Study Unit 3

Expanded Program of Immunization Outline

- Immunization, Immunity and vaccine prevented disease.
- Cold chain management and cold chain equipment and monitoring tools
- Communication with caregivers and defaulters tracing
- Monitoring tools and immunization registers

Study Unit Duration

This Study Unit requires a 2 hours of formal study time.

You may spend an additional 2-3 hours for revision

Expanded Program of Immunization (EPI)

Preamble

This Study Unit explains what vaccination is and how to deliver quality immunization service, including safety injection and waste management reporting.

Learning Outcomes of Study Unit 3

After you complete this unite you will be able to:

3.1 Define immunization, vaccine-preventable diseases, and cold chain

3.2 Describe immunization schedule and site and route of administration Enumerate typical routine immunization day and shake test

3.3 Analyze dropout rate and outreach planning and the relationship with immunization coverage

Terminologies

EPI	Expanded program immunization
AEFI	Adverse effect of immunization
SIAS	Supplementary immunization activities
AD	Aut-disabled Syringes

CHD	Chid Heath Card
OPV	Ra pi vaccine

3.1 Overview of the Immunization Program

3.1.1 Immunity

Before vaccination, it is necessary to understand what Immunity is and the different forms of Immunity. When a person's body has antibodies against a disease, they are said to be immune to it. An antibody is a protein produced by the body to neutralize or destroy infections or toxins. Antibodies are a form of antibody that is specialized for a certain disease. ” Measles-specific antibodies, for example, may protect a person who has been exposed to measles, but won't protect them from mumps. (world health organization, 2015)

Immunity is the capacity of the body to resist disease invasion. Each day, humans are exposed to pathogens, alien disease-causing substances such as bacteria and viruses. Antigens are molecules that are connected to the surface of infections and trigger the body's immune system. An immune response is the body's defence mechanism for combating antigens and defending the body.

A person's immune system might be innate, passive, or acquired. In contrast to passive Immunity, active Immunity includes exposing the body to an antigen in order to produce an adaptive immune response. (world health organization, 2015)

Innate Immunity

Physical barriers (skin, hair, and mucous membranes) and defensive mechanisms (saliva, stomach acid), as well as general immunological reactions, make up a person's natural defences (inflammation). Non-specific Immunity is the name given to this form of Immunity. Even though the immune system cannot identify the specific antigen entering the body, it may nonetheless mount a fast defence in the face of any threat. (world health organization, 2015)

Passive Immunity

This is the body's ability to "borrow" antibodies to fight against infections. Antibodies can be passed from a mother's breast milk to a newborn or another person via blood products containing

antibodies like immunoglobulin. Passive Immunity is most commonly passed down from mother to child. For the duration of the last one to two months of pregnancy, antibodies are transferred through the placenta. A child born at full term will have the same immune system as its mother. Immunoglobulins can protect a newborn for up to a year against some illnesses by acting as a barrier against particular antigens. Innate Immunity is good, but it only lasts until the body's antibodies wear out (wane). (world health organization, 2015)

Acquired (adaptive) Immunity

The Immunity that develops as a result of immunological memory is what we're talking about here. As a result of exposure to a specific antigen (associated with a disease), the body produces antibodies against that antigen. As a result, when the antigen returns, the body's immune system is prepared to attack it. Infections can lead to acquired Immunity, which is when a person contracts a disease and gains Immunity due to exposure to the illness. With Acquired Immunity, the vaccine imitates a specific condition and causes an immune response in the vaccinated individual without making them sick. (world health organization, 2015)

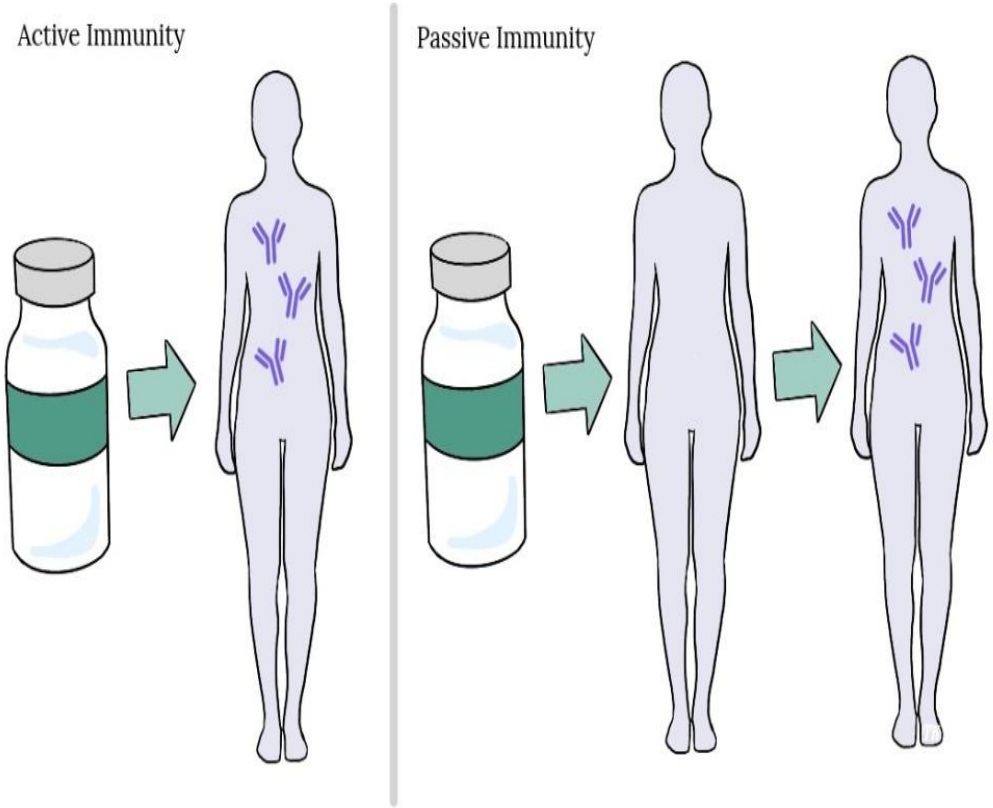

Active Immunity
Passive Immunity

Figure 3.1: Active vs. Passive Immunity. ((world health organization, 2015)

3.1.2 Immunization Program

Objectives of immunization program:

- To outline the Immunization Program's milestones
- illustrate the significance of immunization,
- Describe the regular vaccination services you receive.

