should be reliable and mobilized prior to fixing the outreach.

Note:

In addition to immunisation, plan for delivery of integrated package at outreaches like malaria treatment, antenatal care, de - worming, vitamin A supplementation for targeted age groups.

Table 8.3: Example of Immunization Sessions plan for a Health Facility

State ..... County ..... Health facility .....

Payam/Boma I	Total pop. II	Target pop. (*4% of total population for this exercise*) III	Health facility providing service IV	Session type: *Fixed/outreach/mobile* V	Vaccination contacts per year(*target population X 7*) VI	Contacts per month (*injections per year divided by 12*) VII	Sessions per month (*divide by 70 for Fixed and 35 for Outreach*) VIII	Sessions per month (Date of session) *Fixed >=70 injections per session, or Outreach >=35 injections per session* IX	Resources required to effectively deliver the service (per year)
K	500	20	outreach from **M**	Outreach	140	12	0.34	1 (2nd Tuesday of Month)	Use motorbike
L	625	25	outreach from **M**	Outreach	175	15	0. 43	1 (3rd Tuesday of Month)	Use motorbike
M	1,875	75	**PHCC**	Fixed	525	44	0.63	1 (Last Friday of Month)	1 Motorcycle (600SDG) and OR allowances (100 SDG)
N	250	10	Can reach outreach at **P**	Outreach at **P**	70	6 (add to P)	-	-	
P	1,000	40	outreach from **M**	Outreach	280	23 + 6 = 29	0.82	1 (3rd Thursday of Month)	Use motorbike
S	750	30	river passable in dry season	Mobile	210	Atleast four mobile team visits per year in dry season to serve Bomas S, T, W & X. Workload (no. of injections) per mobile team visit = Annual workload S, T, W, X)/4 i.e. 158 injections per mobile team visit.			Vehicle is needed, fuel, drivers allowance, vaccinations/HWs allowances, community mobilization etc
T	625	25	river passable in dry season	Mobile	175				
W	625	25	river passable in dry season	Mobile	175				
X	250	10	river passable in dry season	Mobile	70				
TOTAL	6,500	260			1,820				

Table 8.4: Example of immunization workplan for first quarter 2012: Health facility M conducting outreach at K, L, P and N

Boma	Session plan	January	February	March
M	Fixed session 1st Wednesday	Date scheduled 5th Jan Date held _____	Date scheduled 2nd Feb Date held _____	Date scheduled 2nd Mar Date held _____
K	Outreach every 2nd Wednesday at community facility	Date scheduled 12th Jan Date held _____ Transport: Motorbike	Date scheduled 9th Feb Date held _____ Transport: Motorbike	Date scheduled 9th Mar Date held _____ Transport: Motorbike
L	Outreach every 3rd Wednesday at community facility	Date scheduled 19th Jan Date held _____ Transport: Bicycle	Date scheduled 16th Feb Date held _____ Transport: Bicycle	Date scheduled 16th Mar Date held _____ Transport: Bicycle
P and N	Outreach every 4th Wednesday at community centre at Boma P	Date scheduled 26th Jan Date held _____ Transport: Motorbike	Date scheduled 23rd Feb Date held _____ Transport: Motorbike	Date scheduled 23rd Mar Date held _____ Transport: Motorbike
Activities for this Quarter		1. Training in AD syringe use 2. Meet community leaders monthly	1. Supply safety boxes for every session 2. Ensure pregnant women get TT at outreach	1. Quarterly meeting on 28th March 2. Training in VVM use
New activities to solve problems (based on data analysis and monitoring)		1. Report staff shortages, request help from county 2. Visit migrant community	1. Reschedule outreach at K 2. Request extra resources for migrant community	1. Plan outreach for migrants 2. Follow up defaulters in Boma M
Monitoring of Vaccination plan implementation		Number of sessions held in January:_____ Number of sessions planned in January:_____	Number of sessions held in February:_____ Number of sessions planned in February:_____	Number of sessions held in March:_____ Number of sessions planned in March:_____
		Is the cumulative DPT-3 monitoring graph on target?	Is the cumulative DPT-3 monitoring graph on target?	Is the cumulative DPT-3 monitoring graph on target?

Table 8.5: Example of Health Facility Immunization Session plans aggregated into a County plan

Payam/Boma I	Total pop. II	Target pop. (*4% of total population for this exercise*) III	Health facility providing service IV	Session type: *Fixed/outreach/mobile* V	Vaccination contacts per year(*target population X 7*) VI	Contacts per month (*injections per year divided by 12*) VII	Sessions per month (*divide by 70 for Fixed & 35 for Outreach*) VIII	Sessions per month (and date) *Fixed >=70 injections per session, or Outreach >=35 injections per session* IX	Resources required to effectively deliver the service (per year
A	10,000	400	**COUNTY PHCC**	Fixed	2,800	233	3.33	4 Every Monday	Bicycle (300 SDG) & 2 vaccinators on the payroll
B	5,000	200	**PHCC**	Fixed	1,400	117+12= 129	1.84	2 (every 2nd Tues)	Motorcycle (600 SDG) and outreach allowances (120 SDG)
C	3,750	150	**PHCC**	Fixed	1,050	88+6+12=106	1.51	2 (Every 2nd Mon)	2 Bicycles (600 SDG) OR allowances (240 SDG)
D	1,250	50	outreach from **E**	Outreach	350	29	0.82	1 (1st Monday)	Served from E
E	2,500	100	**PHCC**	Fixed	700	58	0.83	1 (2nd Monday)	Motorcycle (600 SDG) and outreach allowances (120 SDG
F	250	10	can reach **C**	Fixed at **C**	70	6 (add to C)	-	-	
G	500	20	can reach **C**	Fixed at **C**	140	12 (add to C)	-	-	
J	1,250	50	outreach from **C**	Outreach	350	29	0.82	1 (1st Tuesday)	Served from C
K	500	20	outreach from **M**	Outreach	140	12	0.34	1 (2nd Tuesday)	Served from M
L	625	25	outreach from **M**	Outreach	175	15	0. 43	1 (3rd Tuesday)	Served from M
M	1,875	75	**PHCC**	Fixed	525	44	0.63	1 (Last Friday)	1 Motorcycle (600SDG) and OR allowances (100 SDG)
N	250	10	Can reach outreach at **P**	Outreach at **P**	70	6 (add to P)	-	-	
P	1,000	40	outreach from **M**	Outreach	280	23 + 6 = 29	0.82	1 (3rd Thursday)	Served from M
Q	500	20	can reach **B**	Fixed at **B**	140	12 (add to B)	-	-	
R	1,250	50	outreach from **B**	Outreach	350	29	0.82	1 (4th Thursday)	Served from B
S	750	30	river passable in dry season	Mobile	210	Atleast four mobile team visits per year in dry season to serve Bomas S, T, W & X. Workload (no. of injections) per mobile team visit = Annual workload S, T, W, X)/4 i.e. 158 injections per mobile team visit.			Vehicle is needed, fuel, drivers allowance, vaccinations/HWs allowances, community mobilization etc
T	625	25	river passable in dry season	Mobile	175				
W	625	25	river passable in dry season	Mobile	175				

X	250	10	river passable in dry season	Mobile	70				
TOTAL	35 250	1410			9,870				

Table 8.6: Sample mobile team schedule for the year (taken from Table 8.5)

Bomas	Total Popn	Target Popn	Injections per year (target popn X 7)	Workload per session	Other Interventions planned	Planned Dates	Vehicles Needed	Staff needs
S, T W and X	2,250	90	630	158 injections per mobile team visit	Vit A and ITNs	Jan Mar May Oct	County and NGO Car	4 Health workers + 2 Driver

These tables will:

1 Remind the service providers of the appointment for the next sessions

2 Help health unit staff to plan for each Boma in a Payam,

3 Help supervisors to follow up service providers to outreaches

4 Helps in auditing of outreaches functionality

5 Monitor performance of the delivery of immunisation services (regularity of outreaches)

A copy of this schedule should be provided to the community mobilizers and other persons involved in mobilisation. Any change of the date of appointment should be communicated to all health workers and community contact persons in advance.

8.3.4 Planning for mobile or acceleration campaigns for remote and hard to reach areas

In some states of Southern Sudan there are areas that cannot be reached regularly throughout the year. This may be due to many factors, including remoteness, and seasonal factors such as flooding in the rainy season. Under these circumstances, using mobile teams may be the best way to provide immunization services

Mobile teams provide outreach services but work like a small regular campaign. They can visit several sites over the course of one or more days during the dry season. Since mobile teams will only have a few days in which to do their work, careful planning is needed.

Mobile teams will need extra resources. Therefore, planning should be carried out in onsultation between health facility, county and other levels.

a. Decide which areas need mobile teams.
Refer to the map and session plan in Section 1. When making the plan indicate which areas need mobile teams.

b. Decide how many times per year the mobile team should visit these areas.
A minimum of four visits will be needed to fully immunize infants and pregnant women.[1]

c. Consider what other interventions can be added to immunization when the area is infrequently visited, e.g. malaria control, vitamin A supplementation, anti-parasitic control.
A mobile team session offers a special opportunity to add other interventions to the immunization service. These may include vitamin A and other nutritional supplementation, provision of insecticide-treated mosquito nets (ITNs), and antihelminthiasis treatment etc. according to local need and operational feasibility.

d. Estimate resources needed and submit the plan to the next administrative level.
These include vehicle, driver, fuel, extra staff, extra supplies for other interventions.

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[1] An infant can be fully immunized with a *minimum* of 6 contacts but 7 contacts should be planned for:
Contact 1: 1st TT dose in Pregnancy
Contact 2: 2nd TT dose in Pregnancy
Contact 3: BCG and OPV 0
Contact 4: DPT1, OPV1
Contact 5: DPT2, OPV2
Contact 6: DPT3, OPV3
Contact 7: Measles, vitamin A

e. Request vaccine and supplies for mobile teams.
Request the state level for vaccine, cold box and other immunization supplies. It is easier to bring these from the state with the mobile team vehicle than to use county supplies.

f. **Carefully plan the route and notify the communities in advance**.
Mobilization of the communities is vital when mobile team visits are infrequent. Ideally, plan the visits well in advance and communicate the time and place of each site to each community well in advance.

g. **Look for opportunities for joint planning and pooling of resources with other teams, to deliver various interventions**.
The opportunity to deliver other interventions with immunization to under-served areas will be welcomed by other teams (malaria, nutrition etc). Planning and implementing together will ensure efficient use of resources.

h. Make a schedule for mobile team visits.
Table 8.6 shows an example of a schedule for mobile team visits. You should decide first what other interventions are needed and how these will be provided. The schedule for mobile teams needs to be discussed with the various other teams (malaria, nutrition etc.) and be approved by the appropriate level, since additional resources, e.g. vehicle, driver etc, are required.

i. Use polio plans, data, and results of NIDs to make detailed mobile team plans.
Mobile teams do not usually work "house-to-house" as in some polio NIDs. However the information on population size and distribution from polio NIDs done in the area will be very useful for planning.

j. Consider increasing the target group to under 24 months, since four contacts may not be sufficient to fully immunize the whole birth cohort.

8.3.5 Special planning for urban immunisation services

High population density, poor sanitation and poor nutrition often found in urban areas, lead to higher transmission of diseases, infection of younger children and higher mortality.

The modalities for providing immunisation services in crowded urban areas may differ from rural areas for many reasons, including the following:

- High mobility of the resident population.
- Rumours and misconceptions thrive more in crowded areas.
- The existence of "illegal" settlements that may not be recognized by the government.
- The existence of different religious or cultural beliefs and practices
- Absence of information on the size of the population living in urban areas
- The lifestyle of the population

The key to provision of adequate immunisation facilities to the urban areas is regular, high quality, uninterrupted service at accessible delivery points.

Urban immunisation services may be operationalized in the following way:

a) Fixed site, fixed time for provision of services.

This should include:

- All fixed sites including dispensaries, clinics and maternity homes in the public sector.
- All NGOs engaged in providing health care in urban areas.
- Any private practitioner willing and able to be part of this network.

b) Communication through health workers, NGOs active in the area, print media, television, and radio about the following:

- The timing of local immunisation services;
- Local service delivery points;
- The vaccines and schedule of immunisation;
- The benefits of immunisation.

c) Urban outreach: expanding the network of urban service provision points from the health facility:

- Establish contact with the local leader and obtain support.
- Estimate size of population and frequency of sessions (same as with rural areas).
- Set up a site in every urban slum, with a team of two trained health workers, to provide Immunisation services on a regular (weekly or monthly) basis.
- Use the same principles for creating a session plan and work plan (described in previous section) for the expanded network of urban outreach.
- Plan location of sites, frequency, and timing of service to suit the local population.
- Communicate the time and dates of sessions to the community (using existing channels in the community like loudspeakers, religious or mothers' groups etc.).
- Ensure a regular uninterrupted service to gain the trust and cooperation of the community.
- Where possible, in agreement with community leaders, conduct a house to house immunisation strategy. Alternatively, discuss the possibilities of providing immunisation services over weekends to suit working parents and clients

Careful planning is absolutely necessary to achieve high immunisation coverage rates. Planning ensures that adequate supplies, vaccines, staff etc can be made available. But good planning also entails that recipients know in advance when the next immunisation session will be held.

Remember:

Do not blame the community for low attendance at sessions. Low attendance is often caused by poor planning and/or poor communication by service providers

8.3.5 Planning for immunisation services at community level

To make sure that your plan will be effective, you will need to involve the community you serve.

a) Spend time with local government officials and especially so the community leaders. Local government officials and community leaders can help you decide:

- When to hold Immunisation sessions
- Where to hold outreach sessions
- Who can help you mobilize the community (community liaison person)
- Who can help you during sessions?
- Identify challenges to immunisation services in the community

Local leaders play an important role in their communities. They can help you reduce resistance, deal with rumours, and handle other situations that may affect the success of immunisation sessions. They should be well informed about your activities. In some areas they maintain a complete register of the community. Ask them to help you reach people who do not normally use immunisation services.

b) Work with religious leaders

Work with local Religious leaders to mobilize parents for immunization through places of worship. Church/ Mosque leaders are respected opinion leaders in the communities. Involve them in social mobilization and ask them to mobilize to mobilize their faithfuls for immunization services. Also ask them to announce days, dates and times for immunization sessions during prayers

c) Identify a local contact person

A local contact person is someone who can help you:

- ► Remind mothers and fathers when to bring their children for vaccination;
- ► Alert parents that the vaccination session will take place on the following day;
- ► Spread the word in the village that the outreach team has arrived;
- ► Encourage women to obtain their tetanus toxoid vaccination;
- ► Organize sessions in the outreach
- ► Set up an immunisation session.

Always obtain the telephone number of the local contact for communication before the session (remind him/her about the day, dates and time, or cancellation or postponement in case it is inevitable prior to the immunisation day).

d) Train local people

Local people like village health committee members or payam/Boma mobilisers should be trained on the following:

- ► Follow up on clients who do not return for second or third doses
- ► Follow up on newborns who have not begun their immunisation
- ► Organize client flow during the session
- ► Distribute written information
- ► Weigh children

Local volunteers are critical in identifying newborns and reaching mothers who have not immunized their children. Consider recognizing the contributions of your volunteers.

e) Give feedback to people in the community

Keep people informed and involved by continually sharing with them information on:

- ► Whether the incidence of disease is going down because of immunisation services.
- ► The proportion of children and pregnant women who have been immunised.
- ► The proportion of children and pregnant women who have not started immunisation or completed.
- ► How close your health facility is to reaching your immunisation goals.
- ► Any outbreaks of diseases in your locality or neighbourhood for which they need to be vigilant (and encourage people to get vaccinated).

Feedback encourages people to become involved in identifying their own problems and finding solutions. For detailed information, see unit 8 on building links with the community.

Any change in the session plan (frequency, change of date or location) should be done in consultation with the community leaders and mothers should be informed well in advance about the changes.

