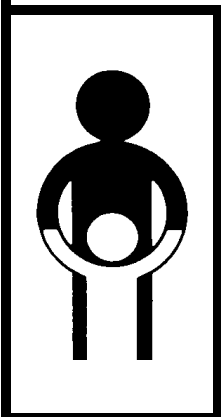


# Immunization in practice

## Learning activities manual



**GLOBAL PROGRAMME FOR VACCINES AND IMMUNIZATION**  
**EXPANDED PROGRAMME ON IMMUNIZATION**



*World Health Organization, Geneva, 1998*

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# Introduction

The Learning Activities Manual, the *Immunization in Practice* modules and the Trainers' Guide are parts of a learning package for health workers who administer vaccines. The Trainers' Guide describes the activities that health workers must undertake in order to master all the skills involved in immunization services. The Learning Activities Manual contains exercises that health workers can do on their own or in small groups.

Learners may complete all the exercises in each module, or trainers may select the exercises they consider most relevant.

The Trainers' Guide contains notes on each exercise to which learners and trainers may refer.

---

# Module 2:

## EPI vaccines

### Exercise 1

1. Which vaccines are damaged most by heat?
2. Why must you throw reconstituted vaccines out after one session?
3. What is the immunization schedule for children? Give the vaccines, the doses and the recommended ages for immunization.
4. What is the immunization schedule for women of childbearing age? Give the doses and the recommended intervals after each immunization.
5. What are the side-effects of each vaccine? What advice do you give parents if they occur?

---

## Exercise 2

### Case study

#### The keen medical officer of Munga

In Munga Province, a keen medical officer named Thomas is managing a successful immunization programme.

One day, he visits a district 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.  
Four of these 15 had never been to a health centre or other health facility before being hospitalized.  
Eleven 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.
- Four children had received measles immunization in the same health centre and had been at the right age for this.

\*\*\*

1. Which of these cases of measles could have been prevented? How?
2. What should the medical officer do to reduce the number of measles cases in the province?

---

### Exercise 3

#### Case Study

##### The window ledge

On Friday, Ramesh decides to defrost and clean his refrigerator because a lot of ice has collected around the freezer.

He puts ice packs in a vaccine carrier and then places the vaccines from the refrigerator in the middle. There is not enough room in the carrier for everything, so he puts the diluent on the window ledge out of the way.

“The diluent will be safe here until I can put it back in the refrigerator. Diluent doesn't lose its potency as vaccine does.”

On the following Monday, immunization day at the Clinic, many children come in for measles immunization. Ramesh takes the measles vaccine out of the refrigerator but at first cannot find the diluent. Eventually he sees it on the window ledge.

\*\*\*

1. Can the diluent from the window ledge be used to reconstitute the measles vaccine?
2. What should Ramesh do before he immunizes the children?

---

## Exercise 4

### Case study

#### Two months pregnant

Mrs Kama, two months pregnant with her first baby, is at the clinic and hears a health worker talking to a group of women. She is telling them about neonatal tetanus, a disease that causes death in newborn babies, and about the injection that women can get to protect themselves and their babies.

Nurse Celia is giving tetanus toxoid immunizations. Mrs Kama asks her for one. "I am going to my mother's village soon and will stay several months," she says. "There may not be time for two injections when I come back."

"I'm sorry," says Nurse Celia, "I can't give you tetanus toxoid now. It's too early in your pregnancy and it might harm the baby."

"My friend told me that the health workers in Ibutown give these injections to every woman the first time she goes to the antenatal care clinic - even if she's only one month pregnant. They say it's not dangerous."

"I'm sorry," says Nurse Celia. "My supervisor has told me not to give tetanus toxoid before a woman is at least four months pregnant."