When a vaccine stimulates the immune system, the body creates antibodies against disease-causing germs, providing active Immunity to the body. Live attenuated and killed formulations of vaccines are the two main categories.

Vaccines promote the immune system to produce antibodies against pathogens. Vaccines can be killed or live attenuated. (Somali goverment, 2010)

Live attenuated vaccines are created from disease-causing viruses or bacteria that have been weakened in the laboratory. There is no illness or mild condition caused by them in a person who has been immunized. The BCG, Measles, and Oral Polio Vaccine. Heat or chemicals are used to kill viruses or bacteria that are used to make inactivated vaccines. They are unable to thrive in persons who have been vaccinated, and hence cannot cause illness. For example, compared to live vaccines, they have a lower efficacy and need numerous doses to get full protection.

Progress in the Immunization Program.

- Expanded Immunization Program (EPI) started 1980: Services expanded to primary care clinics.
- 1993: The first significant measles program was performed, targeting all children aged nine months to 12 years, with technical aid from Indonesia.

- 2002: GAVI submits and receives funding for an ISS/INS project.
- 2004: The GAVI ISS/INS phase 1 money was released (70 per cent for vaccinations and injection safety to UNICEF and 30% for operational expenditures to WHO). 2005: The NE/NWZ initiated a phased Measles catch-up campaign.
- 2007: End of measles catch-up campaign in CSZ; transition from manual excel sheet data entry to HIS software).
- Child Health Days were launched in 2008. (Somali goverment, 2010)

EPI program.

WHO established it in 1974.

- Ensure that frequently recommended childhood vaccinations are accessible to all children
- Initially, eight vaccine-preventable illnesses were addressed.
- Tuberculosis
- Polio
- Diptheria
- Pertussis
- Habatitis
- Hemofelus influenza.
- Tetanus
- Measles (world health organization, 2020)

Immunization Routine

Vaccine

- ✓ BCG (Bacille Calmette-Guérin)
- ✓ OPV (oral poliovirus vaccine)
- ✓ PENTA
- ✓ Measles (MCV)

- ✓ Hib
- ✓ HepB (HB)
- ✓ Penta (DTP-HIB-HepB combination)
- ✓ YF*
- ✓ JE*
- ✓ PCV**
- ✓ RV **
- ✓ HPV**
- ✓ MR, MMR**
- ✓ IPV** (world health organization, 2020)

Disease(s)

- Tuberculosis
- Polio
- Tetanus, , Pertussis Diptheria *Haemophilus Influenzae* type B
- Hepatitis B
- Measles
- Diptheria, tetanus, pertussis, hepB, hib
- Yellow Fever
- Japanese Encephalitis
- Pneumococcal disease
- Rotavirus
- Human papilloma virus
- Measles-rubella, measles-mumps-rubella
- Polio (world health organization, 2020)

Table 3.1 Generic WHO-Recommended Routine Immunization Schedule.

Age	Traditional Vaccines	HepB Vaccine		Hib Vaccine
Birth	BCG, OPV0			
6 weeks	PENT/OPVA1			
10 weeks	Pent2, OPV 2			
14 weeks	Penta3, OPV 3			
9 Manth	Measles,			

(world health organization, 2020) (Federal Ministry of health, 2015) (Somali goverment, 2010)

Table 3.2 Country-Specific Schedules

Age	**Somalia**	**Sudan**	**Ethiopia**
Birth	BCG	BCG OPV0	BCG, OPV0, HepB1
6 weeks	DTP1, HepB1, OPV1	Penta1 OPV1, PCV	DTP1, OPV1, HepB2
10 weeks	DTP2, HepB2, OPV2	Penta2, OPV2, PCV2	DTP2, OPV2
14 weeks	DTP3, HepB3, OPV3	Penta3, OPV3, PCV3	DTP3, OPV3
9 months	Measles	Measles	Measles,HepB3

(world health organization, 2020)

3.1.3 Vaccine Preventable Diseases

DIPHTHERIA

1. **Standard Case Definitions.**

Suspect (history)

Pain in the throat, a mild fever, and a white membrane in the throat are all signs of an infection.

Diphtheria or a diphtheria epidemic in the area has recently been detected.

Probable (based on the patient's history and clinical exam):

Laryngitis, pharyngitis, tonsillitis, and an adhering membrane of the tonsils, throat, and/or nose describe this disease. (world health organization, 2015)

Confirmed cased by LAB

If both serum samples are collected before the injection of a toxoid or antitoxin, then the corynebacterium diphtheria may be isolated from a throat sample and a fourfold or bigger rise in serum antibody titer can be attained. (world health organization, 2015)

2. **Treatment**

   Suspects and cases should be treated with diphtheria antitoxin and antibiotics (erythromycin or penicillin).
   Sufferers and their contacts are vaccinated with diphtheria toxoid as a preventative measure to keep the disease from spreading..

3. **Prevention**

Children are immunized with the DPT vaccine according to the Immunization Schedule.
PERTUSSIS or whooping cough.

1. Case Definition

History of Suspection

A cough that lasts for more than two weeks vomiting may occur as a result of a coughing episode. Typical whooping cough in older infants, especially those exposed to a suspected case during the last two weeks or who have been exposed to a whooping cough outbreak in the area (world health organization, 2015)

Probable case

Someone who has had a cough for at least two weeks and exhibits at least one of the following symptoms of Pertussis is considered to have a confirmed case of the disease. Awe-inspiring whooping and coughing paroxysms

Post-tussive vomiting without evident cause (i.e. vomiting right after coughing) Accurately stated (laboratory tests) Testing for Bordetella pertussis may be done either by isolation or PCR detection of genomic sequences. (world health organization, 2015)

Treatment

In order to minimize the infectious phase, antibiotics such as erythromycin are often administered.

Children with Pertussis should drink lots of fluids to prevent dehydration.. (world health organization, 2015)

Prevention

Children should immunized with the DPT vaccine according to the Immunization Schedule**.**

TETANUS

1. **Case Definition.**

Suspect by history

Newborns who die between the ages of 3 and 28 days, or those who have been diagnosed with Neonatal Tetanus (NT) but have not been investigated, are included in this category. (world health organization, 2015)

Probable (history and clinical examination)

Between three and twenty-eight days old, a newborn who is able to suck and cry on a regular basis, but who gets rigid or spasms throughout this time, is known as a neonatal suckler. (world health organization, 2015)

Confirmed (laboratory tests)

Case categorization is solely clinical and does not require laboratory validation. Physician-reported NT instances are deemed confirmed.