8.4 Estimating vaccine and supplies needs

At each session — whether fixed, outreach, or mobile — it is essential to have sufficient supplies immediately available. Remember that mothers may be making great efforts to attend immunization sessions with their infants. If there are not enough vaccines or syringes at the session and mothers have to return home with their children not immunized, the community will lose confidence in the service.

This section deals with how you can make sure that, at the county and health facility level, you have sufficient vaccine and supplies available for each session on your monthly workplan.

8.4.1 Estimating the vaccine and supply needs for a Fixed Immunization session

Table 8.7 shows the minimum level of vaccine and supplies which should be available at the time of a fixed session of 70 injections, plus OPV and including TT for pregnant women. Note that these calculations do not need any allowance for wastage, since the session is being conducted at a fixed site (in a health facility by definition), where there is access to additional vials and supplies in the health facility. You should have access to at least one extra vial of each vaccine plus diluent, and 10% extra syringes during the fixed session.

Table 8.7: **Vaccines and supplies needs for a 70 injections Fixed session for routine immunization**

Fixed Session	**BCG (20 dose Vial)**	**OPV (10 dose vials)**	**DPT (10 dose vials)**	**Measles (10 dose vials)**	**TT (WCBA, 10 dose vials)**	BCG ADS (0.01Mls)	AD Syringes for other vaccines (0.5Mls)	Mixing Syringes	Safety Boxes
Number of injections	10	30	30	10	20			1+1 for BCG & 1+1 for measles	1 for every 100
Session needs	1 vial + 1 diluent ampoule Plus 1 Vial and 1 diluent as reserve	3 Vials Plus 1 Vial as a reserve	3 Vials Plus 1 Vial as a reserve	1 vial + diluent ampoule Plus 1 Vial and 1 diluent as reserve	2 Vials Plus 1 Vial as a reserve	40	(40+30+20) = 90	4	2

8.4.2 Estimating the vaccine and supply needs for an outreach Immunization session

Table 8.8 shows the minimum level of vaccine and supplies which should be available for an outreach session of 35 injections (including TT for pregnant women) and OPV. These figures can help when deciding how much vaccine and supplies to take before leaving the health facility to do an outreach session. In addition to this minimal supply it is safer to take an extra vial of each vaccine and some extra syringes as a safeguard against running out of vaccine. If you think there will be more than 35 injections to be given at a single outreach session, it is easiest just to double the supplies you take. As previously stated, these are assumptions used for this module; you may need to increase or decrease the number of injections, and therefore the supplies needed, according to your circumstances.

Table 8.8: **Vaccines and supplies needs for a 35 injections outreach session for routine immunization**

Oureach session	**BCG (20 dose Vial)**	**OPV (10 dose vials)**	**DPT (10 dose vials)**	**Measles (10 dose vials)**	**TT (WCBA, 10 dose vials)**	BCG ADS (0.01Mls)	AD Syringe for other vaccines (0.5Mls)	Mixing Syringes	Safety Boxes
Number of injections	5	15	15	5	10			1+1 for BCG & 1+1 for measles	1 for every 100
Session needs	1 vial + 1 diluent ampoule Plus 1 Vial and 1 diluent as reserve	2 Vials Plus 1 Vial as a reserve	2 Vials Plus 1 Vial as a reserve	1 vial + diluent ampoule Plus 1 Vial and 1 diluent as reserve	1 Vial Plus 1 Vial as a reserve	40	(30+20+20) = 70	4	2

Assumptions about session needs estimations:

1. If seven injections are needed to fully immunize an infant and pregnant women: BCG will be one seventh (1/7), measles one seventh (1/7), DPT or DPT/HepB three seventh (3/7), and TT two sevenths (2/7), making seven in all. Of course other non-injectable antigens (OPV) and interventions (Vitamin A) will also be given.
2. Table 8.7 and 8.8 shows the minimum requirements for sessions of 70 injections for a fixed session or 35 injections for an outreach session (only an estimate).

Note that

1. The needs at service delivery level are shown as number of *vials,* not number of *doses.*
2. Always take sufficient AD syringes to match the number of doses in each vial.

8.4.3 Estimating the vaccine and supply needs for each health facility and for the entire county for one month

At the county level you will receive vaccine on a monthly basis from the state level. The amount of vaccine you receive will be based upon the doses needed for the population you serve, with a wastage multiplication factor. It is the county's job to distribute the vaccine and other supplies to every health facility to enable it to conduct its planned fixed and outreach sessions.

The best way to provide vaccine from county to health facility level is according to the number of vials required for each session multiplied by the number of planned sessions, rather than doses required by population. This is because the exact number of infants

attending each session will not be known in advance, and opened vials often have to be discarded at the end of a session (this applies to all reconstituted freeze-dried vaccine vials, and other vaccines where the multi-dose vial policy is not feasible). Table 8.9 illustrates how the vaccines and supplies estimates can be calaculated per month based on the data from Tables 8.5, 8.7 and 8.8.

Table 8.9: **Operational method of estimating needs of health facility M**

	Estimating Fixed Session Needs			**Estimating Outreaches Session Needs**			
EPI vaccines and supplies	**Needs for one Fixed session** (Refer to example in Table 8.7)	**No of fixed sessions in a month** (Refer to example in Table 8.4)	**Total Monthly needs for Fixed Sessions**	**Needs per Outreach session** (Refer to example in Table 8.8)	**No of outreach sessions in a month** (Refer to example in Table 8.4)	**Total monthly needs for OR sessions**	**Grand Total Needs**
	(A)	**(B)**	**(C) = AxB**	**(D)**	**(E)**	**(F)= DxE**	**(G) = C+F**
BCG 20 dose Vials	2	1	2	2	3	**6**	8
BCG Diluents	2	1	2	2	3	**6**	8
DPT 10 dose vials	4	1	4	3	3	**9**	13
OPV 10 dose vials	4	1	4	3	3	**9**	13
Measles 10 Dose Vials	2	1	2	2	3	**6**	8
Measles Diluents	2	1	2	2	3	**6**	8
TT 10 dose vials	3	1	3	2	3	**6**	9
BCG Reconstitution ADs (2 Mls)	2	1	2	2	3	**6**	8
Measles Reconstitution needles (5Mls)	2	1	2	2	3	**6**	8
BCG ADs (0.1 mls)	40	1	40	40	3	**120**	160
Standard ADs (0.5 mls)	90	1	90	70	3	**210**	300
Safety Boxes	2	1	2	2	3	**6**	8

The EPI vaccines and supplies for a county is simply a sum total of all the individual health facility needs as estimated in table 8.9 above. Once the county estimated needs based on sessions is calculated, the County EPI supervisor (or incharge) should ensure that the monthly level of supplies received into the county — which is based upon population numbers and doses with a standard wastage rate — is not lower than this operational estimate.

If there is a difference between the amounts you consume (based on the session estimates) and the amounts you receive, discuss the issue with the higher level to identify the causes (difference in population estimates, higher wastage rates than anticipated, nonadherence to MDVP etc.) to find a solution. You should also avoid over-stocking vaccines by adjusting your monthly order according to the existing stock balance.

Making the best use of EPI vaccines and supplies

Vaccines and AD syringes should be used prudently as possible. Here are some tips to help ensure that optimal levels of supplies are available, while reducing wastage.

1) When ordering vaccine and supplies always adjust for the amount in stock.
2) Use multi-dose vial policy whenever applicable.
3) Try to maximize attendance at every session:
   - ► Follow up on defaulters
   - ► Ensure good communication of session dates, times and locations
   - ► Keep reliable sessions according to the plan
   - ► Monitor attendance and combine small sessions where feasible.
4) Use the most relaible population estimates to avoid shortage of supplies.

Revision Questions

1 What are the operational components of immunization systems?

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2 List the steps to follow during the planning process for immunization services and describe each step.

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3 Describe the RED/REC strategy.

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4 What are the components of the REC strategy?

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5 What factors do consider prior to planning for immunization services at: a) Health facility level b) Community level

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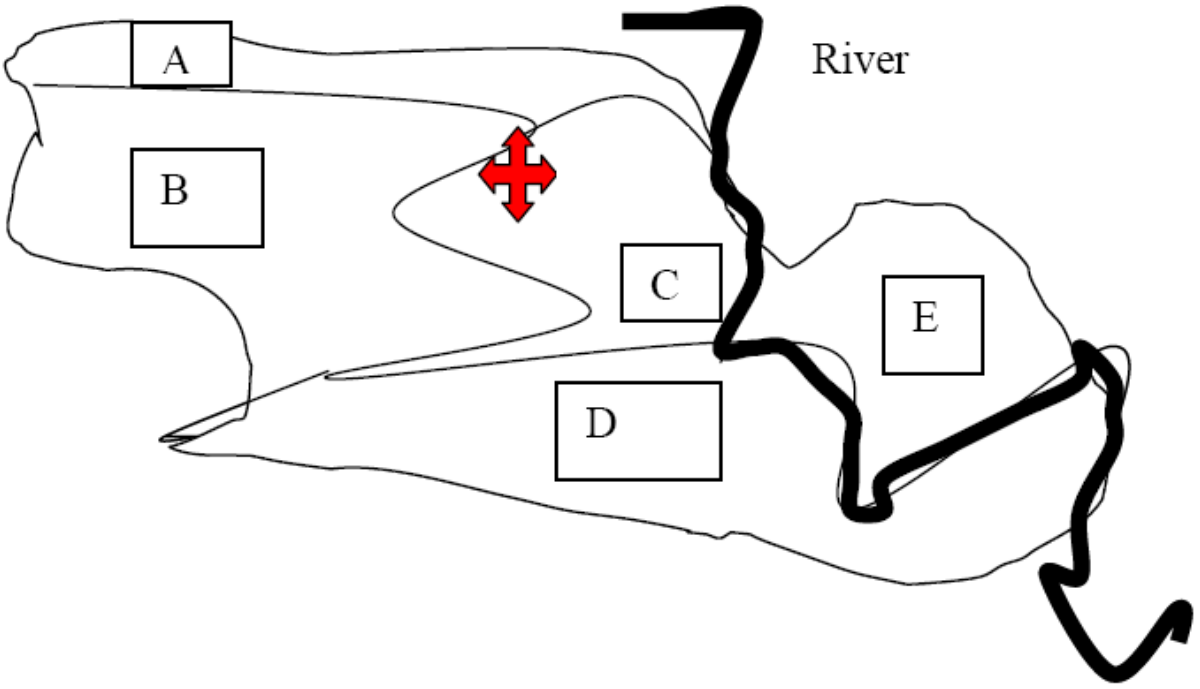
Practice Exercise 8

1. Wau PHCC serves a total population of 40,000 with one static and 40 outreach sites. The community lives in five Payams (Payam A = 10,000 population in three bomas, Payam B = 6000 population in two Bomas, Payam C 20,000 all within 5kms of the Health Center, Payam D = 2,000 population in 4 Bomas and Payam E = 2,000 population in 4 Bomas, this payam is hard to reach and totally inaccessible during the rainy season. See Fig 1. The people have misconceptions on disease causation and lack knowledge on the benefits of immunization.

   Skect map illustrating Payams in Wau PHCC catchment Area



In the previous year the DPT1, DPT3 and measles administrative coverage was 46%, 20% and 12% respectively and there was measles outbreak in village E, 57 cases and two deaths.

What are the immunization programming problems in the population served by Wau PHCC?

Write the actions you would take step by step to solve the problems in the EPI program of the health center.

a) Prepare a session plan for the health center (assume that 70 injections can be given in a fixed immunization session and target surviving infants under one year of age 4%)

b) Draw the map of the health center catchments area and put the corresponding population size to each village in the map and mark the immunization sites (use the alphabets M, F and O for mobile, fixed and outreach sites respectively)

c) What communication activities and strategies would you plan?

d) What monitoring tools and indictors would you include in your plan to track the implementation of your plan and measure your achievements? Plan to monitor communication activities , Coverage and Utilization

2. Akobo Payam has three Bomas and a total population of 10, 000. If pregnant women and children under one represent 4% and non-pregnant women are 20% of the Payams population,

   a. Calculate the number of:

      - Total births/under one children
      - Surviving infants
      - The number of children eligible for DPT1/OPV1, DPT3/OPV3 and Measles.

   b. If you assume to cover the Payam with outreach sessions and intend to reach all children and vaccinate 25% and 20% of pregnant and non-pregnant women respectively with two doses of TT.

      - Calculate number of injections needed per year?
      - Calculate number of injections needed per month?
      - What is the total number of outreach sessions required in a year to vaccinate all children? (Assume 70 injections per session)
      - What will be the total number of sessions required per month?
      - If you want to conduct outreach sessions every month, how many outreach sites should you open?
      - In what condition would you consider mobile teams?

   c. If you have planned to cover 90% of all births with BCG, and 80% of the surviving infants with DPT3 and Measles, 30% of Pregnant & 20% of the Non pregnant women in Akobo Payam with TT. Assume also the Wastage factor for BCG, DPT, TT and Measles are 2, 1.11, 1.11, and 1.25 respectively

      - Calculate the annual number of BCG doses required
      - Calculate the annual number of BCG vials of 20 dose needed
      - Calculate annual number of DPT doses needed
      - Calculate the annual number of Measles doses needed
      - Calculate the annual number of TT doses required

Answer to exercises

a. Total births = **10,000 x 4/100**

= 10,000 x 0.04

= 400 children,

Calculate the number of surviving infants

The number of surviving infants equals total births minus infant deaths,

Total births is 10,000 x 40 /100 = 400 and

The number of infant deaths is 400 x 102/1000 = 41

Therefore the number of surviving infants (SI) = 400 – 41 = 359

What is the number of children eligible for BCG

All live births are eligible = 400

What is the number of children eligible for DPT1/OPV1,DPT3/OPV3 and Measles

All Surviving infants are eligible for DPT1/OPV1,DPT3/OPV3 and Measles=359

b. If you assume to cover the payam with outreach sessions.

- Calculate number of injections needed per year?

  Injections = Elgible x 7= 400 x7=2,800

- Calculate number of injections needed per month?

  Annual injections /12= 2800/12=233

- What is the total number of outreach sessions required in a year to vaccinate all children? (Assume 70 injections per session)

  2800/70 = 40

- What will be the total number of sessions required per month?

  40/12=4 (rounded up from 3.3)

- If you want to conduct outreach sessions every month, how many outreach sites should you open?

  Three (3)

- In what condition would you consider mobile teams?

  In hard to reach areas, where one team may visit more than one village in outreach

c. Vaccine forecast, assumed you have planned to cover 90% of all births with BCG, and 80% of the surviving infants with DPT3 and Measles, 30% of Pregnant &Non pregnant women in Akobo Payam Assume also the Wastage factor for BCG, DPT,TT and Measles are 2, 1.11, 1.11, 1.25 respectively

- Calculate the annual number of BCG doses required

  400 x 90/% x 1 dose x 2 wastage Factor =720

- Calculate the annual number of BCG vials of 20 dose needed

  720/20=36

- Calculate annual number of DPT doses needed

  359 x 80% x 3 doses x 1.11 =956

- Calculate the annual number of Measles doses needed

  359 x 80% x 1 dose x 1.25 =359

- Calculate the annual number of TT doses required

  (400 pregnant + 2000 non prg) x 30% x 2 dose x 1.11= 1,598

UNIT 9: BUILDING ALLIANCES WITH COMMUNITIES TO ENHANCE PARTICIPATION IN IMMUNIZATION

9.1. About this Unit

Building good relationships with community members and their leaders in advance is essential and key in attainment of full benefits of the immunization programme.

This module explains how building alliances can widen participation of partners in the immunisation programme, gain community support and make the immunisation services responsive to community needs. In addition, communicating with parents has also been discussed in this module.

The unit covers the following topics:

- Community assessment including data collection
- Mobilization of the community using suitable methods and messages,
- Roles of the community in mobilization,
- Management of rumours and misinformation about immunisation.

