

WHO/V&B/02.27  
ORIGINAL: ENGLISH

# Increasing immunization coverage at the health facility level



WHO

Vaccines and Biologicals

World Health Organization



unicef

United Nations Children's Fund

# Increasing immunization coverage at the health facility level

Vaccines and Biologicals



WHO

World Health Organization



unicef

United Nations Children's Fund

---

**The Department of Vaccines and Biologicals  
thanks the donors whose unspecified financial support  
has made the production of this document possible.**

This document was jointly produced by the  
Expanded Programme on Immunization  
of the Department of Vaccines and Biologicals and the  
United Nations Children's Fund, UNICEF House  
3 United Nations Plaza, New York, N.Y. 10017, USA

*Ordering code: WHO/V&B/02.27  
Printed: December 2002*

**This document is available on the Internet at:**

[www.who.int/vaccines-documents/](http://www.who.int/vaccines-documents/)

**Copies may be requested from:**

World Health Organization  
Department of Vaccines and Biologicals  
CH-1211 Geneva 27, Switzerland  
• Fax: + 41 22 791 4227 • Email: [vaccines@who.int](mailto:vaccines@who.int) •

© World Health Organization 2002

All rights reserved. Publications of the World Health Organization can be obtained from Marketing and Dissemination, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland (tel.: +41 22 791 2476; fax: +41 22 791 4857; email: [bookorders@who.int](mailto:bookorders@who.int)). Requests for permission to reproduce or translate WHO publications – whether for sale or for noncommercial distribution – should be addressed to Publications, at the above address (fax: +41 22 791 4806; email: [permissions@who.int](mailto:permissions@who.int)).

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

The World Health Organization does not warrant that the information contained in this publication is complete and correct and shall not be liable for any damages incurred as a result of its use.

---

# Contents

<i>Acknowledgments</i> .....	<i>iv</i>
<i>Preface</i> .....	<i>v</i>
<b>Introduction</b> .....	<b>1</b>
<b>Step 1: Compile population and coverage data</b> .....	<b>3</b>
<b>Step 2: Analyse problems, causes and possible solutions</b> .....	<b>7</b>
Step 2.1: Analyse problems .....	7
Step 2.2: Identify causes of the problems .....	10
Step 2.3: Identify possible solutions .....	12
<b>Step 3: Prioritizing areas for the implementation of solutions</b> .....	<b>13</b>
<b>Step 4: Create a workplan for outreach and other activities</b> .....	<b>14</b>
Outreach .....	14
Activities this year .....	14
<b>Step 5: Monitor workplan</b> .....	<b>17</b>
<b>Annex 1: Tools to monitor immunization coverage and to assess community demand for immunization in the health facility</b> .....	<b>19</b>
<b>Annex 1a: Chart for monitoring doses administered and drop-outs in children less than one year of age</b> .....	<b>21</b>
<b>Annex 1b: Tracking systems to identify defaulters by month of birth</b> .....	<b>25</b>
<b>Annex 1c: Guidelines for the community feedback on immunization services</b> .....	<b>29</b>
<b>Annex 2: Worked examples</b> .....	<b>33</b>

---

# Acknowledgements

This guide is the result of team work between WHO, UNICEF and many other partners who are committed to improving immunization services throughout the world. They include the Children's Vaccine Program at PATH, CDC and USAID. The authors would like to express their sincere thanks to all the many people who have contributed to its development.

---

# Preface

## **What this guide can do for your immunization service**

It can help improve coverage and access to immunization in the following ways:

- Encouraging the use of data for action in improving the service
- Strengthening the links between community and service
- Revitalizing outreach
- Providing a focus for supervisors giving supportive on-site supervision.

## **When the use of this guide would be appropriate**

- As a training module in any planned training activities
- During supervisory visits for on-site support at health facilities
- During monthly meetings for health workers at district level.

## **How to monitor the use of this guide**

- Monitor the use of a chart for monitoring doses administered and drop-outs
- Monitor the use of an outreach plan
- Monitor the availability and use of this guide during supervisory visits.

---

---

# Introduction

The aim of this guide is to help health workers to use their own data to identify problems and causes of low immunization coverage, and to plan solutions to increase immunization coverage. These guidelines can be modified to suit the local context and needs, and can be used at various levels of the health system in any country.