2. **Treatment**

Neonate tetanus mortality rates may be reduced from 80% to 50% or lower with excellent 24-hour nursing care in a reference hospital and prudent medication usage.

It is necessary to vaccinate those who have recovered from tetanus since they lack natural immunity and may be infected again. (world health organization, 2015)

3. **Prevention**

The Immunization Schedule recommends DPT/TT vaccination for infants and children.
TT vaccination of women of reproductive age, in or outside of pregnancy.
Even if the pregnant lady has been inoculated, hygienic practices should be followed throughout and after childbirth. (world health organization, 2015)

POLIOMYELITIS

1. **Case Definition**

Suspect (history)

In children younger than 15 years of age, sudden weakness and floppiness anywhere on their body or paralysis in people older than 15 who have polio is suspected. (world health organization, 2015)

Probable (history and clinical examination)

Epidemiological associated case.

Confirmed by lab

The wild poliovirus to be isolated from faeces.

2. **Treatment**

Complete bed rest with the correct posture of the injured limb is recommended during the acute period. Avoid massage and injections at all costs.
The acute phase of physiotherapy is followed by maintenance treatment.
Deformities/contractures treated by orthopaedic surgery. (world health organization, 2015)

3. **Prevention**

According to the Immunization Schedule, OPV vaccine. For children under the age of five, OPV is indicated for regular vaccination and Supplementary Immunization Activities (SIAs).

MEASLES

1. **Standard Case Definition**

Suspect by history or clinical.

Ifj child has a fever

Probable (history and clinical examination

More than three days of fever with a non-vesicular or fluid-free rash (i.e., a maculopapular rash) AND 'Cough or coryza' (running nose) OR 'conjunctivitis).

Confirmed (laboratory tests)

An IgM antibody titer of at least fourfold must be present in the blood for measles virus to be isolated, as well as evidence of measles-specific IgM antibodies in the bloodstream. (world health organization, 2015)

Treatment

Meals and fluids should be consumed on a regular basis as part of the patient's treatment. Vitamin-A doses of 50000 IU for six months; 1 lakh IU for six to eleven months; and 2 lakh IU for twelve months and older are used to treat pneumonia and diarrhoea.. (world health organization, 2015)

Prevention

Vaccination against measles in accordance with the Immunization Schedule

ULOSIS

1. **Case Definition**

Suspect.

TB may be diagnosed in children who have had a fever and cough for more than three weeks, regardless of whether they have lost or gained weight, and who have had recent contact with an active tuberculosis patient in the last two years. (world health organization, 2015)

Probable case

Sputum examination, chest X-ray, Mantoux test, and a history of contact are all clinical signs that may be used to determine whether a patient has influenza.

Confirmed by lab result.

A person who has a positive Mycobacterium tuberculosis culture or two substantial acid-fast bacilli smears in their sputum.

2. **Treatment**

3. Prevention

According to the Immunization Schedule, immunizing newborns with BCG protects them against juvenile types of tuberculosis such as tuberculous meningitis and miliary tuberculosis. (world health organization, 2015)

3.1.4 Cold Chain and Logistics Management

Objectives of the learning.

1. Cold chain systems and their importance in immunization programs are described here.
2. In order to ensure the potency of vaccines, it is important to identify the elements that affect their effectiveness.
3. Explain the MCH, regional, and zonal cold chain equipment.
4. Predict, store, and provide vaccines, ice packs, and diluents in MCH, district, regional and zonal refrigerator/ILR/freezers accurately and consistently.
5. Vaccine waste in the MCH, the district, and the area must be reduced.
6. In the event of a breakdown of Cold Chain Equipment, develop contingency plans and do preventive maintenance..

Cold Chain defined as a mechanism to storae and transferring vaccine between the manufacturing site and the point of usage at prescribed temperatures. The cold chain's critical components are as follows:

• Personnel tasked with the responsibility of managing vaccine storage and distribution

• Equipment for storing and transporting vaccines, as well as temperature monitoring

• Procedural safeguards: to guarantee that vaccinations are kept and transferred at the proper temperature

The Cold Chain is a mechanism for storing and transferring vaccines between the manufacturing

site and the point of usage at prescribed temperatures. (world health organization, 2015)

Figure 3.2 chain cold ((Somali goverment, 2010)

Maintaining the proper temperature for vaccinations is not a simple operation, but the consequences of failing to do so can be severe. Once the power of vaccination is gone, it cannot be recovered. Damaged vaccines must be discarded, resulting in insufficient vaccine stockpiles and vaccine waste. Additionally, children and pregnant women who receive an ineffective (world health organization, 2015)

vaccination are not protected. For a comprehensive list of vaccination sensitivities.

Table 4.1: Summary of Vaccine Sensitivities

Vaccine	Exposure to heat/light	Exposure to cold	Temperature at MCH
Heat and light sensitive vaccines			
BCG	Relatively heat stable, but sensitive to light	Not damaged by freezing.	**+2°C to +8°C**
OPV	Sensitive to heat	Not damaged by freezing	**+2°C to +8°C**
Measles	Sensitive to heat and light	Not damaged by freezing	**+2°C to +8°C**
Freeze Sensitive Vaccines			
DPT	Relatively heat stable	Freezes at -3°C (Should not be frozen)	**+2°C to +8°C**
TT	Relatively heat stable	Freezes at -3°C (Should not be frozen)	**+2°C to +8°C**
At the MCH level, keep all vaccines in the refrigerator/ILR for a period of one month at temperature of +2^{0}C to +8^{0}C			

Thermo-sensitivity of Vaccines

Vaccines sensitive to heat

- **BCG (after reconstitution)**
- **OPV**
- **Measles**
- **DPT**
- **BCG (before reconstitution)**
- **TT**

Most → Least

Vaccines sensitive to freezing

- **DPT**
- **TT**

Most → Least

Figure 3.3 summary of vaccine sensitivities. (Somali goverment, 2010)

Vaccine Damage

Even if the vaccine is destroyed, its outward appearance may stay unaltered. However, the loss of power caused by either heat and cold is irreversible and cannot be recovered.(world health organization, 2015)

Heat caused by Damage

Temperatures above +80°C damage all vaccines, if they exposed to a large amount of heat in a short period (A modest quantity of heat for a long period, such by opening the refrigerator/ILR door/lid repeatedly, such as keeping vaccination in a closed car in the sun).