\*\*\*

1. Who is following the correct procedure Nurse Celia or the health workers in Ibutown?
2. What should Nurse Celia do?

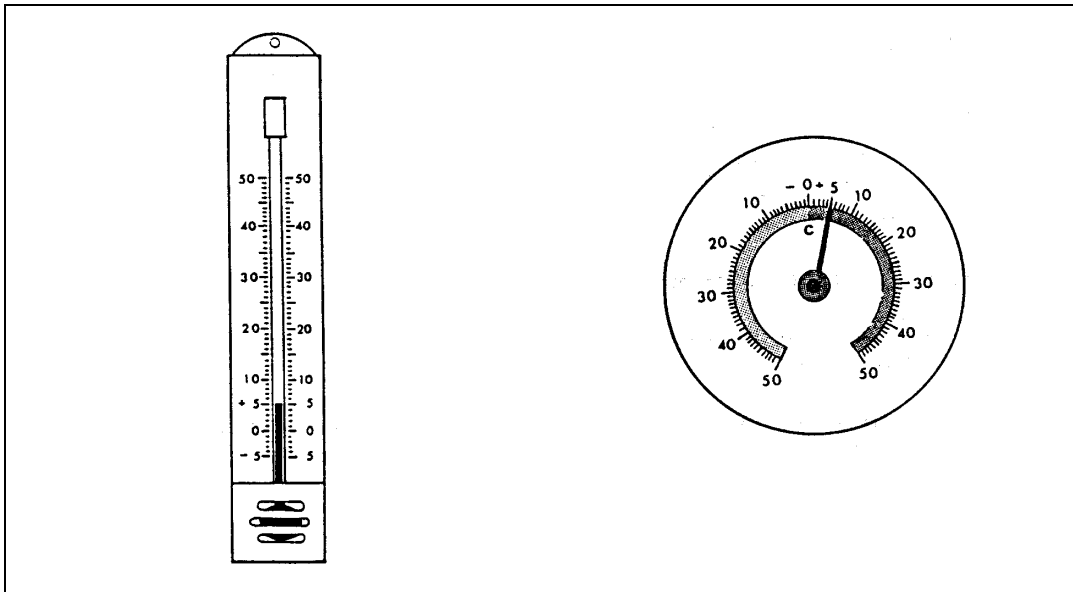
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# Module 3: The cold chain

## Exercise 1

1. What temperature is shown by the thermometers in the picture below? Do they show a safe temperature for storing vaccines?

**Figure 1: Different kinds of thermometers for immunization programmes**



1. Where should each of the following vaccines be stored – on the top shelf or the middle shelf of the refrigerator? Give reasons for your answers.

BCG

OPV

DPT

Hepatitis B vaccine

Measles vaccine

Yellow fever vaccine

Tetanus toxoid

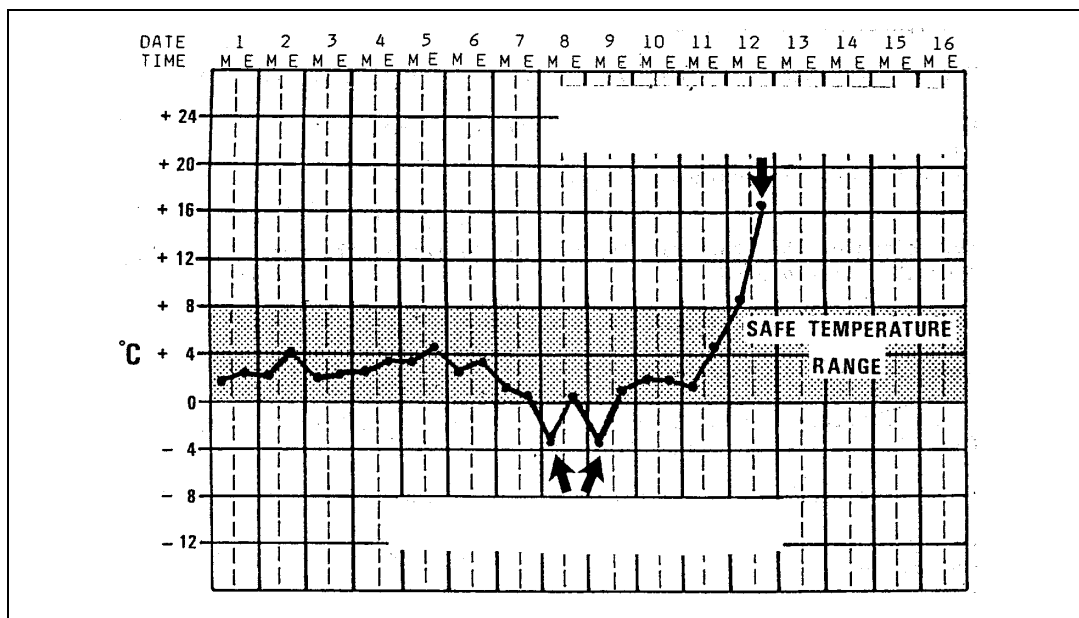
2. In the picture below of a refrigerator temperature chart the shaded area shows the safe temperature range.