Learning objectives

After studying this unit, you should be able:

1. To outline the type of information you would collect from the community.
2. Discuss methods suitable for mobilising the community.
3. Outline key messages on immunisation to be communicated to parents and caretakers.
4. Describe the roles of the communities in mobilisation for immunisation services.
5. List the key partners in mobilisation for immunisation.
6. State the roles of the key partners in enhancing community participation.
7. Discuss management of rumours and misconceptions on immunisation.

Performance objectives

After studying this unit, you should be able to perform the following:

1 Conduct community needs assessment for immunisation services

2 Mobilise the community for immunisation using suitable methods

3 Carry out health eduction to parents and caretakers.

4 Manage rumours and misinformation on immunisation

9.2. Conducting a community asessment

If the health worker is born in the catchment area of his health facility, s/he will already know the networks, settlement patterns, social and community networks and the related behaviours. Such knowledge should be used whenever available. However, it is not uncommon to start from scratch.

In order to conduct a community assessment, you need to meet with community leaders (boma chiefs or sub-chiefs), teachers, religious leaders, Payam Administration staff, Village health Committee (VHC) members where available, parents/elders who visit the facility for whatever reasons, Non – Governmental Organisations (NGOs)/ Community Based Organisations (CBOs), to conduct a preliminary assessment on the community aimed at determining:

- Number of families or households in the community;
- Number of new births and special groups within the community;
- What they know about immunisation;
- Concerns of the leaders and families about immunisation. For example, specific beliefs about immunisable diseases that may be a barrier to immunisation; these may be religious or cultural beliefs;
- Special efforts that can be made to provide immunisation services to special groups e.g. hard to reach populations;
- Constraints in accessing immunisation services. What barriers people may face in accessing services (e.g. distance, seasonal work commitments, traditional festivals or customs, lack of money for transport, unsuitable session days or times);
- Whether parents, their friends, relatives and neighbours are likely to attend immunisations sessions;
- Appropriate locations for outreaches and timing of immunisation sessions;
- If there are any volunteer groups willing to help with immunisation;
- If they have ideas on how to immunise more children in their community;
- What they think about the quality of the service and how the service could be improved;
- Population movements into their community (migrants, refugees, visitors).

Obtaining/having this information helps in understanding the communities we serve, gain their support and increase their participation in mobilization for immunisation.

9.3. Mobilizing the community using suitable methods and channels

9.3.1 Communication

Communication is a two way process that refers to sending and receiving of simple and clear messages that can be understood. When parents and health workers understand the messages on immunisation, it facilitates interaction between them for better service delivery. Health workers not only give messages to parents but they also receive messages from them. In both situations, effective communication takes place only when the messages are understood and there is immediate feedback from the parents on the messages especially during a health education session.

The beneficiaries of an immunisation programme are children below one year (routine immunization series), under five (usually targeted during campaigns) and women of childbearing age (for tetanus vaccinations series). Reaching these beneficiaries may require targeting them indirectly through parents/caretakers and directly by sensitizing and immunizing women of childbearing age. Communication should be directed at changing the behaviour of parents/caretakers so they can understand, appreciate and utilize immunisation services to benefit themselves and the children. In addition, it should provide relevant messages to the parents/caretakers to make informed decisions to seek immunisation services.

To ensure that your communication is effective, the following should be observed:

- Find out what the person you are communicating with already knows about immunisation by asking open-ended questions.
- Do not rush the person involved in the communication but be patient to allow the person to think through
- Acknowledge what the person says as a sign of appreciation
- Motivate the person to ask questions so that you gauge whether the person understands the message. The questions you ask should not bring out yes or no answers but should rather engage the participant to think and reason on why things happen the way they do. If you ask the question, do you understand what we have talked about? The participant/parent can answer yes but this does not mean that s/he really understands. But you can probe by asking when the parent will bring the child for the next immunisation. A person who has understood should be able to answer with the right date.

In addition, during communication with clients/caretakers, ensure that the following principles are observed:

- **Active listening:** This is characterized by paying attention to what is being said and also observing non-verbal communication from the client. Giving full attention is demonstrated by actions such as having eye contact and nodding.
- **Reflection:** This is observing the client's emotions and reflecting them back to him/her. Reflection helps the provider check whether the emotions observed are correct. This helps to show that the provider has empathy and respects his or her feelings.

- **Summarizing and paraphrasing:** This means repeating back to the client what you heard him/her tell you. Miscommunication can happen very easily when two people discuss something. Therefore to prevent it when listening to a client's problem or sharing information with a client, it is useful to summarize or paraphrase what has been said.
- It is important that a service provider uses words that motivate and ensure a client's approval. For example, praise and encouragement help build a client's sense of confidence and reinforces desired behavior. Praise elicits feelings of self-worth in clients, which in turn empower them to better meet their health care needs within a health system.
- Giving information should be based on what the client already knows in order to help ensure that the client's information is complete and accurate. Information should be given clearly and in non technical language, so that the clients understand.
- Giving praise helps make a client feel good about him or herself, which will in turn help them to open up to the service provider and be more willing to cooperate.

9.3.2 Selecting suitable channels/methods to mobilize the community

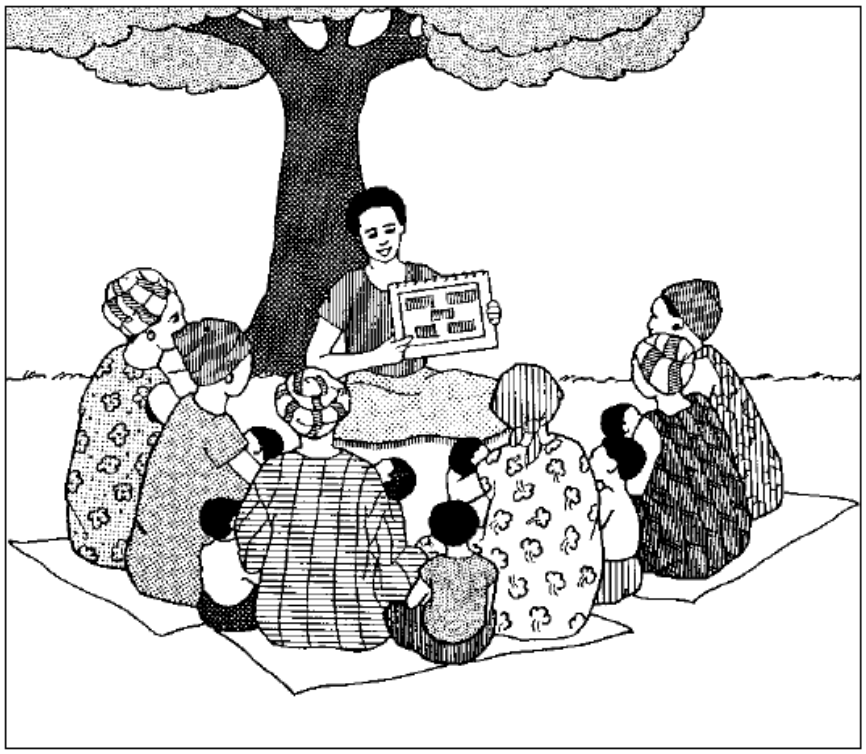
Reaching the parents/caretakers is a gradual process, which requires the use of various channels of communication that transmit messages to the target audiences. Therefore, to make communication and mobilization effective, multiple channels and methods of communication should be used in order to have wider coverage of the population with frequent messages. It is important to select a channel which will be most effective when delivering your messages to the target audience. You should also ensure that the media you have chosen is accessible to the target audience. Some of the channels and methods of communication that can be used are:

a) Interpersonal communication:

This involves face-to-face interaction individually or in a small group between a health worker and a parent or parents at the immunisation session. One way of communicating with parents/caretakers is to interact with them on individual basis, which could be done through counselling a parent who comes to the immunisation post/centre with a sick child. This parent can be counselled by a health worker on why it is safe to immunize a sick child.

Another opportunity for communicating with parents/caretakers happens when group/groups of parents/caretakers at an immunisation session with their children receive education from a health worker before they immunize their children. The health education session could be conducted during the time when parents are waiting for Immunisation or are in the community during a community meeting. Other opportunities to communicate with parents are: at places of worship, discussion sessions at farmers' meetings or during home visiting. The key to communicating effectively with groups of parents /caretakers is to address their shared interests in the group. A health worker/communicator can use various methods to support the oral communication.

Figure 9.1: Illustration of a health education session with mothers prior to a session



Health workers will use the following approaches to deliver messages on immunisation:

i) Ask parents/caretakers about their experiences in dealing with problems related to Immunisation.
ii) Invite them to ask questions
iii) Use stories when teaching parents/caretakers and ask them to tell you what they think about the immunisation programme
iv) Use short plays/simulation of events to deliver messages on immunisation

b) Mass media

This involves the use of electronic and print media channels to deliver messages on immunisation. Such channels include:

- Electronic - (Radio and TV spots, telephone messages and talk shows) to disseminate messages to target audiences in form of programmes and spots
- Print media (newspapers and IEC promotional materials in appropriate languages),

c) Folk media

Use of traditional media that includes music, dance, drama, stories and puppet

d) Community film shows

This involves use of cinema vans which have audio-visual equipments for showing out door films. During the day, the van is good for mobilizing people using mega phones/loud speakers informing them of any up coming event. The same van is used at night to show relevant films that stimulate the audience and triggers discussion at the end of the show.

Use clear, simple and accurate messages

Creating effective messages is not easy; you need to give truthful, technical, practical and motivational information in a way that can be easily understood by the different audiences at different times. You must be very clear so that you cannot easily be misinterpreted.

9.4.3 Key messages about immunisation

Always use clear, simple and accurate messages

The following are some of the generic key messages about immunisation that health workers and mobilisers should deliver to the parents and caretakers

The communicator/health worker should always communicate the following key messages to parents/caretakers about immunisation so that they are able to complete the immunisation schedule hence have their children protected against vaccine preventable diseases.

The targeted immunisable diseases:

Tell the parents/caretakers about the diseases and the types of vaccines required to prevent them (refer to the immunisation schedule discussed in unit 3)

Vaccine given, the disease it protects, and the advantages of the vaccine:

It is important that parents/caretakers are told about the types of vaccines given for each disease so that they appreciate the vaccine and what disease it prevents.

Number of doses of the vaccine required for protection:

Knowing the number of doses to be given helps the parents/caretakers to understand the value of immunisation and encourages them to complete the dose/schedule. During communication, emphasize the importance of completing the immunisation schedule

Possible side effects that are likely to occur due to immunisation and their management:

Tell parents/caretakers the possible side effects that are expected after each vaccine given. If you are giving several vaccines at once, explain the side-effects for each vaccine. Advise parents/caretakers on how to manage the side effects resulting from each vaccine (refer to unit 2 and 3) where and when to seek medical assistance.

Return date:

Tell the parents/caretakers about the exact day and date when they should return for the next immunisation; say how many weeks ahead the date is.

Tell the parents to use all available opportunities to remember the date for the next immunisation e.g. those who have access to a calendar and can read, can use it; for those who do not have access and cannot read, use public events, religious holidays etc. to help them remember e.g. independence day, matyres day, etc

The place of the next immunisation:

Tell the parent where to go for the next immunisation. This is particularly important if you are changing the venues.

The number of visits a child needs in order to complete immunisation (fully immunized):

Tell the parent the number of times that s/he will need to complete the immunisation for the child to be fully protected from vaccine preventable diseases. Refer to the immunisation schedule discussed in unit 3.

Examples of Key messages

- Vaccines are safe and effective and have been tested and approved by the MOH, WHO and UNICEF.They do not cause lameness or disease.
- Each time you take your child to a health unit, bring his/her child health card with you so that the health worker can check the immunisation status and immunize the child if it is necessary.
- Immunisation is a government priority. Every child has a right to be immunized and it is the duty of the parents to take their children for immunisation.
- Immunisation is free and available at all government, NGO, some private health facilities and outreach Immunisation posts.
- It is safe to immunize a child who has a minor illness, disability or who is malnourished. Very sick children should be treated first and immunized on discharge.
- Immunisation is cheaper compared to treating the child who has developed the illness or disability of a vaccine preventable disease.
- It is possible that your child may develop mild reactions after immunisation e.g. fever and pain. Your child will be relieved by bathing with warm water and light dressing and if the pain/crying persists, take the child to the nearest health facility.
- Remember to bring your child for the next immunisation dose on the date indicated on the child health card.
- Lack of vitamin A can cause night blindness.
- For a woman to have full protection, (self and new born) against tetanus, she must receive 5 doses of TT vaccination according to the schedule.

Each of these messages should be given more than once. This increases the likelihood of being remembered especially if done by different health workers, for example the one giving immunisations and the one completing the paperwork at the exit point. Check clients' understanding by asking them questions as they leave the immunisation sessions.

9.4. Roles of the community in mobilization for immunisation services

Community leaders and members have a comparative advantage in mobilizing for immunisation services because of their privileged knowledge of their society. They know the customs and norms of their people that should be considered while designing social mobilization strategies. Parents should act as mobilisers for their fellow parents.

9.4.1 Community leaders (Local chiefs)

The roles of the community leaders (chiefs) include;

- Mobilising and allocating resources for immunisation services.
- Participating and planning for immunization services.
- Participating in selection of sites and timing (date and time) for immunisation outreaches.
- Advocating for immunisation of children at every forum.
- Monitoring and evaluating immunisation activities.
- Participating in community sensitisation programs
- Promoting or ensuring equity of services
- Dispelling rumours by giving correct information

9.4.2 Village Health Committee

- Hold sensitization meetings in the community.
- Advocate and lobby for commitment and support of leaders for immunisation services in their communities.
- Work closely with health workers to identify problems related to low coverage and dropout rates so that communities are mobilized to overcome the problems.
- Identify social groups operating in the community e.g. youth groups, women and men groups, drama groups to encourage them mobilize communities to participate in Immunisation efforts.
- Collect immunisation data from the community and submit to the health facility and give feedback to communities to improve or promote immunisation services.
- Conduct regular monitoring, updating of information and assessment of coverage.
- Mobilise resources for immunisation services.
- Mobilise parents and caretakers for immunisation services.
- Participate in tracking drop outs and remind parents to complete the immunisation services through home visiting
- Register newborns, under one and under five years old children and support correction of missed opportunities.
- Educate the hard to convince parents/caretakers/clients on the benefits of immunisation services.
- Report notifiable diseases occurring in their communities to their health workers.
- Act as role models by taking their children for immunisation.
- Display and distribute IEC materials for enhancing social mobilization.
- Dispel rumours

9.4.3 Religious leaders

- Mobilise and talk about immunisation to their congregation
- Participate in planning for immunisation services through Religious founded health facilities
- Support immunisation activities by asking for evidence of immunisation at baptism, Confirmation, Circumcision and marriage ceremonies.

9.4.4 Parents/caretakers

- Bring children and their grand children for immunisation services.
- Encourage fellow parents/ caretakers to take their children for immunisation and complete the schedule.
- Attend social mobilization meetings.
- Safely keep the child health and TT cards and bring them to the health facility on the subsequent immunization visit or whenever seeking health care.

9.4.5 Partners in mobilization for immunisation services

- Members of the Legislative Assembly (Parliamentarians)
- Cultural/ traditional leaders, clan leaders
- Religious leaders
- Professionals (health workers, teachers, social workers etc),
- Owners of media houses – local FM stations
- Community based organizations (CBOs)
- Journalists/ reporters
- Non Government Organisations (NGOs)
- Opinion leaders
- Gender groups (Women groups, Youth groups, Men groups etc)
- Service Clubs like Rotary and Lions clubs
- Private Sector and investors
- Security Organisations like Police and Army.

Their role of partners will among others include mobilisation and allocation of resources, advocacy and formulation of favourable policies, program communication to their communities, role modelling, enforcing existing laws and regulations.