Vaccine Vial Monitor (VVM)

The VVM is a device that monitors vaccine vials. A VVM is a heat-sensitive label applied to a vaccination vial to monitor the amount of time you've spent in the sun.

Time and temperature together cause the inner square of the VVM to progressively and permanently discolour. Check the state of the VVM before opening a vial. (world health organization, 2015)

Is a VVM used to determine the potency of vaccines? In terms of vaccination potency, long-term heat exposure is the most important element that the VVM doesn't take into account. A vaccination that is vulnerable to freezing temperatures may be damaged by the VVM since it doesn't account for freezing exposure. (world health organization, 2015)

How read the VVM

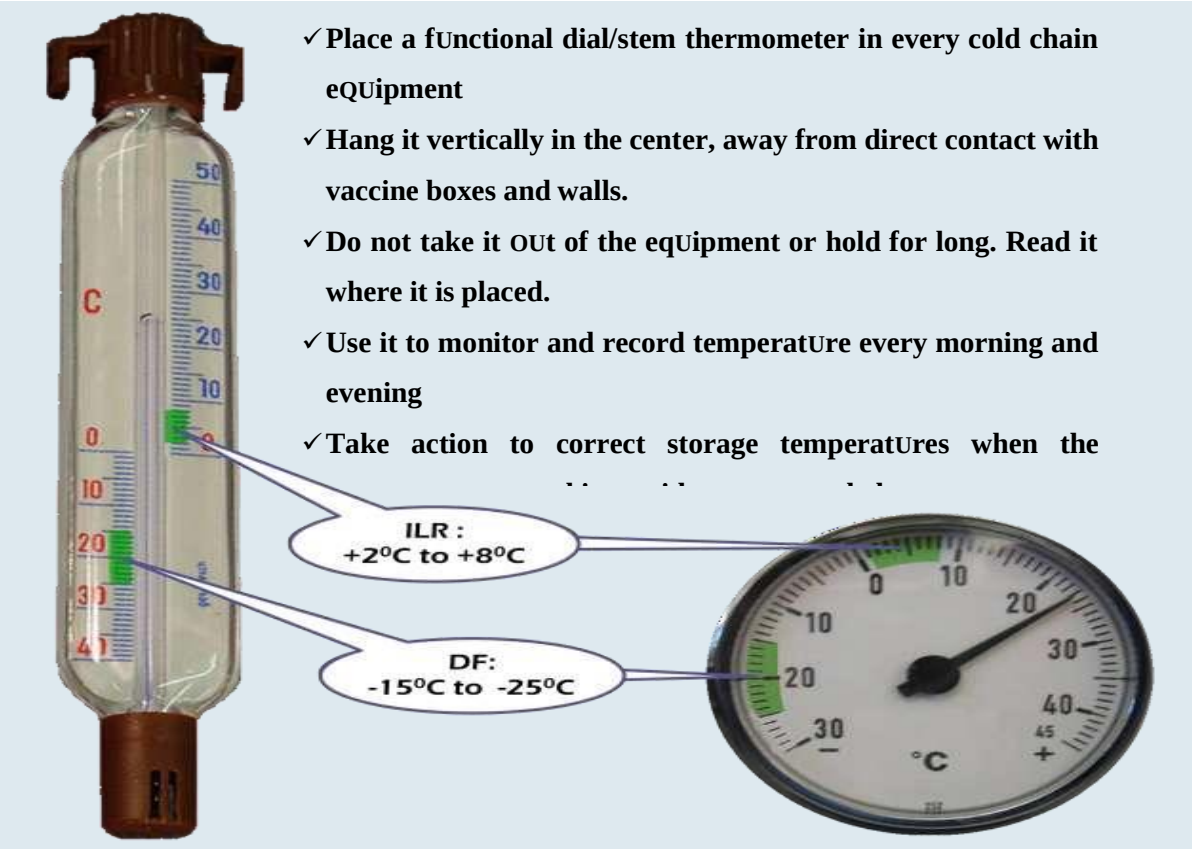
Figure 3.4: Different stages of the VVM(source WHO)

The color of the square on the inside is paler than the circular one on the exterior. As long as it hasn't expired, use the vaccination.

In spite of the fact that the inner square is more illuminated than the outside circle, the latter is still more dimly lit. As long as it hasn't expired, use the vaccination.

Toss Away Point: The outside circle and the inner square are the same color. CANCEL VACCINE USE IMMEDIATELY.

The inner enclosure is a deeper shade than the outer circle: DISCONTINUE USETHERMOMETERS*:*



(Somali goverment, 2010)

Figure 3.5 correct usage of thermometer

Using a dial or a stem (alcohol) to assess vaccine storage temperature. When it comes to refrigerators, ILRs, and deep freezers, thermometer is precise and sensitive record of temperature is 500C to + 500C.

Keep the 12-month temperature recording form booklet on the cold chain equipment's top and check it every day to determine if the temperature record is maintained as instructed in