a) What temperature is shown at the top of the safe temperature range? What temperature is shown at the bottom?

b) What do you notice about the temperature on the:

- morning of day 3;
- evening of day 5;
- morning of day 8;
- evening of day 12?

**Figure 2: A refrigerator temperature chart**



- 
4. Why should you put ice packs (or ice cubes) between the vaccines and the foam pad of a vaccine carrier?
  5.
    - a) How do you keep opened vaccine vials cold during a session?
    - b) How do you keep unopened vials cold during a session?

---

## Exercise 2

### Case study

#### Omar's story

Omar is immunizing children when his supervisor arrives unexpectedly. Having prepared to give his next injection, Omar picks up some DPT from a cup of water. The supervisor feels the water and finds that it is hot.

She asks: " Why is this vaccine in hot water? "

"The vaccine was frozen solid this morning when I took it out of the refrigerator," says Omar. "I had to put it in hot water to melt it so that I could get it into the syringe."

\*\*\*

1. What has Omar done that is wrong?
2. What should be done with the DPT vaccine?
3. What should Omar do about the children whom he gave the DPT?

---

### Exercise 3

#### Case study

##### Liza and the ice packs

Liza, a community nurse, conducts outreach immunization sessions on Tuesdays and Thursdays.

One Tuesday she returns late from her outreach trip. She leaves her vaccine carrier and other equipment at the health centre and hurries home.

On Wednesday afternoon she cleans and sterilizes syringes and needles for the next day's outreach. She checks the vaccine supply and puts the melted ice packs in the freezer.

On Thursday, Liza leaves for the outreach site early in the morning. It is already hot. When she arrives at the site, people are waiting for her. She opens the vaccine carrier and finds that the ice packs have melted. The thermometer in the carrier reads +16° C.

\*\*\*

1. What should she do now?
2. What should she do in the future to prevent this problem?

---

## Exercise 4

### Case study

#### A vehicle breaks down

Pak Nana is a health worker on the Broma District outreach team. One morning the team's vehicle breaks down on its way to an immunization session. Pak Nana opens the bonnet and begins to look for the problem while his fellow worker lies down under a tree and falls asleep.

An hour later, supervisor Pak Jacob drives up and stops to see if he can help. He thinks he may be able to take the vaccine and the other health worker to the immunization session.

Pak Jacob finds the vaccine carrier in the sun on the back seat of the vehicle. The lid is partly off. Inside the carrier are vaccines, a bottle of Fanta and three small pieces of ice in a plastic bag full of water. He finds syringes in a cardboard box, and bowls, cups and cotton wool in a paper bag.

At this point Pak Nana finishes repairing the vehicle. "We can go now," he says. "We can have the immunization session after all."

"I'm afraid we can't," says Pak Jacob. "We must send a message to cancel the session and go back to the health centre."