9.5. Managing rumours and misinformation

Rumours and misinformation about immunisation are among the most serious threats to the success of the immunisation programme. Once rumours and misinformation start they can be very hard to stop.

9.5.1 Meaning of rumours

Rumours refer to information that is spread in the community on a certain subject but is not necessarily true and therefore has no basis. In regard to immunisation, rumours refer to negative information about vaccines and the entire immunisation programme whose intention is to tarnish the good name/image and benefits of immunisation by stopping parents/caretakers from taking their children for immunisation.

9.5.2 Meaning of misconceptions and misinformation

Misconceptions refer to wrong thinking, wrong perception of a certain situation or subject. Misinformation refers to giving false information either deliberately or accidentally. This can be in form of a belief, which is not necessarily true about the subject. Misconceptions in immunisation refer to wrong beliefs and thinking that are held by some members of the community about immunisation. Once people have misconceptions and rumors about immunisation, they look at it negatively and start discrediting the benefits accrued by children, parents/ caretakers and the entire nation.

9.5.3 Common sources of rumours

Who starts rumours?

Rumours are started by people who have vested interests to fail the services being provided or people who lack knowledge on the subject. These include:

- *Traditional healers*: these do not believe in modern medicine but believe in the traditional power of preventing disease and want to promote their activities by creating negative attitudes about immunisation and other modern health services.
- *Religious Sects/cultural groups*: Some religious sects in Southern Sudan do not believe and approve of immunisation and consequently preach against it
- *Anti vaccine/lobby groups*: These are organised groups, which have a deliberate motive of discouraging people from utilising immunisation services. Such groups are common the world over and have published articles or accessed controversial, malicious or distorted articles from the Internet with information discrediting immunisation in general and polio initiative in particular.
- *Some misguided elements in the community*: These involve people who want to sabotage government programmes as a deliberate move to make government lose popularity among the population. For example some politicians in Southern Sudan preached against the polio campaign initiatives and portrayed it as a dangerous undertaking for children.
- *Sometimes health workers* may not be well equipped with information to dispel rumours or misconceptions circulating in their communities. At other times, some health workers may not be vigilant enough to cope with the rate at which the rumour is spreading. When some health workers fail to be good examples in taking their children for immunisation or providing the correct information, rumours may start

9.5.4 Causes of rumours about immunisation

Rumours often spread as a result of a number of factors that includes any of the following the following:

- *Lack of adequate and correct information about immunisation* creates knowledge gaps among the population, which creates a fertile ground for rumours to thrive and circulate in the community.
- *Mistrust of health workers by the community.* It is well known that health workers are a source of information about health issues. Once the community develops doubt about the credibility of health workers, this creates a gap for rumours to flourish. For example the refusal by some health workers to have their children immunised and failure to answer some questions about immunisation create doubt in the community on the credibility of the exercise and contributed to the rumour that polio vaccine was not safe.

- *Coincidental events.* Occurrence of some events that coincide with routine and supplemental immunisation activities is another factor that fuels rumours. For example, if the HIV vaccine trials are to be conducted in Southern Sudan, Ministry of Health (MOH) should not plan for NIDs implementation as it may help to build rumours that the NIDS vaccine is contaminated with HIV. Another example of coincidental happening is the occurrence of malaria epidemic following Polio campaigns that may lead people to think/believe that the deaths due to malaria were caused by Polio vaccine.

9.5.5 How to respond to rumours and misconceptions

At the State or County level, a Rapid Response Team (RRT) should constitute itself into a rumour management task force to coordinate activities preventing and managing rumours in the state or County.

Health workers at all levels of service delivery should develop a proactive plan that has a mechanism to prevent and counteract rumours in a community. This means having a comprehensive programme on education about immunisation so that you minimise chances of rumours starting and spreading.

Steps of the comprehensive response to rumours

- Act swiftly to identify the source of the rumours and understand their contents (extent of the rumour, type of messages circulating about immunisation,)
- Identify the people and organisations responsible for fabricating and spreading the rumours and design strategies to educate them
- Collect data and facts about immunisation in preparation to respond to rumours by giving correct information.
- Determine the reasons behind creation of these rumours (is it lack of information, religious/cultural opposition, beliefs or mere propaganda?).
- Turn the rumour around by going to the source and asking the people what solution they can offer to diffuse the rumour.
- Target key and credible opinion leaders in the affected area (community leaders, religious leaders, elders, clan leaders etc) and sensitise them about immunisation and seek their support in mobilising for immunisation promotion.
- Identify appropriate occasions to disseminate facts about immunisation e.g village meetings, religious gatherings, cultural and social functions such as fundraising).
- Involve NGOs and CBOs which respect peoples values to disseminate information on immunisation
- Liaise with the County to conduct mass media campaign by involving various FM stations to disseminate information on immunisation. In particular seek out media that has already misinformed people and use it to disseminate correct information and dispel the rumours.
- Mobilise communities by empowering local people to address and take responsibility for the issue e.g. demystify rumours against polio eradication through education using various channels of communication.
- Train community based structures like Village Health Commitees or local chiefs and the media personnel so that they can support you in disseminating correct information at various venues.

Unless the rumour can be easily contained and addressed you must refer the matter to your supervisors as quickly as possible. You will need to work under their direction; action may even need to be taken at the national level. The consequences of rumours can be serious and, if unchecked, they can travel quickly beyond your local area.

Therefore;

- Develop strong relationships and trust with your community in advance (religious, social and media groups).
- Take timely action to deal with rumours. Failure to take action may have negative consequences on the program. Doing so will benefit routine immunisation services.
- React swiftly and adapt your ongoing activities to give a quick response.
- Give clear and consistent messages.

Management of the rumour should involve addressing health workers at the health facility and agreeing on what to communicate.

Exercise 9

1) Describe some of the channels and methods of communication that can be used during mobilization for immunization services

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.....

2) List the 5 key messages on immunisation to be communicated to parents and caretakers

.....

.....

3) Who are likely to be your partners in mobilisation for immunisation services and what are their responsibilities?

.....

.....

4) What are the common causes of rumours on immunisation?

.....

.....

5) How would you demystify/manage the rumours on immunisation?

.....

.....

.....

Discuss your answers with your Supervisor

UNIT 10: MONITORING IMMUNIZATION PERFORMANCE AND SUPPORT SUPERVISION

10.1. About this Unit

This unit discusses how to collect immunisation data, compile a report and monitor performance of the programme. The unit also emphasises the importance of support supervision in capacity building for service delivery and monitoring performance of EPI services at all levels. It shows how you can improve the performance of your service by identifying and solving problems, and incorporating the solutions as activities in your workplan. This unit covers the following topics:

1. Collecting immunisation data using basic recording tools: child immunization register, child health cards, TT cards, Monthly Immunization reporting, drop out monitoring forms, and Vaccine and Injection Material Control Book (or Vaccine stock control cards)
2. Making summary reports: monthly reporting at health facility level.
3. Monitoring your performance
   - Making and using a monitoring chart (immunisation coverage and drop out rate)
   - Compiling your immunisation data
   - Analysis and interpretation of immunization data
4. Using your data to identify problems, propose solutions and take corrective action according to your priorities.
5. Using EPI support supervision checklist to monitor performance and build capacity for continuous improvement and maintenance of high quality immunisation services.
6. Sharing programme performance information and provide feedback at all levels (vertical, horizontal) including community leaders.

Learning objectives

After studying this unit, you should be able to:

1. Describe basic recording tools used for collecting immunisation data.
2. Discuss the components of immunisation report.
3. Explain ways of using data to monitor your performance.
4. Outline steps in carrying out support supervision.

Performance objectives

1. Collect immunisation data using basic recording tools.
2. Analyse data, Identify problems, propose solutions and take corrective action.
3. Compile summary monthly, quarterly and annual performance reports.
4. Carry out support supervision using a checklist to monitor performance and build capacity for continuous improvement and maintenance of quality immunisation services.

10.2 Why Collect immunisation data

The purpose of collecting immunisation data is to determine the total number of children under one year of age and women in childbearing age immunized in a given period. This information is then used to calculate and monitor immunisation coverage, dropout and vaccine wastage. Through monitoring you can assess how well you are doing and what improvements you should make. By reporting coverage to your supervisors you inform them of your progress and help them to plan how to support you.

10.3 Recording immunisations

All health workers in every health facility that provides immunisation services should record all immunisations given on the relevant client's data collection tools as indicated below: **i)** Child (immunization) register, **ii)** Road to Health or Child health card, **iii)** TT cards and iv) Tally sheets

10.3.1 Child Registers

The child register helps health workers keep track of the immunisation services they offer to each infant and track drop outs. Each health facility is provided with a child register that should be used at both the static unit and at outreaches.

The register has (and collects) the following information:

- Child's registration number (to be used on the road to health or child health card)
- Date on which child was recorded,
- Identification details (name, date of birth or age, sex, address specifying village and Payam),
- Screening for vaccination status to document the antigens due to be administered to the child
- Any remarks on the status of the child that is considered important to their health or vaccination can also be documented e.g. immunisation completed

How to use the register

You must register children as soon as they arrive at the health facility or outreach for the first time. Fill in the information except the space provided for vaccinations, LLIN and vitamin A supplementation. This space should be completed after the vaccinations; vitamin A supplementation and LLIN have been provided. It is recommended to have a child number on the register for each infant and use the same number on the child health card. This way, for the next immunisation, it will be easy to locate the child's entry on the register.

On subsequent immunisation visits, do not create a new entry of the child's particulars (Number, name, address, sex, date of birth) in the register. Ask the mother/caretaker for the child health card and look for the corresponding number and name of the mother and address in the register. If the child health card is not available, ask the mother/caretaker the details of the first Immunisation to locate the child's entry in the register.

A sample of the child immunization register and the TT register for women of chld bearing age is indicated below.

Table 10.1: Child Register (for recording infant immunizations)

Card No	Date	Child Name	Date of Birth	Sex	Address/Village	BCG	Oral Polio Vaccine				DPT Containing Vaccine			Measles	Vitamin A	LLIN	Yellow Fever			Remarks
							Zero Dose	OPV-1	OPV-2	OPV-3	DPT-1	DPT-2	DPT-3							

Table 10.2: Women of Child Bearing Age Register (for recording TT vaccination)

Ser/ No	Date	WCBA Name	Age	Address/Village	Pregnant	Non Pregnant	Date of Vaccinations					Remarks
							Basic		Booster			
							TT-1	TT-2	TT-3	TT-4	TT-5	

10.3.2 The immunisation Cards

There are two types of immunisation cards used;

- Road to Health or Child Health Card (CHC)
- Tetanus Toxoid (TT) card for Women of Childbearing Age (WCBA).

The cards contain information on the immunisation status of the child and the woman respectively. The cards are important for many reasons;

- They serve as a reminder for parents to return to the static or outreach for the next dose.
- They help the health worker to determine a child's or woman's immunisation status.
- They are useful when health workers carry out immunisation coverage surveys and disease outbreak investigations, to get accurate data on the immunisation status of the child or WCBA
- CHC is used for monitoring the growth of the child
- CHC may be required at school entry
- CHC may be the only document available that has vital information of the child's particular's like date and place of birth
- CHC is a legal document e.g. seeking travel clearance
- CHC is an IEC material for the parents
- May be requirement for seeking child health services at health facilities

Each child or Woman of Child bearing age vaccinated should have a card with immunisations marked correctly.

How to use the immunization *Card*

On First attendance Visit

1. Complete the client's identification details
2. Plot the weight of the child on the provided growth monitoring chart and explain to the mother the progress on growth curve
3. Record the date of the given vaccine in the corresponding box
4. Record dates for vitamin A and LLIN in case they are given.
5. Record the return date and communicate it to the mother/caretaker
6. Record any service or information given relevant to the child's health on the provided space at the back of the CHC

Continuation/subsequent visits

- Use the CHC number to track the child details in the child register.
- Use the CHC to screen for the due vaccines and highlight with bracket signs "( )" in corresponding box for the due vaccines. DO NOT RECORD THE DATE AT THIS POINT.
- Proceed with steps 2 to 6 described for the first attendance visit

Lost card

- Identify whether the child is a resident or a visitor.
- If the child is a resident, use child's name, address and date of birth to trace the immunisation details in the child register.
- Take history from the caretaker about the previous immunisation details.
- Provide a new CHC.
- If the child's details are in child register, copy details including the vaccination dates for all previously received vaccines onto the newly provided CHC.
- If the child's name does not appear in your child register, proceed as follows:
    a. For residents record the child in child register
    b. Probe for vaccines given previously and place a tick (√) in the corresponding box on the CHC and register. DO NOT PUT ANY DATES.
    c. For visitors provide the CHC, fill it accordingly and do not record the child in the child register.
- Highlight with bracket signs "( )" in corresponding box for the due vaccines. DO NOT RECORD THE DATE AT THIS POINT.

For the rest of the steps, proceed as stated in first attendance.

- Counsel the mother on how to safely keep the card and the importance of the card. (Refer to the uses of CHC outlined above).

Remember to mark on the immunisation card the next appointment date. Make sure that the return date indicated on the CHC corresponds with the scheduled static or outreach dates.

Remind the mother verbally as well as by writing on the card the return date for the next dose. Always return the card to the mother.

Figure 10.1: Road to Health or Child Health Card

Ministry of Health
Government of Southern Sudan

CHILD HEALTH CARD

HEALTH FACILITY NAME

CHILD'S NAME | SEX

CHILD CLINIC NO. | DATE FIRST SEEN

DATE OF BIRTH | BIRTH ORDER

FATHER'S NAME

MOTHER'S NAME

DISTRICT

LOCATION

SUB-LOCATION/VILLAGE

SIBLINGS
(BROTHERS & SISTERS)

	NAME	YEAR OF BIRTH	SEX	ALIVE/ DIED
1				
2				
3				
4				
5				
6				
7				
8				

NOTES

Date ____ Symptoms ____ Treatment

NOTES

Date ____ Symptoms ____ Treatment

IMMUNISATIONS PROTECT YOUR CHILD

Sign when baby immunised

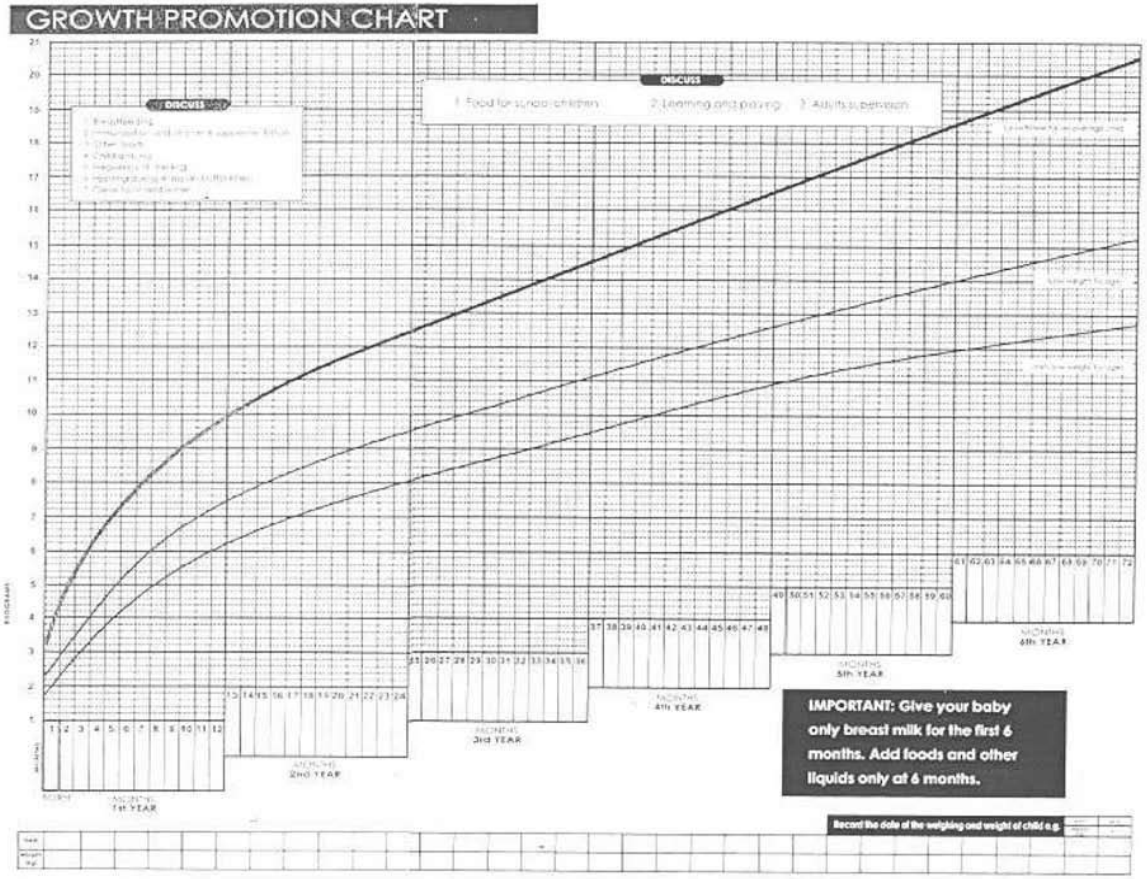
	DATE GIVEN	DATE CHECKED	PRESENT / ABSENT
TUBERCULOSIS (BCG-VACCINE) at birth			
BCG - SCAR			