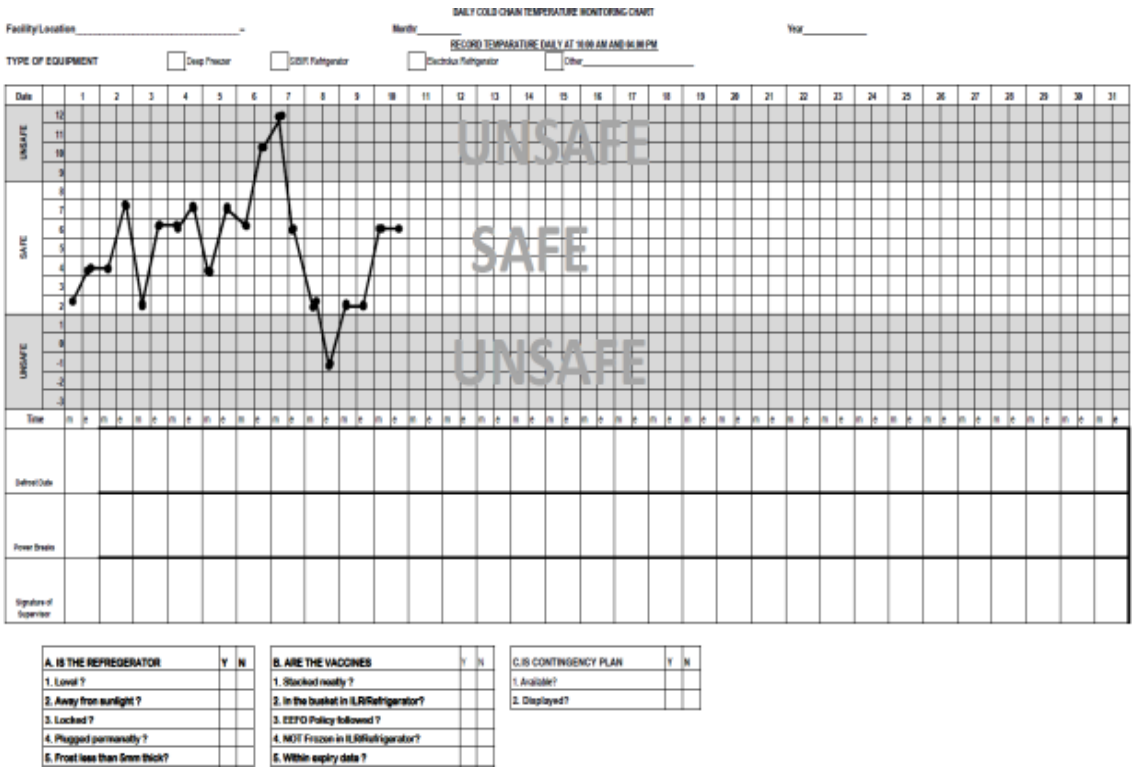


Figure 3.6 Temperature Record ((world health organization, 2015)

3.2.3 Adverse Events Following Immunization

LEARNING OBJECTIVES

To provide a definition for Adverse Events Following Immunization (AEFIs) and to characterize the various forms of AEFIs.

• To investigate, report, and respond to AEFIs.

• To outline the roles and responsibilities of AEFI's medical staff at all levels.

A medical occurrence after a vaccination raises worry and is suspected to be caused by immunization is known as a events caused by vaccines (AEFI). AEFIs can pose a severe hazard to the vaccination program and, in certain situations, to the recipients' health if they are not appropriately controlled. It's critical to recognize, investigate, monitor, and respond to AEFIs as soon as possible so that corrective actions may be taken. (world health organization, 2015)

Types of AEFI

Vaccine reactions

These can be characterized as mild or severe. Common vaccination responses include symptoms of local of radness, pain, swelling and fever and sametimes allergy and vomiting.

Rare significant vaccination responses such as high grade fever 39 and above

Error Codes Inappropriate vaccination storage, handling, preparation, and administration can cause adverse effects. The most prevalent program fault is infection from the nonsterile or improper injection. The condition might be local such abscess or systamtatic such toxic or infection shock.). (world health organization, 2015)

Adverse events

Inappropriate vaccination storage, handling, formulation, and administration can cause this. The most prevalent program fault is infection from non-sterile or improper injection. Local (suppuration, abscess), systemic (sepsis, toxic shock syndrome) or blood-borne viral infection (e.g., HIV, Hepatitis B or Hepatitis C). (world health organization, 2020)

Coincidental Events

Coincidences are temporally connected to vaccination but not causally. Similar events occurred in other age groups at the same time, although they not receive suspicious vaccine (s). There is no sign that the incident is connected to vaccination.

Injection Reactions

Vaccinated toddlers and adults may respond in anticipation of and in response to any type of injection. This response is unrelated to the vaccine's substance.

Unknown AEFIs indicate that the cause of the incident is unknown. Before coming to this conclusion, rule out all of the preceding factors. (world health organization, 2015)

3.2.4 Recording and reporting tools in EPI.

LEARNING OBJECTIVES

- ✓ To deliver a list and description of vaccination indicator and reporting formats.
- ✓ To detect and resolve frequent problems with vaccination records and reports.
- ✓ To examine regular coverage data in order to discover access and use issues.
- ✓ To establish an action plan that is appropriate for the MCH and district levels.

Information on recipients, vaccination status, visit date, and number of VPDs and AEFIs is gathered from the records. These are usually kept by the person who gathered the data and are meant to be used at that level. (world health organization, 2015)

Reporting

On the other hand, data is collected and submitted to higher levels of program management. A continual stream of data informs vaccination program administrators and vaccine providers if immunization services are reaching the target population, what proportion of the target population is getting vaccinated, who isn't being vaccinated, and what the service quality is. Do we have enough resources to meet our needs? (world health organization, 2015)

Is there a decrease in VPDs and AEFIs?