\*\*\*

1. Why does Pak Jacob cancel the immunization session?
2. What should Pak Nana do differently next time?

---

# Module 4:

## Ensuring safe injections

### Exercise 1

1. What can happen if you use an unsterile syringe and needle to give an injection?
2. What must you do if you touch the shaft or bevel of a needle?
3. What can happen if you do not clean syringes and needles before you sterilize them?
4. What can happen if you inject BCG too deeply because the needle is barbed?
5. Why must you put the forceps on the rack lid of the sterilizer?
6. Why must you let injection equipment cool off before you use it?
7. Below is a list of equipment needed for cleaning and sterilizing syringes and needles. What is missing from the list?
  - Wash basin
  - Steam sterilizer
  - TST indicator
  - Hard water pad
  - Timer

---

## Exercise 2

### Case Study

#### The accident

Nurse Marta always goes to outreach sessions on the same day of the month so that people know when to expect her. She always arrives on time and the people are always ready for her.

On the first Monday of the month she is on her way to Masu Village as usual. A large truck brushes her arm as it passes on the narrow muddy road and she falls off her bicycle. The vaccine carrier lid breaks open and all the vaccines and ice packs fall out. The sterile syringes and needles also spill on to the ground. Luckily, Nurse Marta is unhurt and her bicycle is undamaged.

Shaken, she picks everything up and returns to the health centre, where she sterilizes all the equipment. Because the day is hot she disposes of all the vaccines. She then sends a message with the bus driver, indicating that she cannot come on this occasion but that, as usual, she will come on the first Monday of the next month.

\*\*\*

1. Is Nurse Marta correct in what she does? Explain your answer.
2. What else could she do to make sure that the people are ready for her next outreach visit?

---

### Exercise 3

#### Case study

#### No steam

Araba is sterilizing syringes and needles in a new steam sterilizer. She loads the barrels, plungers and needles into the rack, puts the rack into the sterilizer base, puts the lid on, and puts the forceps on top. She closes the sterilizer and puts it on the stove. She lights the stove and sets the timer for 20 minutes.

A few minutes after lighting the stove, Araba notices that no steam is coming from the pressure valve.

She takes the sterilizer off the stove and turns the stove off. When the sterilizer is cool she opens it. It is completely dry inside and the syringes are beginning to melt.

\*\*\*

What has Araba forgotten to do?

---

## Exercise 4

### Case study

#### Using a timer

Sister Mita is visiting health centres to discuss with health workers how the district office could distribute vaccines more efficiently. At Haddad Health Centre she finds Nurse Lamya discussing polio with some clients.

While they are talking, Nurse Lamya puts a steam sterilizer on the stove and sets the timer. After 20 minutes the timer rings and Nurse Lamya takes the sterilizer off the stove.

Sister Mita says: "We cannot use the equipment in this sterilizer. We must go through the sterilization process again. This time, let me show you the correct way to sterilize".

\*\*\*

Why does Sister Mita say the equipment cannot be used?

---

# Module 5: Organizing immunization sessions

## Exercise 1

1. Your health centre serves a total population of 4000. How many 10-dose vials of each vaccine do you need if you have an immunization session once a month?
2. You are starting an immunization outreach service in a remote area with a total population of 2500. You do not want to hold sessions with fewer than 20 children and 20 women. How many times a month should you go to the area for a session?
3. How many syringes and needles of each kind do you need for an immunization session 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?

---

## Exercise 2

### Case study

#### 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 immunization equipment are on a narrow shelf on the wall. The parents are queueing quietly in the middle of the room, waiting their turn.

\*\*\*

Your friend asks for your advice after the session. What do you say?

---

### Exercise 3

#### Case study

##### Reducing vaccine wastage

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

He prepares everything before people come to his weekly immunization sessions. He takes the vaccine he thinks he will need out of the refrigerator. He constitutes the BCG, measles and yellow fever vaccines. He 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 he immunizes one or two children with DPT, OPV or hepatitis B vaccine and that no one needs BCG, measles or yellow fever vaccine.

Hassan's careful record-keeping shows that he is wasting more than 80 % of his vaccine.