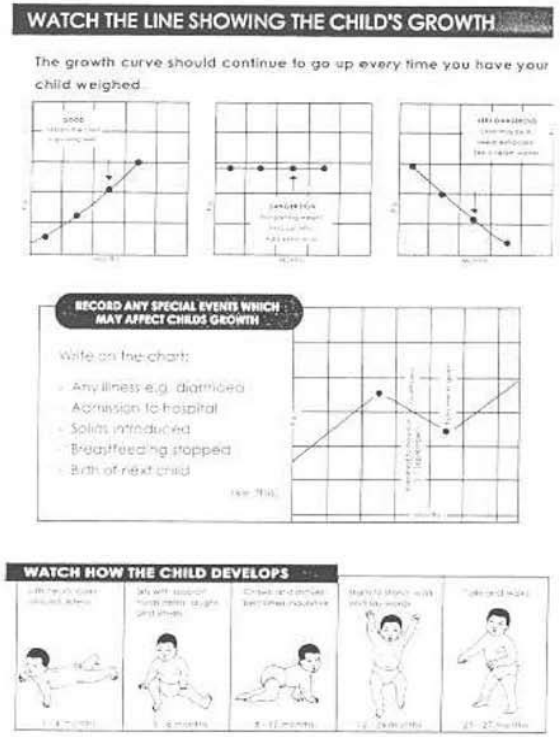
DIPTHERIA / WHOOPING COUGH / TETANUS (DPT VACCINE)	DOSE	DATE GIVEN	ENTER DATE NEXT VISIT
1st dosa at 6 weeks			
2nd dose			
3rd dose			

POLIOMYELITIS (ORAL POLIO VACCINE)	DOSE	DATE GIVEN	
Birth dose (before 6 weeks)			
1st dose after 6 weeks			
2nd dose			
3rd dose			

MEASLES VACCINE	DATE GIVEN
give at 9 months	

BRING THE CHILD TO CLINIC EVERY MONTH EVERY CHILD MUST HAVE A BIRTH CERTIFICATE SHOW THIS CARD ON EVERY VISIT HAVE YOUR CHILD WEIGHED EVERY MONTH

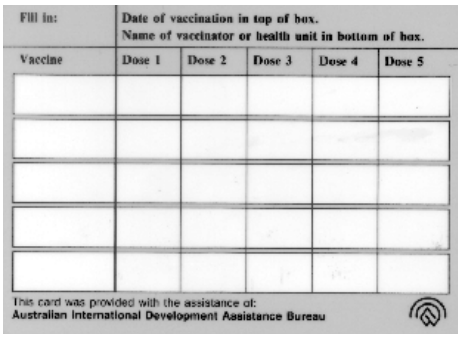

GROWTH PROMOTION CHART
DISCUSS
1. Food for under children
2. Learning and playing
3. Ability to perceive
IMPORTANT: Give your baby only breast milk for the first 6 months. Add foods and other liquids only at 6 months.
Record the date of the weighing and weight of child e.g.


WATCH THE LINE SHOWING THE CHILD'S GROWTH
The growth curve should continue to go up every time you have your child weighed
RECORD ANY SPECIAL EVENTS WHICH MAY AFFECT CHILDS GROWTH
Write on the chart:
- Any illness e.g. diarrhoea
- Admission to hospital
- Solids introduced
- Breastfeeding stopped
- Birth of next child
WATCH HOW THE CHILD DEVELOPS
Encourage development by spending time with the child, playing with him and encouraging him to learn.

10.3.3 TT cards

- Fill the identification information about the woman
- Screen for the due TT dose
- Mark with the brackets sign " ( )" in the corresponding box
- Record date after administering the due dose in the provided brackets
- Record the return date after communicating verbally to the woman
- Counsel on how to keep the card safely and its importance
- For a mother who has lost a card, please provide a new one and update according to her history. Figure 10.2 shows a sample of the TT vaccination card.

Figure 10.2: TT vaccination card (insert Picture of South Sudan Card)



10.3.4 Tally sheets

Tally sheets are forms on which health workers make a mark every time they administer a dose of vaccine. These are used as a basis for monitoring and reporting. Use a new tally sheet for each session. The same tally sheet can be used to mark both vaccines given to infants as well as vaccines given to pregnant women

Tally sheets help health workers to count the number of immunisations they give with each vaccine and each dose in a day. They are used for recording:

- Name of the health facility (static) or outreach where the immunisation was given from
- Children immunisations;
- Women of childbearing age immunised

a) Record children's immunisations on Tally sheet

After you have immunized a child, record the immunisation date on her/his immunisation card and inform the mother/guardian which doses were given. On the tally sheet strike off one zero "Ø" on the tally sheet against each dose of antigen given. If the child is under 1 year of age, tally off a zero "Ø" in the column headed "Children 0-11 months of age". If the child is older, tally off a zero "Ø" in the column headed "Above 12 months". Each tally "Ø" represents a vaccine dose administered.

If vitamin A or LLIN is given to the child, also mark it on the tally sheet as well.

b) Record tetanus toxoid immunisations

After you have immunized a woman, record the date on her TT card and strike off one "Ø" in the tetanus toxoid section of the tally sheet against the dose given. If the woman is pregnant, tally off a zero "Ø" in the column headed "Pregnant". If she is not, tally off a Zero "Ø" in the "non-pregnant" column. If vitamin A or LLIN is given to the woman, also mark it on the tally sheet.

Remember:

- Mark the tally sheet each time you give a vaccine.
- If you wait you may forget.
- Do not tally before administering the vaccine.

c) Complete the tally sheet at the end of a session

At the end of each immunisation session, count/total the number of tallies you have made. This tells you the number of immunisations you have given with each vaccine dose, vitamin A and LLIN. You will use this information to monitor performance and prepare a monthly report. File all used tally sheets by month and year, and store them safely. Keep the tally sheet for at least 3 years for easy retrieval and future reference e.g. supervisors to check the data quality (accuracy of reporting), surveys. After 7 years, files of tally sheets just like other health facility records could be archived (stored away).

Figure 10.3: Routine Immunization Tally Sheet

Ministry of Health
Government of Southern Sudan

GOVERNMENT OF SOUTHERN SUDAN, MINISTRY OF HEALTH
ROUTINE IMMUNIZATION TALLY SHEET

Facility Name: _____ **Facility Type:** _____ **Boma:** _____

Payam: _____ **County:** _____ **State:** _____

Suporting Agency: _____ **Month:** _____ **Sheet No:** _____

	Infants (0-11 months)		Total		Total	Children above 1 Year		Total		Total
Antigen	Static	Out Reach	Static	Out Reach		Static	Out Reach	Static	Out Reach	
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
BCG	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
OPV-0	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
OPV-1	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
OPV-2	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
OPV-3	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
DPT-1	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
DPT-2	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
DPT-3	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
Measles	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	00000 00000 00000	00000 00000 00000				00000 00000 00000	00000 00000 00000			
	TT in Pregnant Women of Child Bearing Age					**TT in Non-Pregnant Women of Child Bearing Age**				
TT-1	00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000		00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000	
	00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000		00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000	
TT-2	00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000		00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000	
	00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000		00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000	
TT-3	00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000		00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000	
	00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000		00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000	
TT-4	00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000		00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000	
	00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000		00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000	
TT-5	00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000		00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000	
	00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000		00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000	

10.4 Making Summary Reports

The immunisation data collected needs to be consolidated into a summary form, either manually or electronically, for transmission to the County Health Department (CHD) and then to the State Ministry of Health. The State Ministry of Health EPI operations unit compiles the data and transmits it to the GoSS/MOH. At each level the data should be analysed and used to improve immunization performance. The format for summarizing immunisation attendance is shown in figure 10.4.

10.4.1 Reporting coverage monthly

Compiling a monthly immunization report

From the routine immunization tallysheets filled during the month, prepare the summary report on immunization as indicated below.

- Gather ALL Tally sheets used in a month together including those from outreaches
- Count the number of vaccinations given for BCG, Polio, DPT (or DPT combination vaccine), and Measles by age and dose, and write the value for each in the corresponding cell

Submit your report

- Complete and submit an immunisation summary report to the CHD not later than the 9th day of the following month.
- The CHD should report to the state MOH not later than the 15th day of the following month.
- The State EPI operations unit at SMOH summarizes reports from all County Health Departments and submits a state summary report on immunization to the GoSS/MoH not later than the 28th day of the following month.

Figure 10.4: Monthly Reporting Summary Form

Ministry of Health
Government of Southern Sudan

GOVERNMENT OF SOUTHERN SUDAN, MINISTRY OF HEALTH
PHCC/PHCU IMMUNIZATION REPORT: MONTHLY REPORTING SUMMARY FORM

Month **Year:** _____ **Sheet No:**_____

Name of Health Facility **Facility Type:** _____ **Facility Type:**_____

Boma: _____ **Payam:** _____ **County:** _____ **State:** _____

Reporting Agency: _____ **Reporting Period:** _____ **Date of reporting:** _____

H/Facility Catchment Popn: _____ **Estimated # of Children 0-11 months:** _____

Antigen	Infants 0-11 months		Total <1 yr Immunized	Children Above 1 year		Total >1yr Immunized
	Static	Out Reach		Static	Out Reach	
BCG						
OPV-0						
OPV-1						
OPV-2						
OPV-3						
DPT-1						
DPT-2						
DPT-3						
Measles						
Vitamin A						
Yellow fever						

TETANUS TOXOID VACCINATIONS

Vaccine	Pregnat WCBA	Non-Pregant WCBA
TT-1		
TT-2		
TT-3		
TT-4		
TT-5		

VACCINE UTILIZATION SUMMARY

Vaccine	VACCINE DOSES RECEIVED: Stock at Start of Month	VACCINE DOSES RECEIVED: Total Doses Received in the Month	VACCINE DOSES USED: Total Distributed to other H/F	VACCINE DOSES USED: Total Doses Used	VACCINE DOSES USED: Doses Discarded	Balance in cold storage at the end of the Month
BCG						
DPT						
OPV						
Measles						
T/Toxoid						
Vitamin A						
Yellow Fever						

Current Stock of AD Syringes	
Type	*Number*
5 Mls	
2 Mls	
0.5 Mls	
0.1 Mls	

PLANNING AND MANAGEMENT IF ROUTINE IMMUNIZATION SERVICES

Static Immunization Functioning	
Number of Fixed Sessions Planned for the reporting month	
Number of Fixed sessions actually conducted in the reporting month	
Outreaches Immunization Functioning	
Number of Outreach immunization Sessions Planned for the reporting month	
Number of Outreach Immunization sessions actually conducted in the reporting month	

Supportive Supervision	
Number of Support supervisions received from the County Health Department	
Number of Support supervisions received from the State Ministry of Health	
Number of Support supervisions received from the GoSS/MOH level (including Partners)	

Community Linkages	
Number of Community meetings planned in the reporting month	
Number of of community meetings actually held in the reporting month	

Reported by: .....

Date Compiled: ...../...../.....

Date Submitted : ...../...../.....

Date Updated:...../...../.....

10.4.2 Preparing good reports

Health workers should ensure that the reports prepared and submitted are;

- ***Complete:*** All the sections of the report have been completed; no parts have been left blank and all reports due from reporting sites, including outreaches, have been received and included.
- ***Timely:*** Check the deadline for report submission. Reports should be submitted to the next level before the deadline. When reports are sent and received on time, the possibility of a prompt and effective response is greater.
- ***Accurate:*** Before sending the reports, cross check the totals and all calculations. Make sure that the reported figures correspond to the actual figures.

The County and the State MOH should keep track of the completeness and timeliness of reporting by the lower level health facilities. SMOH and County Health Departments should remind those that have missing or late reports to complete and submit.

10.5 Monitoring your performance

Monitoring is a process of following up progress in implementation of activities to identify strength or achievements, gaps and taking action to strengthen the weak areas. Monitoring should be done periodically. The data should be collected, compiled and analysed. It should be used to improve programme performance. This section guides you through some common ways to use data at all levels.

10.5.1 Making and using charts to monitor vaccination coverage

An Immunisation monitoring chart shows the progress you are making in immunisation coverage in your health centre catchment area. It summarizes the information given in monthly immunisation reports (see above). The monitoring chart graphically shows:

- Doses given compared to the number of infants eligible to receive them; (This chart enables you to compare the number of people you actually immunize each month with your coverage targets).
- Dropout rates, by comparing the number of infants that started receiving immunisations to the number of infants who received all the needed doses of the vaccines.

Every health facility should display a current monitoring chart on the wall, where it can be seen by all staff everyday. This chart can be used at every level, national, State, County and health facility. A blank immunisation monitoring chart is shown on the next page (Figure 10.5).

Figure 10.5: A blank immunisation monitoring chart

State: ..... County: ..... H/Facility: ..... F/Year:.....

Antigen: ..... Target Population: .....

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Cummulative Target												
DPT-1 Immunization												
Cumm. DPT-1												
DPT-3 Immunization												
Cumm. DPT-3												

* This mmunisation monitoring chart can be used to monitor all the other antigens

How to prepare the chart for monitoring doses administered and dropouts in children under one year of age

This chart has been developed to track the monthly progress you are making towards immunizing children under one year of age each month and throughout the year. It also helps you to determine whether your target population is completing the series of vaccines (e.g. DPT-3 or 3rd dose of DPT combination vaccines)

1. Calculate the annual and monthly target population to receive immunisation services.

a) Annual Target

Determination of annual target populations of children aged under 1 year, pregnant women and non-pregnant women:

- From the EPI services micro-plan described in Unit 8, determine the total population in the area served by your health centre.

- Calculate the number of children aged under 1 year by multiplying the total population by 4% i.e. Total population × 4 %= annual target population of children.
- Calculate the number of pregnant women by multiplying the total population by 4%

  Total population × 4 %= annual target population of pregnant women
- Calculate the number non-pregnant women by multiplying the total population by 17%

  Total population × 17 %= annual target population of children (check this)

Example:
In a catchment area with an estimated total population of 10,000, calculate the Annual target population of infants, pregnant women and non-pregnant women:

b) Monthly target
To get the monthly target population, divide the annual target population by 12. i.e. Annual Target population ÷ 12 = monthly target population.

10.5.2 How to prepare/complete/fill the charts

At the beginning of the year you need a blank immunisation monitoring chart for each of the following:

- BCG
- DPT-3 (or 3rd dose of DPT containing vaccines) and OPV 3
- Measles vaccine
- TT2+ pregnant women
- DPT-1 to DPT-3 drop out rate

Fill /complete/prepare each chart as follows.