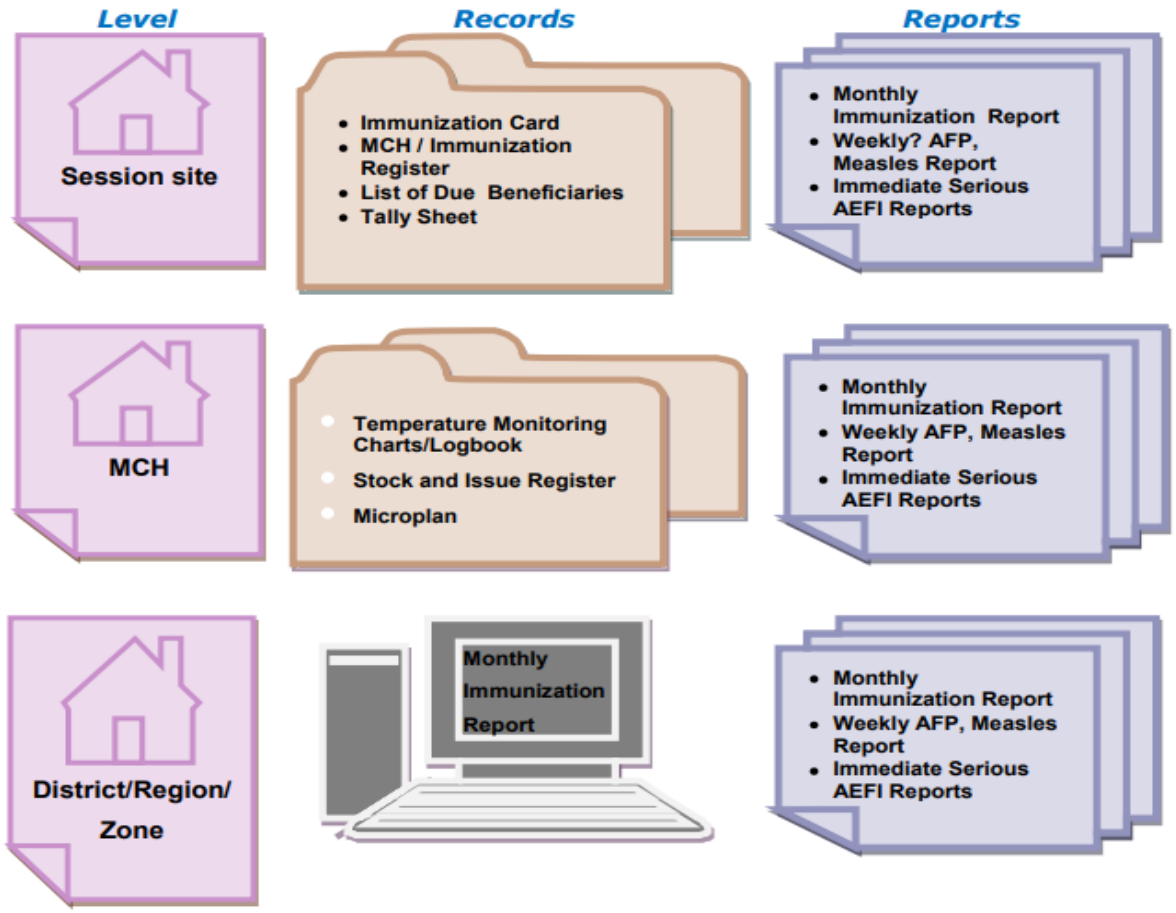


Figure 3.8 Report (Somali goverment, 2010)

Records

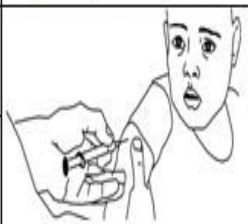
Table 3.6 Records

Data Collected	Uses
▪ An individual's identity number, their mother's maiden name, and the name of their father/husband. ▪ In addition, please include the following information: due date, residence address, name of MCH/Health Facility, name and age of newborn (infant's gender), immunization dates (by dosage), and services received during CHDs	• The vaccinator can keep track of the vaccination process of a certain pregnant lady and her unborn child. • reminds the carer of the immunizations administered and those due • If the recipient is from another region, the information on immunization status is provided.

(Somali goverment, 2010)

Immunization Card

Immunization for the Child (0 to 59 months)

Ideal Age Limits	Vaccine	Preventing what disease	Received through	Date Given	Date next dose
Immediately after birth - 11 bilood	BCG	 Childhood TB	☐ Routine EPI	/ /	
Immediately after birth - 11 bilood	OPV0	 Poliomyelitis	☐ Routine EPI ☐ Child Health Days	/ /	/ /
1½ - 11 bilood	OPV1		☐ Routine EPI ☐ Child Health Days	/ /	/ /
2½ - 11 bilood	OPV2		☐ Routine EPI ☐ Child Health Days	/ /	/ /
3½ - 11 bilood	OPV3		☐ Routine EPI ☐ Child Health Days	/ /	
1½ - 11 bilood	DPT1	 Diphtheria, Pertussis, Tetanus	☐ Routine EPI ☐ Child Health Days	/ /	/ /
2½ - 11 bilood	DPT2		☐ Routine EPI ☐ Child Health Days	/ /	/ /
3½ - 11 bilood	DPT3		☐ Routine EPI ☐ Child Health Days	/ /	
9 - 11 bilood	Measles 9-11 bilood	 Measles	☐ Routine EPI ☐ Child Health Days	/ /	
9 - 11 bilood	Measles 12-59 bilood		☐ Child Health Days	/ /	

- There should be a gap of at least one month between two doses of OPV and two doses of DPT
- Fever and minor pain and soreness after DPT vaccination are normal. A few children might develop fever and sometimes rashes 7-1 days after measles vaccination. This is harmless. Do not worry.

Figure 3.9 Immunization card (Somali goverment, 2010)

Tools for monitoring data

Regardless of the type of data you own, it doesn't matter all that much. Planning, discovering plan deviations, and taking remedial action are all more crucial when using data (monitoring and evaluation). The tools listed below assist in making efficient and effective use of the data.

Coverage Monitoring chart

This graph was made to track newborn coverage versus the target population on a month-by-month basis (left-outs). This test can monitor the vaccination status of patients (dropouts). Assemble a bar chart for each level based on the data from Level 1. (from MCH forward). Graphs should also be displayed and updated on a regular basis.

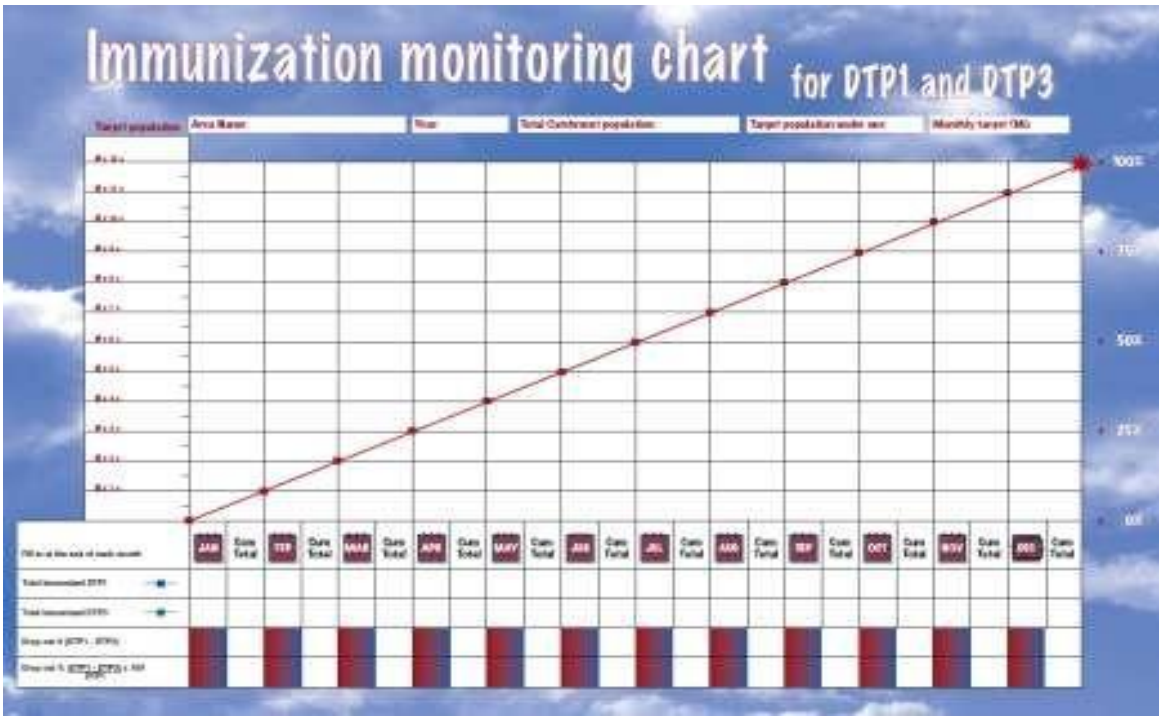


Figure 3.10: Coverage Monitoring Chart (world health organization, 2015)