\*\*\*

What, if anything, can be done to reduce the waste?

---

## Exercise 4

### Case study

#### The missing kerosene

Ida is a community nurse at the Ngoro Health Centre. She is going to hold an outreach immunization session for a group of villages a long way away from Ngoro. This is a new outreach site and the people there are still learning about the benefits of immunization. She wants to arrive on time and to do everything correctly.

The previous afternoon she checked that there were enough ice packs in the freezer and she decided how much vaccine to take. She cleaned all the injection equipment so that it would be ready for sterilization before her departure.

Early in the morning, Ida comes to the health centre and begins to sterilize the equipment. Before steam starts coming out of the valve, the stove goes out. There is no more kerosene.

Ida rushes to the shop to buy some but the owner has closed for the day to go to a funeral. The other shops are closed and the families she knows have run out of kerosene because it is the end of the month.

After an hour of searching she finds some. It takes another hour to complete the sterilization process, so she leaves for the outreach session more than two hours late.

\*\*\*

1. Could Ida have solved the problem another way?
2. What can she do to prevent this from happening again?

---

# Module 6:

## During a session: registering and assessing clients

### Exercise 1

1. Why are immunization cards important?
2. What immunizations, if any, is each of the following clients due to receive?
  - A newborn.
  - A 10-month-old child who has had BCG, OPV0-3, DPT1-3 and HB1-3.
  - An 8-month-old child who has had BCG, OPV0-3, DPT1-3 and HB1-3.
  - A 6-week-old child who has had BCG and OPV0.
  - A 5-week-old child who has never been immunized.
  - A 20-year-old woman who has never received a tetanus toxoid immunization.
  - A 4-week-old child who received BCG at birth but has no scar.
  - A woman who received TT2 8 months previously.
3. What immunizations can you give on the same day to an 11-month-old who has never been immunized?
4. Should you give measles vaccine to a child who was immunized with this vaccine during an outbreak the previous month?

---

## Exercise 2

### Case Study

#### The date stamp

Health workers Cato and Nina run outreach immunization sessions once a week in a crowded city neighbourhood. Cato registers clients, weighs the children and decides which vaccine or vaccines a client should have. He then stamps the date in the corresponding space or spaces on each client's immunization card.

Nina examines the card and gives the vaccine or vaccines indicated by the date stamp.

One day three children with measles come to the health centre for treatment. Cato examines their immunization cards and finds that they all have a date stamp 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. One father says that he did not know his child needed two immunizations on the day in question : she received DPT3 only. The third parent cannot remember what happened.

\*\*\*

1. What do you think happens?
2. How could the problem be prevented?

---

### Exercise 3

#### Case study

##### The sick child

Hilda's grandmother brings her to the neighbourhood health centre when she is 6 weeks old for OPV1, DPT1 and HB1 immunizations. Three days later, Hilda becomes very ill and goes into shock. After a brief period of hospitalization she recovers fully.

Subsequently, when Hilda is 11 weeks old, her grandmother brings her to the health centre to be treated for a cold.

\*\*\*

1. What would you do if you were a health worker in this centre?

---

# Module 7:

## During a session: preparing vaccines

### Exercise 1

1. Where should you put sterile forceps when you are not using them?
2. If you need to put a syringe down, where should you put it?
3. What does it mean when the inner square of a vaccine vial monitor is darker than the outer circle?
4. How long does reconstituted vaccine last?

---

## Exercise 2

### Case study

#### The unlabelled vaccines

When Nurse Santina opens the refrigerator to take out some DPT vaccine she sees a lot of water in the main compartment. Everything is wet. She checks the temperature: it is + 2° C.

Nurse Santina finds that there are no labels on any of the vials in the place where she always keeps DPT vaccine. The water has washed them off.

She says to herself: "All our DPT was new last week. These people have come a long way for their DPT immunizations and I don't want to discourage them. The refrigerator is cold enough".