1) Determine the monthly and annual target populations as described above
2) Label the chart -At the top of each chart enter:
   - The name of the health centre;
   - The year (usually the calendar year);
   - The antigen that is monitored on the chart;
   - The total annual target population.
3) Plot the cumulative monthly targeted population and connect them with a line. The connecting line should look like diagonal line drawn from zero to the top right-hand corner equal to the annual target of all children/ women to be immunized in the catchment area.
4) Plot immunisation data on the chart
   a. Record the monthly totals of infants/women immunized in a month provided at the bottom of the graph.
   b. Add the current month's total to the previous cumulative total to calculate the current cumulative total and record it on the row below for the one you have been recording.
   c. Plot a dot or star on the graph for the cumulative[1] total on the right side of the corresponding month.

d. Connect the new dot or star to the previous month's dot with a straight line

e. Repeat above (a to d) every month until the end of the financial year.

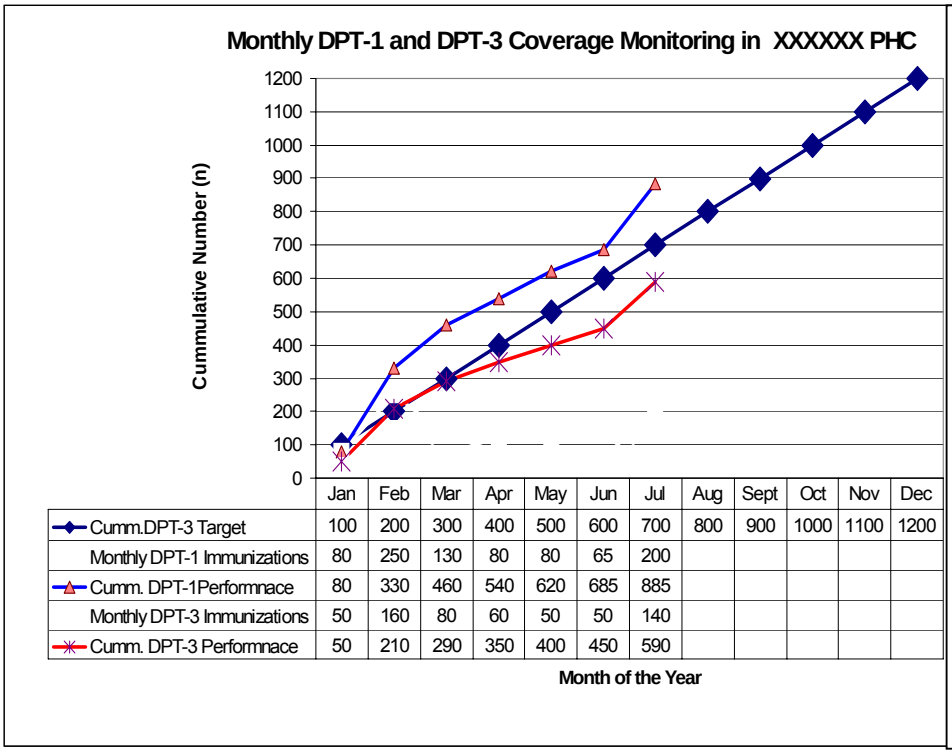
5) Calculate the drop out rate between DPT-1 and DPT- 3 as follows;

$$\text{Drop out rate} = \frac{\text{Cummulative DPT1 Total} - \text{Cummulative DPT3 total}}{\text{Cummulative DPT1 Total}} \times 100$$

Cumulative means the total number of doses of vaccines given in the current month plus the monthly totals for all the previous months. Use the same time period for each dose and vaccine. For example, the cumulative number of DPT3 doses given by the end of March is the total number of doses given in January plus the total number given in February plus the total number given in March.

The figure below shows how to prepare a coverage and dropout-monitoring chart focusing on DPT1 and DPT3.

Figure 10.6: Example of a DPT-1 and DPT-3 immunization monitoring chart



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Cumm.DPT-3 Target	100	200	300	400	500	600	700	800	900	1000	1100	1200
Monthly DPT-1 Immunizations	80	250	130	80	80	65	200					
Cumm. DPT-1Performnace	80	330	460	540	620	685	885					
Monthly DPT-3 Immunizations	50	160	80	60	50	50	140					
Cumm. DPT-3 Performnace	50	210	290	350	400	450	590					

NOTES:

The graph format is prepared once a year.

It is filled in monthly using the data from the monthly report.

The cumulative coverage data for DPT1 and DPT3 is then plotted for a visible record of achievement.

The graph can be plotted against target numbers (children < 1 year of age) or target percents.

The target population (children <1 year of age) is calculated as 4% of total population.

The total target population (in the example 1200 children <1 year) is divided by 12 (months) and used as the cumulative monthly target (100, 200, 300 etc.)

The space between the DPT1 (blue) and DPT3 (red) plot lines is the visible record of cumulative dropout.

10.6 Interpreting coverage data

After several months your immunisation monitoring charts for children's vaccine and tetanus toxoid show you the percentage of the target population immunized, whether it is increasing or decreasing, and how the number of immunisations given compares with targets. For immunisation the target is 100% (every child should be reached with immunisation services).

If you are not reaching your targets you should try to identify the reasons and decide how to solve the problems.

After you have completed immunisation monitoring charts for OPV3, DPT1 and DPT3, BCG and measles, and TT2+ pregnant women, as described in section 10.5.2 above, analyse the results. Compare the cumulative total line on the graph with the coverage target line

- If the cumulative total line is on or above the target line, you are making good progress.
- If the cumulative total line is below but close to the target line you are making fair progress.
- If the cumulative total line is far below the target line you are not making progress.

10.7 Identifying problems and their causes

If your immunization data show that the cumulative total line is on or above the target line, you should plan how to maintain the good performance. If the data show that you are not reaching coverage targets or that the number of immunisations given each month is decreasing, try to find out why by asking the following questions:

- Are there any groups of people who do not have access to the health centre or to outreach services that you provide?
- Are there any groups of people who have access to, but do not use, the health centre? Why? Are they migrants or refugees? Are there religious, ethnic, linguistic or other reasons?
- Do people know about immunisations and ask for them for their children? Do women understand how tetanus toxoid can benefit their newborns and themselves? Do people understand that they need more than one dose of some vaccines?
- Are immunisations provided at convenient times and places? Are children and women immunized quickly or do they have to wait a long time for service?
- Are health workers courteous?
- Are abscesses or other health problems occurring which people believe are caused by immunisations?
- Did the health facility experience any vaccine stock outs and gas/power irregularities?

10.7.1 Where can you find the information?

You can identify problems by talking with community leaders, supervisors, parents and other health centre workers. You may also learn something by looking at what you do during immunisation sessions.

- *Community leaders.* Political, religious, cultural and other leaders can tell you
    a) Where underserved groups live
    b) Why people do not use services – this is particularly important.
- *Parents and women of childbearing age* can tell you:
    a) Whether they are aware of the need for immunisations
    b) Why they (or their neighbours) are not using available immunisation services -this is particularly important.
    c) Other workers in the health centre can tell you why they think parents and women of childbearing age are or are not using immunisation services.

- *Immunisation sessions.* If you check on what you do in immunisation sessions you may discover shortcomings:
    a) Do you always use sterile techniques?
    b) Do you always explain:
        - When to return for the next immunisation;
        - Where to return for the next immunisation;
        - The number of visits needed to complete the immunisation schedule;
        - What side-effects might occur;
        - What to do about side effects?
    c) Do you always show respect for clients' time and listen to their concerns?
- When you have identified problems you can then plan actions for solving them.

10.8 Taking action to increase coverage

After analysing your coverage data you know whether you are making progress, what problems you have, and what is causing them. The next step is to solve the problems and prevent similar ones from occurring in the future. Working with your supervisor, try to develop solutions that you can handle yourself. If possible, plan activities that do not need additional resources from the County or higher levels.

If people do not have access to immunisation services you may want to increase outreach activities. This may require additional vaccines, transport or cold-chain equipment, and you may therefore need to undertake planning with your supervisor.

If people have access to immunisation services but are not using them, consider one or more of the following strategies:

- Increasing people's knowledge about immunisation;
- Changing the hours of immunisation sessions so that they are more convenient for parents;
- Involving community members in solving transport problems;
- Training health workers in communication skills, immunisation safety, organization of fixed and outreach activities, or other skills that may affect clients' decisions to use the services.
- Tracking drop outs: A drop out child is one who begins the immunisation schedule but does not complete.

10.9 Common causes of low coverage

The common causes of low coverage are dropout, missed opportunities for immunization and defaulters. These are discussed in detail below:

10.9.1 Immunisation drop out rate.

Definition: An immunisation drop out is a child or woman who commences vaccination but fails to complete the doses according to the schedule.

Common causes of immunization drop outs

Anything that happens to a child or its mother/caretaker on the very day when the immunisation session is scheduled may cause a drop out because it affects the child's ability to be brought for vaccination. Children vaccinated at outreaches are much more affected by this phenomenon than those vaccinated at static units.This is because vaccination sessions are timed to take place once a month to coincide with the schedule. If a child misses a scheduled dose for whatever reason, he/she has to wait for the following month.

a) Household/community factors responsible for drop outs
   - Child sickness
   - Mothers/caretakers sickness
   - Mother gone for other activity like burial, harvest or planting
   - Long distance to vaccination point or difficult terrain
   - Change of residence
   - Natural hazards like heavy rains, landslides, floods or earth quakes
   - Insurgency
   - Rumours and misconceptions
   - Lack of transport
   - Lack of reminder messages
   - Negligence of parents/caretakers

b) Health system related factors:
   - Health workers not turning up for scheduled outreach.
   - Lack of vaccines (stock out before or during the session).
   - Health workers not telling the mother/ caretaker the return date during the previous session.
   - Severe adverse events following immunisation like an abscess at the injection site.
   - Long waiting time at the immunisation session.
   - Poor handling of caretakers during the previous session.

Strategies to reduce drop out rates

This can be achieved by catering for the above factors in the implementation plans. Some specific actions to reduce drop outs may include but are not limited to;

1. Educating mothers/caretakers on the EPI policy that sickness is not a contraindication to vaccination.
2. Promoting men's involvement in immunisation such that when the mother is sick or has gone for some other engagement, the husband or any other responsible person at home can take the child for vaccination.
3. Strictly following the timetable for immunisation sessions and make the outreaches regular.
4. Knowing the correct target population in the service area to help you make accurate estimates of vaccines for outreaches.
5. Improving the attitudes and communication skills of health workers to ensure that every mother/caretaker is told the vaccine given, disease it prevents, number of doses needed to complete the schedule, possible side effects, their management and return dates. The date when the child should be brought back for the next dose should always be written on the child health card and told to the mother/caretaker. On exit, the mother/caretaker should

be asked to recite the return date.

6. Observing proper injection safety and hygiene to avoid adverse events following immunisation.
7. Establishing a child register where all the children in the catchment area and their particulars are recorded.
8. Establishing a reminder system for parents to inform them of the next dose and where it will be given.
9. Establishing a drop out tracking system using the child register:
    - Obtain/compile a complete list of infants and women of childbearing age from the register.
    - On a weekly basis, update this list of children and doses given.
    - Identify the children on schedule and those defaulting.
    - Liaise with the community leader/mobiliser to carry out home visit to follow up the defaulting children while picking those that have not started.
    - At home, inquire about reasons for defaulting or for not seeking the first dose.
    - Explain the immunisation schedule, benefits and reasons for completing the schedule and encourage parents/caretakers to take the children for the next vaccination.
    - Endeavour to talk to the father of the child and solicit his support for EPI.
10. Give clear key messages during home visiting. Such messages may include:
    - Vaccination protects the child only when all doses have been administered on schedule.
    - Immunise the child five times before he/she is one year old to complete the schedule.
    - Vaccines are safe and effective.
    - Immunisation is free

10.9.2 Missed opportunities and reaching missed children with immunisation services

Definition: Missed opportunity for immunization occurs when a child or woman of child bearing age comes to a health facility or outreach site and for one reason or another does not receive some or all the vaccine doses for which he or she is eligible.

Causes of missing immunisation

i) Parent/caretaker causes

- Lack of adequate information on immunisation services such as the benefits of immunisation and safety of vaccines,
- Social, cultural, religious or political barriers
- Lack of commitment to immunisation, or no motivation to go for the service and as a result the parent/caretaker keeps postponing.

ii) Service provider problems

- Not involving the community leaders in the planning for outreaches like in selecting outreach locations, date and timing.
- Not involving other players in immunisation service delivery – community leaders, religious leaders and community based programs.
- Deficiencies in the planning and provision of resources for immunisation services.
- Quality of services -long waiting hours, improper handling of the parents and caretakers at the service delivery point, lack of communication between the parents and health workers.

iii) Other causes

- Insecurity
- Long distances to service delivery points and difficult terrain

Strategies for reaching missed children with immunisation services

1. ***Increasing awareness*** – The community needs to know more about immunisation in order to be convinced and accept to utilize the services.
2. ***Home visiting*** – To increase awareness on immunisation, follow up and remind parents and caretakers on the days/dates for immunisation, register children in the target age group for immunisation and check on the child health card to ensure that the child is being taken for immunisation on schedule.
3. ***Mapping of the catchment area for EPI service delivery*** points and establishing the target population – Through home visiting, and use of registers, the eligible children can be tracked to ensure that they are all being reached with immunisation services.
4. ***Improving and expanding the outreaches functionality*** – Adequate planning is very important to ensure that the outreaches are regular, take place on the scheduled day and time, and all resources are available (human resources, vaccines, diluent and injection materials etc).

   Plans should be made to reach populations that are not accessed due to geographical barriers, or are distant from the nearest health facility like opening up another outreach depending on the population to be serviced.
5. ***Improvements in scheduling immunisation sessions:*** The health workers should discuss the scheduling of immunisation sessions with community leaders to ensure that sessions are convenient to the parents/ caretakers. Health workers should honour the appointment dates.
6. ***Minimizing missed opportunities*** through:
   - Improving screening at OPD and in patient clinics/wards.
   - Improving the quality of services by: reducing long waiting hours at immunization sessions, client care/handling, ensure proper vaccination techniques.
   - Improving communication between the health workers and parents and caretakers.
   - Ensuring adequate vaccines and other supplies,
   - Extending immunisation services to private for profit and private not for profit healthy facilities.
7. ***Giving Catch up doses*** so that children and women are given doses that are due or those missed. Catch-up immunisation is a one-time special activity to identify individual children (or women) through screening of their vaccination history (by card and/or verbal) and provide vaccine doses that are due or that had been missed.
8. ***Mop-up strategies*** to target populations with low immunisation coverage or to respond to outbreaks (for example measles outbreak).
9. ***Immediate response to outbreaks.*** One of the responses to outbreak of vaccine preventable disease like Polio or Measles is vaccination of the population at risk. Through this, some children who may have not been previously reached with immunisation services may be reached.
10. Designing strategies for reaching the special populations like.
    - Refugees, fishing populations, nomads/herdsmen, displaced populations due to insecurity. These can be reached through strengthening inter-sectoral collaboration with other agencies like the Red Cross, UNHCR, Security agents and use of other strategies like use of mobile teams.
    - Hard to reach populations due to socio -economic, cultural and religious beliefs, practices and attitudes on immunisation.

10.9.3 Defaulter

Definition: A defaulter refers to a child who begins immunisation but doesn't follow the recommended schedule.

Health workers should use the child registers to identify children who have not completed their doses and liaise with community resource persons or mobilizers who will, through home visiting, remind parents of these children to complete the schedule. Community mobilizers will ascertain the reasons for defaulting or dropping out. During tracking of drop outs, community mobilizers should ensure that they give parents adequate information on the immunisation schedule, clear any circulating rumors and misconceptions, benefits of completing the schedule, importance of keeping the road to health or child health card and remind them when and where their children can receive the next dose.