3.3 Preparing a Coverage/Dropout Monitoring.

Follow the steps outlined below, structured hierarchically, to create a chart tracking the number of doses given and the dropout rate for newborns under the age of one year. (world health organization, 2015)

3.3.1 Write down the Annual Target Population

Yearly vaccination services are provided to children under the age of 1 as a part of the annual target population. Medical Centers for Health (MCH) first calculates its annual target population based on the total number of births in its service region (world health organization, 2015)

3.3.2 Calculate the monthly target population

This stage influences the amount of infants that will be born in a given month. To calculate the number of children who need be vaccinated each month, divide the annual target population by 12. (i.e. the monthly target population). 156/12 = 13 months if you want to reach your annual target of 156 in a year. A vaccine plan including the immunization of 13 newborns per month should be implemented. (world health organization, 2015)

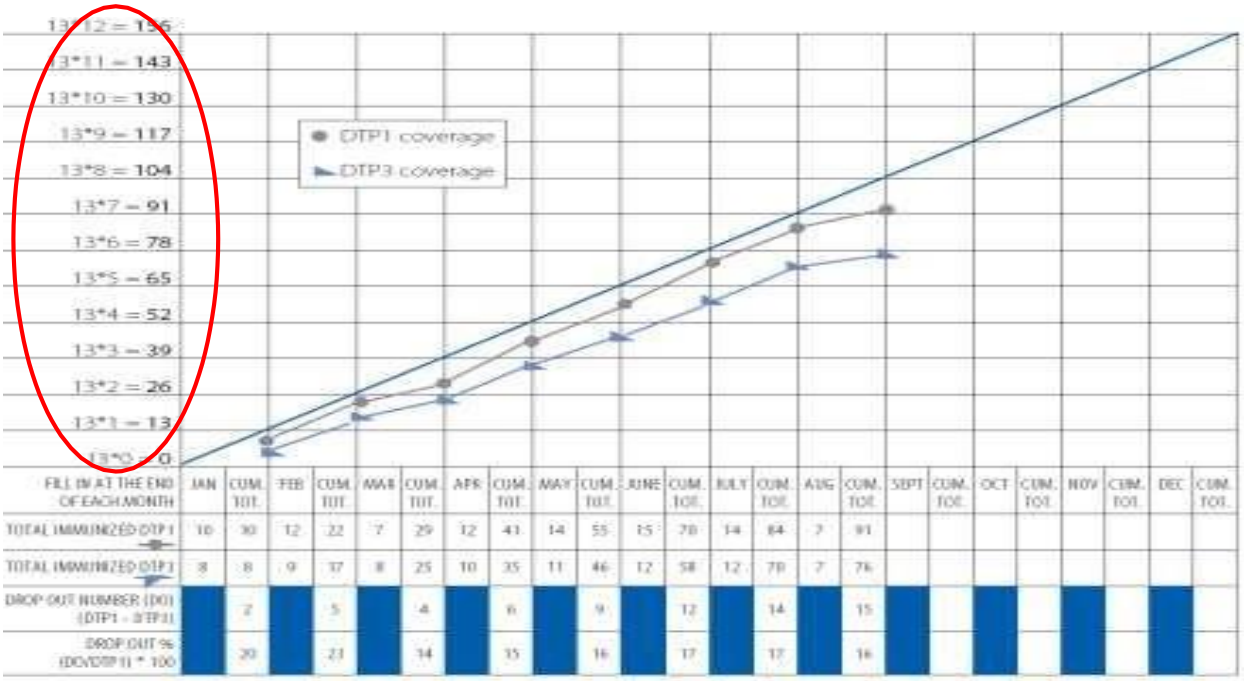


Figure 3.11 (world health organization, 2015)

3.3.3 Label the chart.

To avoid misrepresenting the chart, make sure it has a title typically put at the top of the chart. For instance, Duruqsi MCH-2010: Penta doses provided and dropouts in babies aged one year.

Put the cumulative monthly aim (the growing number) on the chart's left (Y axis). So if your monthly goal is 13, your total goals for April, May, June, and July will be 13, 26, 39, and 52, respectively (13 + 13 + 13+ 13).

3.3.4 Label the boxes

Below with the name and dose of the vaccination that you are tracking, for example DTP1 and DPT3 or Measles BCG.