She gives four babies an injection of 0.5 ml of liquid from one of the vials. Thirty minutes later the four mothers, very upset, rush into the health centre. Their children became unconscious and were admitted to hospital on an emergency basis.

Later, a senior nursing officer comes to discuss what has happened. She says: "It appears you gave injections of insulin instead of vaccine".

\*\*\*

1. What is Nurse Santina's mistake?
2. What should she do to avoid making this mistake again?

---

# Module 8:

## During a session: giving immunizations

### Exercise 1

1. Why is it important for an adult to hold a child securely and in the right position for an injection?
2. Why must the bevel of an intradermal needle face upwards?
3. How do you keep vaccines cold during an immunization session?
  - a) Opened vials that you are using.
  - b) Unopened vials.
4. How do you give each of the following vaccines?

Vaccine	Kind of injection	Immunization site
BCG		
OPV		
DPT		
Hepatitis B		
Measles		
Yellow fever		
Tetanus toxoid		

1. terms:

intradermal;  
intramuscular;  
subcutaneous.

---

Exercise 2

**Case study**

**Three sick babies**

It is immunization day at Kanja Health Centre. Usually, 25 to 30 parents attend with their children, but this time only eight parents have come. Three mothers are worried because their babies are sick.

When Tema screens the clients he finds that the sick babies have red and tender swellings on their thighs and moderate fever. All three came to the health centre a week previously for their first doses of DPT and OPV. It had been a busy day, Tema remembered; one of the health workers had a day off and things kept going wrong. They had to rush to finish immunizing all the clients before nightfall.

\*\*\*

1. What is the probable cause of the swelling?
2. What should Tema do?

---

### Exercise 3

#### Case study

##### Wrong way Kudzu

Kudzu arrives at the outreach site late and many children are waiting. He has been on a crowded bus for two hours and want a cigarette to calm his nerves. So he smokes while preparing for the immunization session.

The community has given him a table to use during the session. He places it in the sun because the clients are sitting in the only shady place, under a mango tree.

Before he starts giving immunizations, Kudzu takes from his vaccine carrier two vials of each kind of vaccine and two ampoules of diluent for BCG and two for measles vaccine. He reconstitutes the BCG and measles vaccines and shakes them well. He then puts the vaccines on the foam pad on top of the vaccine carrier.

In his rush to get ready, Kudzu drops his only forceps on the ground. He knows the forceps are contaminated, so he washes his hands thoroughly and uses his fingers instead. He holds syringes and needles by their adaptors when assembling them thinking that this is satisfactory as long as he does not touch the other parts.

Finally, he loads a syringe with 2 ml of measles vaccine, put it into the vaccine carrier to keep cool, and begins immunizing.

Kudzu is giving the fourth injection with the same syringe and needle when a health educator who happens to be passing by tells him to stop the session.

\*\*\*

1. Is the health educator right to stop the session?
2. What reasons does she have for stopping it?

---

# Module 9:

## After a session

1. When is the best time to clean and sterilize reusable syringes and needles?
2. Would you keep or throw out the vaccine in each of the following cases?
  - a) You have brought back opened vials of OPV and DPT with some vaccine left in them on returning from an outreach session.
  - b) Opened vials with some tetanus toxoid and hepatitis B vaccine left in them remain as you finish a session in your health centre.
  - c) You reconstitute a vial of BCG vaccine at 11.00 and there is still some left at 14.00 on the same day, when you are ready to begin the afternoon session.
  - d) You drop your last vial of DPT vaccine on the floor.
    - i) The vial has been opened.
    - ii) The vial has not been opened.
  - e) Your refrigerator is out of order all weekend. What should you do with each of the following vaccines it contains:
    - BCG unopened;
    - OPV opened;
    - OPV unopened;
    - DPT opened;
    - DPT unopened;
    - measles reconstituted;
    - yellow fever unopened;
    - hepatitis B opened;

---

- hepatitis B unopened?

f) After returning from an outreach session you open the vaccine carrier to find the ice in all the ice packs has melted. What should you do with:

(i) the opened vials inside;

(ii) the unopened vials inside?