Monthly meetings should be held between health workers and community mobilizers in a health facility catchment population to review the number of drop outs visited, how many responded, causes of drop outs and possible solutions. The following month, the mobiliser and the health worker will again check in the child register to document how many of the visited children responded. This process is the one referred to as tracking defaulters and drop outs.

Health workers should address the causes of drop outs by improving communication, ensure constant availability of vaccines and injection materials, ensure regular functioning of static and outreach sessions.

10.10 Supportive Supervision

Supervision refers to a process of guiding and facilitating health providers at their work places to perform their work better using problem solving approach with emphasis on two-way communication. Supervision generates information that is used to improve the quality of services being offered.

Supervision is one of the important components of the Reaching Every County/Child strategy that is used for programme improvement but is rarely given the attention it deserves because of competing programme activities. However, when supervision is done, it helps to solve problems, build teams, build leadership skills and empowers health providers to monitor and improve their performance.

10.10.1 Key elements of support supervision

Effective supervision should have the following key elements:

- Routine monitoring of programme performance.
- Conducting discussions with people in the field to identify strengths to be reinforced and weaknesses to be corrected.
- Developing follow-up strategies for improvement of subsequent activities
- Supporting the team in the field with knowledge and skills to implement designed strategies
- Introducing new concepts, policies and operational guidelines

10.10.2 How to conduct support supervision

Effective support supervision means continuation of team building, on the job training and programme improvement. The process of achieving results in programme improvement takes time considering the various aspects that have to be tackled during implementation of programme activities. The supervision is seen as a process during which supervisors help the supervisees to build teamwork and solve problems for better programme performance.

Remember supervision is not a fault finding exercise; it should be done in a cordial, friendly and interactive manner such that there is maximum benefit for the good of the service. Supportive supervision is "not a spot checking exercise" and therefore supervisors should avoid conducting supervision in a hurry.

Before supervision:

- Before supervisors go to the field, it is important that they review the necessary records and determine the areas that need to be examined closely. The records to be reviewed should include: County/health facility plans for immunization, communication strategies/methods, schedule for various activities, previous supervision reports and recommendations made and status of implementation and monthly immunization monitoring reports.
- Supervisors should be carefully selected, knowledgeable, confident and skilled in the specific area to be supervised.
- Identify the relevant logistics such as feedback or IEC materials to carry along with you for distribution during the field visit.
- Prepare the check list, where it doesn't exist or familiarize themselves with the existing check list.
- Send advance information to the supervisees.
- Find out relevant salient information about the State/County / health facility to be supervised.

During supervision:

- Observe activities being implemented.
- Conduct interviews with relevant health workers, clients, community leaders, community members, including County leaders.
- Meet with health workers to discuss activities they are doing and issues affecting them. During the discussions, agree on a programme of activities to address the identified challenges.
- Observe an immunisation session by paying particular emphasis on the interaction between the health workers and clients (quality of dialogue; are key messages on immunisation being given? how are they given? technique of administration of vaccines). Refer to the check list for guidance.
- If you observe any deviation from the standard procedure, give immediate feedback if it is life threatening in a manner that will not demean/ offend the health worker or provide the feedback during a debriefing meeting with the health workers.
- Review records to assess the status of implementation.
- Conduct data quality audit/assessment.
- Write a report about field activities and the people you interacted with. Have the report discussed through appropriate management structures at County level and agree on the course of action to take.
- Give feedback to the State/County /health facilities supervised.
- Support the County/health facilities supervised to implement the corrective measures.
- Conduct follow-up supervision to establish progress and identify further assistance that may be required.

Checklist for EPI Support Supervision at Health Facilities, MOH/GoSS

I. General Information

1. Name of health facility:_____Who owns the HF_____County_____State_____
2. Date of Visit:_____Date of previous supervision:_____
3. Name and responsibilities of the contacted person/supervisee
   a. _____
   b. _____
   c. _____
4. Total catchments area population:_____
5. Target population for the year: Total birth/ PW_____ Surviving Infants_____ NPW_____
6. EPI static sites: _____,Outreach:_____ Mobile _____
7. Are there un reached population? Yes_____ No_____
8. If yes, Number of Boma's :_____, total Population: _____
9. Is the EPI activities managed by EPI trained personnel? Yes_____, No_____
10. If yes, When was s/he last trained?:_____
11. Is the EPI policy document available Yes _____, No_____
12. Are health facility micro plans and budget prepared annually? Yes_____ No_____

II. EPI Plan:

No	Description	Yes	No
1.	Is there an updated EPI Work Plan (monthly/quarterly) including outreaches and mobile clinics for RI?		
2.	Is social mobilization and communication included in the EPI workplan?		
3.	Is there annual and quarterly vaccine, AD syringe, mixing syringe and safety box forecast for the HF?		
4.	How many outreaches (n=_____) and Statics (n=_____)are planned per month?		
III.	**EPI Service Delivery**		
1.	How many outreaches (n=____) and statics (n=_____) were implemented in the last reporting month?		
2.	What is the number of infants immunized against the total catchment area n(% covered) last month?		
	i. BCG coverage _____ (_____%) ii. DPT3 Coverage _____ (_____%) iii. OPV3 Coverage _____ (_____%) iv. Measles Coverage _____ (_____%) v. PW TT2+ Coverage _____ (_____%) vi. NPW TT2+ Coverage _____ (_____%)		
3.	Is Vitamin A given as part of your routine EPI program?		
4.	Is open multi-dose vial policy practiced?		
5.	Is there defaulter tracing mechanism? If yes, specify- _____ _____		
IV.	**EPI Monitoring**		
1.	Have the vaccination monitoring chart been updated for last reporting month?		
2.	Is dropout rate monitored monthly?		
3.	What is the current drop out rate for?		
	i) DPT1-DPT3 _____(_____%)		
	ii) DPT1-Measles _____(_____%)		
4.	Did any county EPI staff visit this health facility in the last quarter?		
5.	Was there any support supervision feed back after the visit (observe for record of feedback)?		
6.	Any EPI performance assessment meetings conducted?		
7.	Was there any program where CHW/Boma health committee are involved in EPI assessment?		
8.	If yes who and how frequently,_____ _____		
9.	Have you ever explored the degree of users' satisfaction for EPI?		
V.	**Vaccine and Cold Chain management**		
1.	Is there enough vaccine at least for one month at HF level?		
2.	Does the cold chain person or vaccinator know the actions to be taken during power interruption?		
3.	Are there enough wicks and glasses?		
VI.	**Safety of injection**		
1.	Are there sufficient amount of Ad syringes to use for the vaccine quantities in stock?		
2.	Are safety boxes used for disposal of used needles and syringes?		
3.	Do you use one mixing syringe for one vial?		
4.	Are needles recapped after use?		

5.	At the end of the EPI sessions does the vaccinator take care to leave the immunization site safe and clean?		
6.	Does the vaccinator know the common vaccine reactions for antigens used in EPI?		
VII.	**Community mobilization/community involvement**		
1.	How is mobilization carried out for immunization in the Bomas?		
2.	Who mobilizes the target population at the Boma level?		
3.	Is there community involvement in an outreach site selection?		
4.	Is there community involvement in scheduling outreach session?		
5.	Is there community involvement in mobilizing mothers?		
6.	How frequent doses the Boma health committees meet?		
VIII.	**Support from Higher Level**		
1.	Is there a feedback from the county or state levels on the HF monthly EPI reports (observe)?		
2.	Are vaccinators updated on current policies and guidelines?		
3.	Is there a meeting in the Health facility where EPI performance is reviewed?		
4.	Did you receive financial support for immunization activities implemented last month?		
5.	Is the supply of kerosene or gas for your refridgerator regular?		
6.	Are you regularly supplied with EPI reporting formats?		
IX.	**Observations by supervisors**		
1.	Is the expiry date and batch no of vaccines recorded?		
2.	Do you have refrigerators out of order?		
	How many?____,Type_____ Reasons for non functioning		
3.	Is the refrigerator placed close to the wall, heat object, sunlight?		
4.	Current temperature reading of the refrigerator		
5.	Do you record the refrigerator temperature twice daily including weekends?		
6.	Has refrigerator temperature been >+8^{o} c and/or <2 ^{o}c been recorded in the last month?		
7.	Are there unnecessary materials placed on the top of the refrigerator?		
8.	Are there sufficient ice packs in the freezing compartment?		
9.	Is there frost beyond the acceptable amount above 5 mm?		
10.	What is the method of defrosting?		
11.	Are the respective vaccines stored in the proper fridge compartments?		
12.	Is there any vaccine that has exceeded expiry date in the refrigerator?		
13.	Is there vaccine vials without labels in the refrigerator?		
14.	Is there frozen DPT or TT vaccines confirmed by shake test?		
15.	Is there any vial with VVM that has reached discard point?		
16.	Are needles separated from the syringe after use?		
17.	Are needles recapped after use for vaccine administration?		
18.	Is a single mixing syringe used for one vial?		
19.	Have the vaccination schedules for children and women and contraindication for vaccination explained?		
20.	Is the immunization status of children and mothers checked every day?		
21.	Are mothers told about when to come for the next vaccination?		
22.	Are there BCG and measles vaccines reconstituted before 6 hours?		
23.	Is the number of vials of measles/BCG vaccine available equal to the no. of vials of diluents?		
24.	Is open multi-dose vial policy practiced?		
25.	Are the opened vials properly labeled and kept in the refrigerator?		
26.	Is there specific place in the refrigerator for opened vials?		
27.	Is this health facility using appropriate tally sheets and reporting formats?		
28.	Are the used tally sheets and reporting formats appropriately filed?		
29.	Is reporting complete for all three previous months?		
30.	Is reporting to the county done timely (by 9th of the next month)?		
31.	Verify the validity of doses by checking the age of the child when he/she received the vaccine		
	1) Number of DPT1 doses received before the age of 6 weeks in the previous one month		
	2) Number of measles doses received **before** the age of 9 months in the previous one month		
	3) No. of children vaccinated after age one year and misclassified and reported as under one in the previous one month.		
32.	Are birth dates for all children documented in the child register for Immunization		
33.	Are all dates for vaccine receipt documented		
34.	Is there a health worker assigned to Boma outreach?		
35.	Is vaccine wastage monitored?		
36.	If yes, compare wastage rate of :		
	1. BCG____% , 2. Measles____%, 3. DPT___%, 4. OPV____%, 5. TT_____%		

X. Client exit Interview

Exit interview Questions: Interview at least 5 patients for the facility visited

1.Were parents/caretakers told about the vaccine and AEFIs?

2. Do the clients know when to come back for the next vaccination?

	Question 1		**Question 2**	
1st Interview	Yes	No	Yes	No
2nd	Yes	No	Yes	No
3rd	Yes	No	Yes	No
4th	Yes	No	Yes	No
5th	Yes	No	Yes	No

XI. Summary of the supervision activity

1. Strengths of the health facility:

2. Five major areas for improvement:

3. Five major recommendations with action points (responsible person/agency and date)

NB: All challenges and recommendations have to be put in the supervision book or prepare two copies and give one to supervisee.

Name and title of supervisor: _____

Date and signature of supervisor:_____

Exercise 9

1) What is the use of :
   a) Child registers-

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.....

   b) Immunisation cards

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2) What is monitoring?

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3) What information can you obtain from the immunisation monitoring charts?

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4) What is immunisation drop out?

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5) What are the main causes of drop out and what are the possible solutions?

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6) As a supervisor, what key tasks can you carry out during support supervision?

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UNIT 11: DISEASE SURVEILLANCE

11.1. About this Unit

This unit provides basic information for disease surveillance activities at all levels and assists in detecting, monitoring and responding to specific EPI diseases for which response is feasible and cost effective. This unit should be supplemented with the disease specific surveillance guidelines already provided by WHO in Southern Sudan.

Specifically this unit will be used:

- To provide basic information for all health workers.
- To monitor quality performance indicators for EPI disease surveillance
- To provide support supervision for EPI surveillance activities

This unit covers surveillance for AFP, measles, NNT, and AEFI, which are done by all levels. The other EPI diseases like Diphtheria, Partusis, childhood tuberculosis and Maternal tetanus are not included in this module but should be routinely reported through weekly or Monthly reporting systems of HMIS.

Objectives

Learning objectives

After studying this unit, you should be able to:

1. Define disease surveillance
2. State the purpose of disease surveillance
3. Describe methods of disease surveillance currently used in Southern Sudan
4. Describe in detail disease surveillance methods used for EPI target diseases within the frame work of IDSR

Performance objectives

After studying this unit, participants should be able to perform the following

1. Detect and report all suspected cases/outbreaks of Acute Flaccid Paralysis (AFP), measles, Neonatal Tetanus (NNT) and Adverse Events Following Immunization (AEFI)
2. Investigate a suspected case or outbreak of AFP, measles, NNT, and AEFI
3. Analyse and interpret disease patterns and trends of vaccine preventable diseases
4. Monitor the performance of disease surveillance system by use of indicators
5. Guide the immunization programme to improve performance

11.2. Definition and purpose of disease surveillance

Disease surveillance is the systematic, continuous collection, collation, analysis and interpretation of information on where, when and in whom the diseases occur and the dissemination of the information so that action is taken.

The mainstay of disease surveillance information is to provide evidence against which appropriate actions are made to prevent further spread of diseases.

The information obtained from EPI disease surveillance is used to:

- Analyze disease incidence and trends in geographical areas and groups in order to identify those areas and groups that are at high risk of vaccine preventable illness or death.
- Evaluate the impact of immunisations and the diseases they are meant to prevent
- Identify, investigate and control EPI disease outbreaks plus or minus laboratory confirmation in communities not reached by the programme.
- Plan and implement immunisation activities to reduce or eliminate risk of acquiring vaccine preventable diseases.
- Satisfy the requirements to certify that a disease (e.g. poliomyelitis) has been eradicated or NNT has been eliminated
- Use data driven decisions to introduce new vaccines once available globally

11.3 Methods of disease surveillance

The following table summarizes the different surveillance methods in Southern Sudan.

Method	Use & information collected	Limitations
Weekly epidemiological reports	• Collects data on cases & deaths due to epidemic prone diseases weekly • Enables quick outbreak identification, investigation & response	• Varying County & national completeness • Lacks some information e.g. age distribution, vaccination status • Not all counties or health facilities report weekly
Monthly Health facility morbidity and mortality reporting system	• Aggregated data on morbidity and mortality including vaccine preventable diseases • Data segregated by age (0-4 years & above five years) • May include Data segregated by gender	• Incompleteness at State, County, and national levels • Misses some information e.g. exact age distribution, vaccination status
Case based surveillance ± laboratory support	• Detailed information on each case is collected by use of a case investigation form within 48 hrs of case detection • Focuses on target diseases for eradication/elimination/control • Specimens are collected for lab confirmation e.g. AFP and soon measles • Specimens may not be collected for some diseases e.g. NNT	• Inadequate implementation by the peripheral health workers • Incomplete filling in of the case investigation forms • Health facilities lack case investigation forms & kits • • Data discrepancy between IDSR reported case-counts and case based data (investigated cases not reported in IDSR)

Method	Use & information collected	Limitations
Case based line listing	➢ Detailed information is collected on each case for all the cases seen in a month e.g. measles line lists ➢ This information is retained at the health facility level for data analysis and utilization ➢ Line list is updated with lab results if specimen was collected ➢ Helps the health facility to detect an outbreak easily and its causes ➢ Useful for outbreak investigations	➢ Not fully done by the health facility ➢ Inadequate forms at the health facility level
Sentinel surveillance	➢ Involves a limited number of health facilities mainly hospitals ➢ Collects data on specific priority diseases ➢ Specimen collection on some cases e.g. suspected bacterial meningitis for Hib and streptococcal pneumonia, stool for rotavirus or serum for Hepatitis B	➢ Data may not be generalizable to all Counties because of differences e.g. Immunisation coverage
Outbreak investigation	o Detailed information on each case is collected using a case investigation form or line list o Specimens are collected for lab confirmation from a few cases e.g. suspected measles outbreaks o Line listing is done on other cases involved in the outbreak o Data collected helps to develop appropriate control measures	o Inadequate response implemented by the counties o Post outbreak report is not submitted to the GoSS/MOH o Line listing not done by health facility and usually data is only available for cases with specimens o Limited involvement of the County Rapid Response Teams
Special studies	o Special studies can be designed to collect additional information that is not routinely collected. o Such studies are usually one time activities or periodic if indicated	o Limited resources to conduct regular studies

All states and Counties should implement the various surveillance methods with technical support from the central level and should ensure that the quality surveillance performance indicators are monitored regularly.