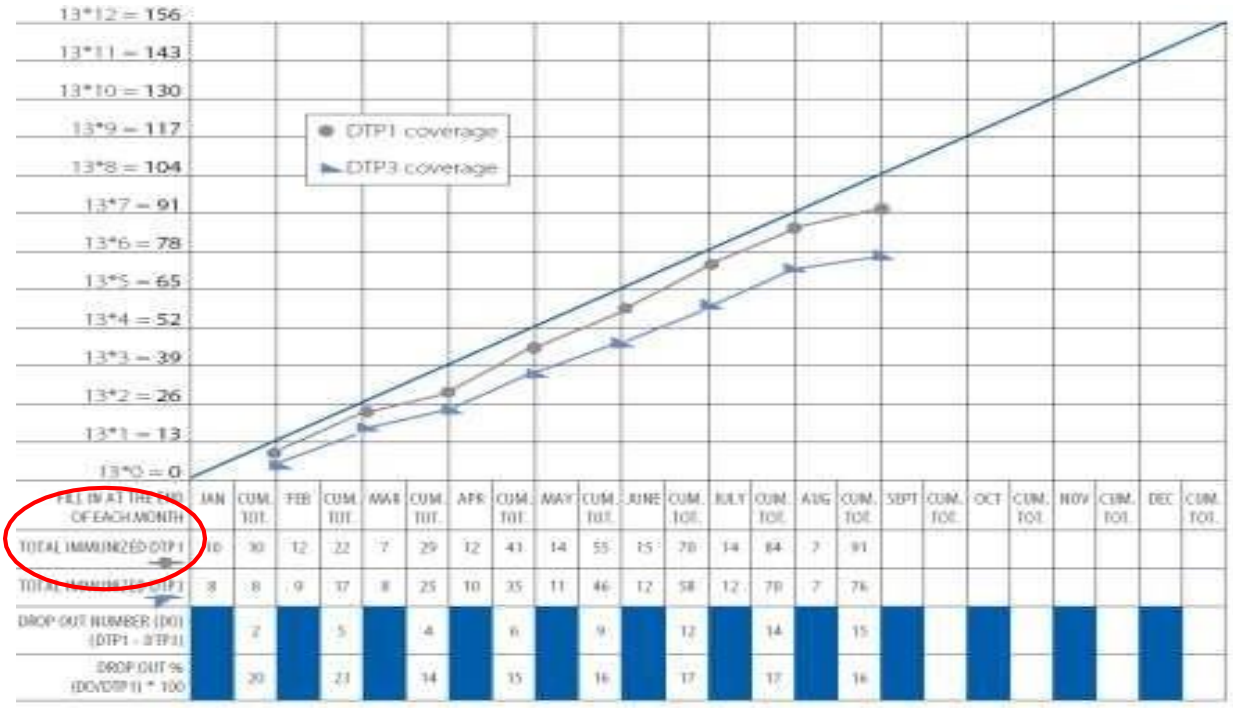


Figure 3.12 DTP1 and DPT3, or BCG and Measles. (world health organization, 2015)

3.3.5 Draw a diagonal line

Assuming that every infant is immunized on time, a diagonal line drawn from zero to top right corner represents the ideal vaccination rate.

3.3.6 Plot the immunization data on the chart.

A row of boxes underneath the graph may be hiding there. For each month you'll be keeping track of your spending, look for the specified spaces. A month's worth of doses are tallied.

For current cumulative total, add current month doses to monthly cumulative total and place it on top of month column you are recording. Place a dot in the month column to symbolize the month's cumulative amount.

From this month's dot, draw a straight line to the previous month's dot.

Every month for the rest of the year, you should repeat steps 1 to 3. **(world health organization, 2015)**

Plot the administration of Penta doses (follow steps 1 to 4).

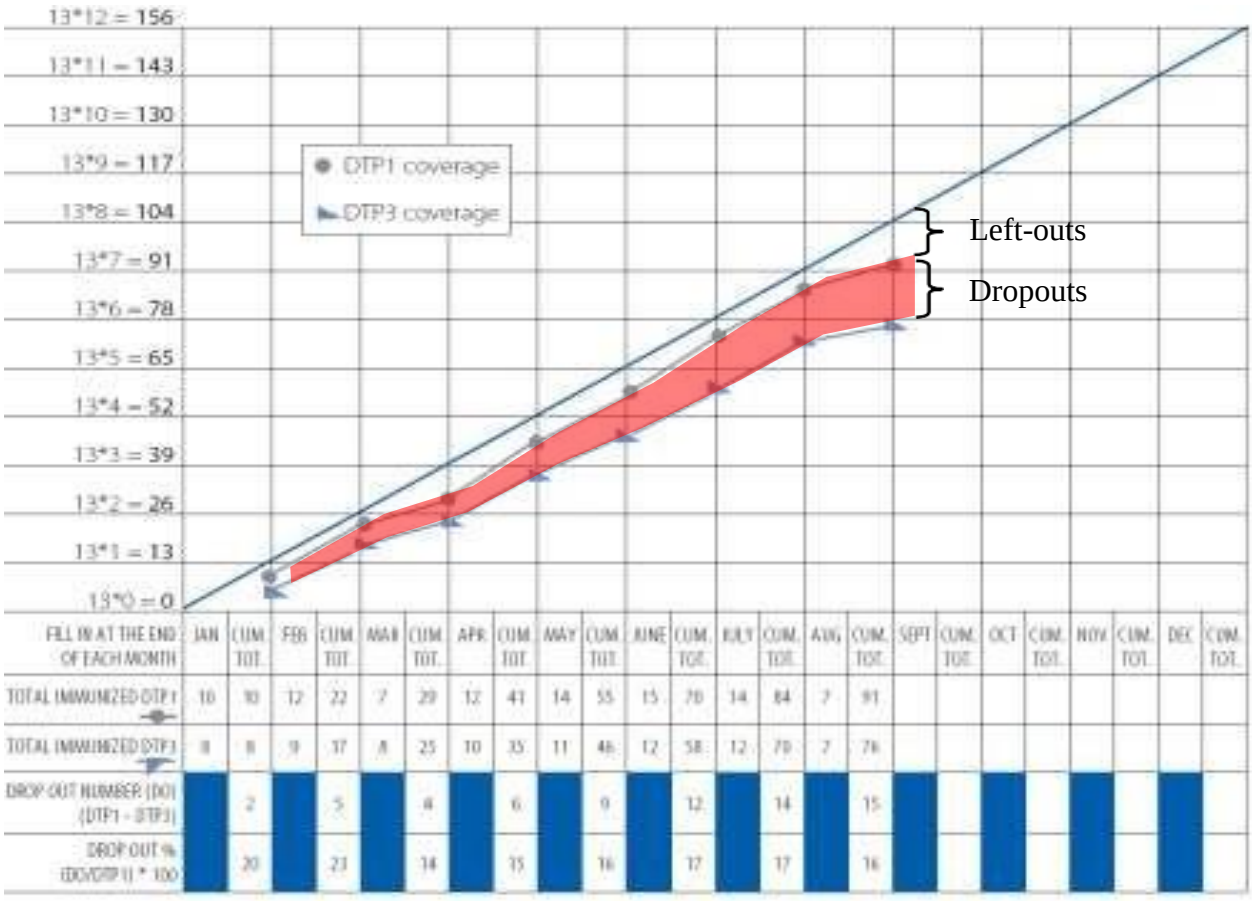


Figure 3.13 (world health organization, 2015)

3.3.7 Calculate the total number of dropouts

Between Penta1 and 2, subtract the cumulative number of Penta 3 dropouts from the cumulative number of Penta1 dropouts.

3.3.8 Calculate the cumulative dropout

Use the following formula to get the aggregate dropout rate:

Dpout Rate calculating by multiplying the cumulative total of DPT1 by the sum of DPT3 and then multiplying the result by 100.

On the diagonal target line, look for the space between it and DPT1. This is where the left-outs for DPT1 may be observed visually. Dropouts can also be observed as the space (in pink) between the DPT1 and DPT3 lines. (world health organization, 2015)

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