---

# Module 10: Communicating with parents and involving communities

## Exercise 1

What are the five essential messages about immunization?

---

## Exercise 2

### Case study

#### The new outreach site

Maria, the energetic new director of the Modu Health Centre, has agreed with the district supervisor to raise immunization coverage by 20 % in her first six months in the job. One of the things she plans to do is to increase the number of outreach sites. She makes a big calendar to put on the wall of the health centre, showing the days and locations of the outreach sessions.

One week before the first outreach session in Tuding, Maria visits the place for the first time. She sees the community leaders and tells them about the immunization programme. She says that a team will come the following Tuesday at 8 . 00 to give immunizations and she asks the community leaders to notify people and arrange a site.

When the team arrives the next Tuesday there are no tables, chairs or water, and no clients.

The team members are disappointed and the community leaders wonder what has gone wrong.

\*\*\*

1. What do you think has happened and how could Maria have prevented it?
2. What can the team do while in Tuding?

---

### Exercise 3

#### Case study

#### Crossing the road

Abu-Bakar holds immunization sessions once a week in his health centre. His supervisor, Nash, visits him on an immunization day and observes that there are no clients.

“The people here don't like to have their children immunized”, says Abu-Bakar. “They come only when someone is sick.”

“I wonder why,” says Nash. “Let's try to find out by asking the woman who is standing across the road.”

Mrs Banda is surprised when the health workers cross over to see her. She tells them that her older children have had whooping cough and measles but have survived. None of her children have been immunized.

Abu-Bakar and Nash sit down with Mrs Banda on the front porch and start talking about immunizations.

\*\*\*

1. Why do you think no one comes to be immunized?
2. What can Abu-Bakar do to get people to come to the immunization sessions?

---

## Exercise 4

### Case study

#### Kassim's way

Kassim has recently been appointed district supervisor. During his first few months in the job he visits every health centre. One, located in a remote area, has a large population but few clients. Kassim wants to know why.

First, he talks with community leaders. They tell him that the health centre is too far away for most people to walk to and that there is no transport.

Then he goes to the health centre and talks with Claudia, the community nurse. He asks her about her work and her family and how she is getting along. She is glad to have the opportunity to sit down and talk to someone about her problems.

While Kassim is at the health centre he also sits with clients and asks them about their work, families and health, and whether they have difficulty in getting to the health centre.

Claudia is amazed at how relaxed and friendly the clients are with Kassim, and she thinks about how she treats them. She usually feels too tired to bother with the niceties and just rushes the clients through and sends them away.

She decides to try working in Kassim's way. She offers clients a chair, asks them how they and their children are, and enquires whether the health centre is meeting their needs.

The next time Kassim visits he finds many clients at the health centre. The atmosphere is warm and friendly, and Claudia spends at least a few minutes talking with every client. No one has any complaints about the centre being too far away.

\*\*\*

Discussion point: is the health centre really too far away or is there another problem?

---

# Module 11:

## Monitoring immunization coverage

1. How does record-keeping help the health worker, the supervisor and the community?
2. Will the babies born in the following circumstances be protected at birth?
  - a) Jamila had her first tetanus toxoid injection in September. Her baby was born in November.
  - b) Etty was given TT1 in December 1995, TT2 in February 1996, but no tetanus toxoid thereafter. Her first baby was born in February 1998.
  - c) Olga had her third dose of tetanus toxoid one month after her second, but no further doses. A baby was born to her six years later.
3. Look at the chart below and answer the following questions.
  - a) What is the monthly target population for Valla?
  - b) How many children should have had DPT1 between January 1 and July 31?
  - c) How many children actually did have DPT1 between January 1 and July 31?
  - d) What percentage of the target population for the first seven months of the year had received DPT1 by the end of that period?
  - e) Answer the same questions for .PT2 and DPT3.
  - f) Answer the same questions for the period January 1 to April 30.