11.4 EPI Disease Surveillance Framework

This section provides basic information for surveillance activities at all levels and assists in detecting, investigation, monitoring and response to specific vaccine preventable diseases.

11.4.1 Acute Flaccid Paralysis (AFP)

Rationale for AFP surveillance

Poliomyelitis is targeted for eradication. Globally a highly sensitive surveillance system for Acute Flaccid Paralysis (AFP), including immediate case investigation, and specimen collection is the gold standard for documentation of progress towards this set goal.. AFP surveillance is critical for documenting the absence of wild (and vaccine associated) poliovirus circulation for polio-free certification.

AFP Case definition

Any child aged less than 15 years of age who develops sudden onset of flaccid/floppy paralysis affecting either one or two limbs OR a person of any age in whom a clinician suspects poliomyelitis.

Specimen collection

Collect 2 stool specimens 24-48 hours apart preferably within 14 days of onset of paralysis. Place each specimen in well rebelled stool collection containers. Store the specimens in a specimen carrier with hard frozen ice packs and ship the specimens within 72 hours to GoSS/MOH together with a COMPLETELY FILLED AFP case investigation form (annex 1).

Laboratory criteria for confirmation of diagnosis

Laboratory isolation of wild poliovirus from stool specimens collected from suspected case

Final Classification Scheme for AFP cases done by NPEC

Final classification of each AFP case is done independently of the investigator to ensure impartiality. This is done by the Expert Review Committee (ERC). The objectives of ERC are to confirm or discard a diagnosis of poliomyelitis after every AFP case is fully investigated. Once a case has been classified as polio compatible (case investigated beyond 14 days of onset of paralysis and 60 days later has residual paralysis or lost to follow up or died before follow up) this means that the area may still have circulation of wild poliomyelitis and the surveillance system is not sensitive enough to detect this circulation, if it occured.

Indicators of AFP surveillance performance

- Non-polio AFP rate of 2 per 100,000 population under 15 years of age
- At least 80% of AFP cases investigated with two adequate stool specimens collected 24-48 hours apart and within 14 days of paralysis onset
- At least 80% of AFP surveillance specimens arriving at a WHO accredited national reference laboratory within three days of being collected.
- At least 80% of AFP surveillance specimens receiving results within 14 days of receipt of specimen

- At least 80% of AFP cases with inadequate stool specimens have a 60-day follow up (annex 2 for copy of 60-day follow up case investigation form).
- At least 10% of the stool specimens having a non – polio enterovirus isolated

11.4.2 Measles

Rationale for Measles surveillance

The Southern Sudan National Measles control strategy, Global Measles Mortality Reduction and Regional Elimination strategic plans seek to reduce measles deaths by 95% by the year 2010 compared to the 2000 levels. In either plans, surveillance for measles is well articulated as an important strategy for identifying high-risk populations, predicting and preventing potential outbreaks and documenting progress towards the global and national targets.

Measles Case definition

Any person with fever (hot to touch if not measured) and a generalized maculo-papular rash and AT LEAST one of the following: Cough, Coryza (runny nose) or conjunctivitis (red eyes) OR Any person in whom a clinician suspects measles.

Specimen collection

The recommended specimens for case based surveillance are blood; and in outbreak investigations, blood and throat swabs may be used for virus isolation.

A: Blood

Case based surveillance involves collection of serum or dried blood spot specimens. Blood safety precautions should be strictly observed during specimen collection, storage and transportation.

A.1 Steps for Serum specimen collection for measles IgM testing

- Blood specimen should be taken off EVERY suspected measles cases within 30 days of onset of rash
- 3-5 mls of blood should be collected from suspected measles cases into a vaccutainer labeled with the patient's identification number and date of collection.
- Do not freeze whole blood before serum separation.
- The blood should then be left to stand (at an angle) at room temperature or centrifuged (where available) to allow serum to separate from blood cells.
- The separated serum should then be transferred with a Pasteur pipette into a labeled serum tube.
- Ensure that serum for measles laboratory testing is kept at +4 to +8°C
- The serum should in turn be transported in a reverse cold chain (+4 to +8°c) in a specimen carrier to a designated national reference laboratory together with a filled in case investigation forms within three days of collection.

If for whatever reasons no specimen is collected, the filled measles case investigation form should be forwarded to the County Health Department and through the state MOH to GoSS/MOH. All investigated measles cases (whether with blood or only the filled in case investigation form) should be line listed. Each case notified, investigated and immediately reported through the case-

based surveillance system should also be included in the weekly IDSR and monthly morbidity and mortality reporting systems.

A.2 Dried blood spot specimens

- Blood collected on a filter paper will be obtained by applying lancet (preferably auto disabled type) to the skin on the lateral side of the left ring finger tip.
- After piercing the fingertip using the lancet, blood should be allowed to flow freely onto the filter paper.
- Fill as many circles on the filter paper as the flow of blood from the finger can allow.
- Ensure collection of good quality filter paper specimens (with fully filled circles).
- Allow the loaded filter paper to dry in air at room temperature.
- When the filter paper (specimen) has dried properly, wrap the filter paper in a parafilm paper and enclose in an envelope.
- Ship the envelop to the designated national reference laboratory for measles diagnostics at room temperature.
- Do not keep a dried filter paper with a specimen in a fridge (temperature +4 to +8°c). Keep at room temperature

B: Throat swabs/nasopharngeal swabs

In order to isolate measles virus (usually during suspected measles outbreaks) health workers should obtain throat swab specimen from the patients as well. To obtain this specimen the health worker should follow the following procedure:

- Apply a swab (an applicator with cotton wool) on the throat of the suspected measles patient within the first 5 days of onset of rash.
- After collection place the specimen back into the tube with the transport media.
- Store the tube with the specimen in a specimen carrier with frozen ice packs, +4°C.
- Ship the specimens to the designated national reference laboratory for measles diagnostics within 48 hours in a specimen carrier with 2 well frozen ice packs.

When a health worker comes across a patient within 5 days of onset of rash both blood and throat swab should be collected. The designated national laboratory for measles diagnostics will process these specimens to isolate viruses in order to document the circulating viral strains. If unable to perform virus isolation studies, the specimen will be referred to where this capacity exists and preferably with capacity to conduct genotyping tests.

Steps for investigating a suspected measles outbreak

Measles outbreak investigations should include the following

1. The health facility staff detecting the suspected measles outbreak should notify the County Medical Officer (CMO) within 24 hours about the occurrence of clusters of suspected measles cases using the quickest available means of communication.
2. The CMO should within 24 hours send the County Rapid Response Team (CRRT) to the affected area to initiate an investigation.
3. The CRRT should collect blood specimens from the first 5 suspected measles cases only, fill in the measles case investigation form completely. Select the community where you know there are 5 or more suspected measles cases using the routinely collected measles

surveillance data from the measles line list.

4. Collect throat swabs for virus isolations from at least 5 suspected measles cases with onset of illness still within 5 days.
5. Coordinate or combine the investigation with some other routine activity, such as supervision or immunisation supplies delivery to save on the costs. Funding for an outbreak investigation should come from the County budget, but GoSS/MOH in conjunction with WHO/IDSR can provide investigation tools, technical support and where necessary additional vaccines/vaccination supplies.
6. Conduct house-to-house interviews with EVERY household in the affected community.Ask if ANYONE in the household has had measles during the past six months using the community case definition for measles (any person with fever and skin rash).
7. The CRRT should line-list all subsequent cases to record the age, vaccination status, address, date of rash onset, outcome, etc
8. The County team notifies all clinicians and surveillance coordinators in nearby areas of the outbreak and the need for intensified surveillance.
9. The County surveillance team should conduct active case search in health facilities and in surrounding villages to determine the extent of the outbreak.
10. Analyze your data and answer the following questions (most affected age group, vaccination status, case fatality rate, possible causes of vaccine failure or lack of vaccination in the affected area etc).
11. The County affected should update the County rumour/outbreak logbook.
12. The County health team should monitor the evolution of the outbreak by keeping track of the number of cases and dates of onset of rash of reported cases using an epidemic curve.
13. The CRRT should complete and send to the EPI department at GoSS/MOH a 2-page County outbreak investigation report (within 2 weeks of the investigation) summarizing the findings, the response, evaluation and feedback processes.

Laboratory criteria for confirmation of diagnosis

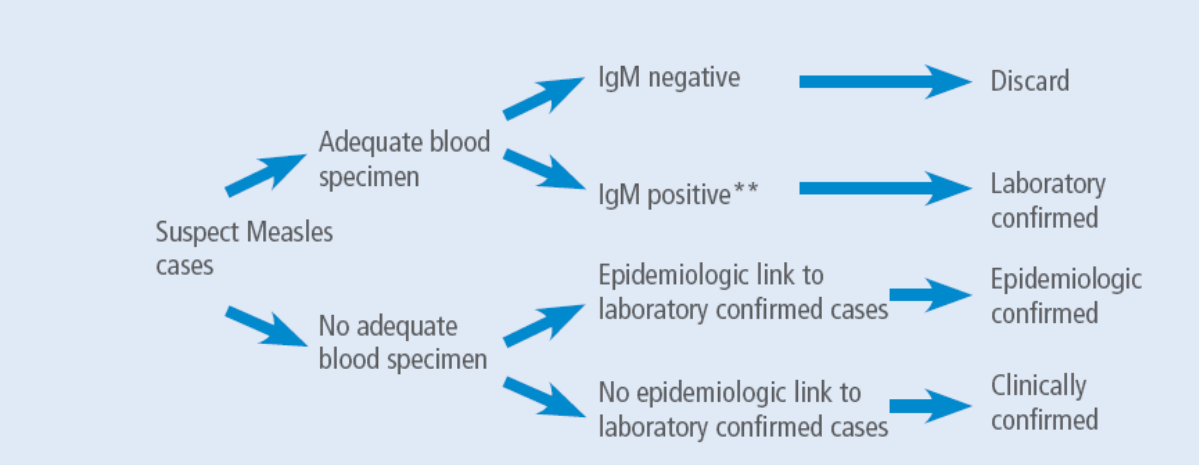

Figure 11.1: Final classification of measles cases

Performance indicators for measles surveillance

- At least 80% of weekly reported cases investigated for laboratory confirmation
- At least 80% of measles surveillance specimens arriving at UVRI/EPI laboratory within three days of collection

- 80% of cases notified within 48 hours after rash onset
- 80% of cases investigated with adequate specimen and laboratory results
- At least 80% of measles surveillance specimens having results within 72 hours of receipt of specimen
- At least 80% of expected weekly reports received
- The rate of non – measles febrile rash illness cases that have been discarded after a negative igm measles test result per 100,000population. (Target 2/100,000 population)

11.4.3 Neonatal Tetanus

Rationale for surveillance

With support from UNICEF, UNFPA and WHO, Neonatal Tetanus (NNT) is targeted by Ministry of Health for elimination as a major public health burden along with maternal tetanus. Elimination is defined as less than one NNT case per 1000 live births at County level per year. High coverage with tetanus toxoid among pregnant women and in high risk areas among all child bearing age women (CBAW), as well as improved access to clean delivery services are primary strategies for achieving this goal. Effective surveillance is critical for identifying areas or populations at high risk of NNT and for monitoring the impact of elimination interventions.

NNT Case definition

Is any new born with a normal suck and cry for the first two days of life and between 3 and 28 days of age cannot suck normally, becomes stiff and develops spasms on external stimuli (touch or light or noise).

Laboratory criteria for confirmation of diagnosis

No laboratory investigations are necessary in case confirmation. Investigation involves filling in completely an NNT case investigation form.

Final classification of NNT cases

The basis for case classification is entirely clinical. NNT cases reported by physicians are considered to be confirmed once they meet the standard case definition. However, National and International focal persons in the states should examine NNT case records during active search.

NNT Surveillance indicators

- Percentage of NNT cases that have had a completed case investigation form (target 80%)
- Percentage of NNT cases detected and reported within 7 days of onset of symptoms (target 80%)

11.4.4 Adverse Events Following Immunisation

Rationale for AEFI surveillance

Vaccines are administered as a preventive measure to large numbers of healthy children and women and are among the safest of pharmaceuticals. However, like any pharmaceutical product taken in the body, vaccines may on rare instances cause adverse events (un wanted effects).

These range from hypersensitivity with mild side effects, to serious (but rare) illnesses. If proper procedures of injection safety and vaccine handling are followed adverse events are minimized.

AEFI Case definition

Adverse Events Following Immunisation (AEFI) are medical incidents or reactions observed within four weeks following Immunisation and are believed (truly or falsely) to be caused by vaccination.

Laboratory criteria for diagnosis

Laboratory tests during AEFI investigations should be tailored towards the perceived cause of the adverse event and should be determined by the investigating team. The health worker should fill in AEFI investigation form and notify the State EPI operations officer about the detected AEFI who should in turn link up with the state level Rapid Response Team to investigate the reported AEFI.

Case classification

- ***Vaccine reaction:*** Event caused or precipitated by the vaccine when given correctly, caused by inherent properties of the vaccine
- ***Programme error:*** Event caused by an error in vaccine preparation, handling and administration. Health workers handling and administering vaccines could minimize these errors by following the correct procedures and techniques.
- ***Coincidental:*** Event that happens after immunisation but is not necessarily caused by the vaccine – a chance association
- ***Injection reaction:*** Event occurring due to anxiety, or pain from, the injection itself rather than the vaccine
- ***Unknown:*** Cause of the event cannot be determined

AEFI Surveillance indicators

- Percentage of AEFI cases investigated with a completed AEFI case investigation form A filled in + specimen collection
- Percentage of AEFI cases investigated within 3 days of notification
- Percentage of AEFI cases reported within 48-72 hours of onset of symptoms

Exercise 11.

1 What is Disease surveillance

2 List methods of surveillance currently used by your County

3 List the steps of AFP surveillance

4 What are the objectives of measles surveillance?

5 List the main strategies for achieving neonatal and maternal elimination in Southern Sudan

6 How do you investigate and respond to a case of NNT?

7 What is the standard case definition of an AEFI?

Annex 1: AFP Case investigation forms

Annex 2: 60-day follow up investigation form

Annex 3: Measles Case Investigation form

Annex 4: Measles Line listing format

Annex 5: NNT case investigation form

Annex 6: AEFI Case investigation forms

Annex 7: Yellow Fever Case investigation forms

Annex 8: IDS outbreak investigation reporting format

References

1. PATH October 2000. Giving Safe Injections: Introducing Auto –Disable Syringes (Training manual). PATH/ SEA/00.12.
2. USAID October 2003. Immunisation Essentials. A Practical Field Guide.
3. WHO 2001, Vaccines and Biological. Resources for Immunisation Managers, Module 8- Operational Components of Immunisation systems.
4. WHO Geneva 2002. “First, do no harm” Introducing auto-disable syringes and ensuring safety in immunisation systems of developing Countries. WHO/V&B02.26.
5. WHO Geneva 2004. Immunisation in Practice. A practical guide for health Staff.
6. WHO Geneva 1996. Safety of injection in Immunisation Programmes. WHO recommended policy. WHO/EPI/ LHIS/96.05
7. WHO/AFRO November 2004. Implementing RED Approach. A Guide for District Health Teams.