These guidelines focus on how to increase coverage by:

- reaching the unreached (improving access)
- reducing drop-outs (improving utilization)

The guidelines are set out in five simple steps. There are worked examples to follow in the Annexes.

## Objectives

- To achieve at least 80% coverage with all vaccines in every district.
- To build on experiences of polio eradication.

## Strategies

- To encourage the analysis and use of data collected by health workers at delivery level.
- To provide simple guidelines for microplanning at health facility and district level.
- To revive outreach.
- To improve interaction between health services and the community.

### 5 Steps – Flow chart





---

## What does the strategy entail at health facility level?

<b>Five key steps</b>	<ol style="list-style-type: none"><li>1. Compile data on population and immunization coverage for your area.</li></ol>
	<ol style="list-style-type: none"><li>2. Analyse the data you have collected:<ul style="list-style-type: none"><li>• to determine the main problems associated with low coverage in your health service area</li><li>• to determine access or utilization problems</li><li>• to determine the causes behind these problems: supply, staffing, service (delivery and demand), IEC (information, education and communication)</li><li>• to decide what solutions you need to implement to address these causes</li><li>• to decide what resources are needed (existing or extra).</li></ul></li><li>3. Prioritize according to which geographic area and what solutions you need to implement first.</li><li>4. Plan priority activities for the year, including outreach.</li><li>5. Monitor the impact of the workplan.</li></ol>
<b>Who is involved?</b>	All health facility workers (especially those who participate in all routine immunization activities).
<b>Outcomes</b>	<ol style="list-style-type: none"><li>1. A workplan for outreach activities for the facility with defined tasks for each worker.</li><li>2. Increased immunization coverage in the health service area.</li></ol>

# Step 1:

## Compile population and coverage data



- List the name of each geographic area or community that you serve, through routine or outreach services – **Table 1** (column a ).
- List your target population numbers – **Table 1**: infants <1 year, (column b).
- Enter the number of doses of vaccine administered in the target age group during the preceding 12-month period, for example – **Table 1**: DTP1, DTP3, measles (from columns c to h).
- Calculate previous year’s immunization coverage, for example – **Table 1**: DTP1, DTP3, measles, (from columns f to h). You can also use this table to calculate coverage for any other vaccines administered (hepatitis B, yellow fever, *Haemophilus influenza* B, TT1, TT2+) and vitamin A.

To calculate immunization coverage, divide the total number of immunizations given over the preceding 12-month period by the target population. Use the formula below:

Annual coverage for childhood immunizations (BCG, DTP3, OPV3, measles, HepB3, yellow fever, Hib 3) and vitamin A		
$\frac{\text{Number of children under one year of age receiving all required doses for selected vaccine or vitamin A during the last 12 months}}{\text{Target population of children under one year of age}}$	X 100 =	Percentage coverage with the vaccine or vitamin A
Annual coverage for TT2+ (pregnant women only)		
$\frac{\text{Number of pregnant women receiving protective doses of TT (TT2, TT3, TT4 and TT5) during the last 12 months}}{\text{Target population of children under one year of age}}$	X 100 =	Percentage coverage with TT2+

---

**Table 1. Analysis of health facility data**

**Table 1. Analysis of health facility data**

Name:

Goal: Increase immunization coverage to at least 80% with all vaccines in every district

Area name	Compile population, immunization coverage data in the previous 12 months				Analyse problem				Prioritize area						
	Target population figures (No.)	Doses of vaccine administered			Immunization coverage (%)		Unimmunized (No.)			Drop-out rates (%)	Identify problem (see table 2*)	Categorize problem according to table 2**			
	< 1 year	DTP1	DTP3	Measles	DTP1	DTP3	Measles	DTP3	Measles	DTP1 - DTP3	DTP1 - Measles	Utilization	Category 1, 2, 3 or 4	Priority 1, 2, 3, ...	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p

\* Please specify quality of access and utilization: poor or good  
 \*\* Category 1: No problem: drop-out rates low, coverage high.  
 Category 2: Problem: drop-out rates high, coverage high.  
 Category 3: Problem: drop-out rates low, coverage low.  
 Category 4: Problem: drop-out rates high, coverage low.



---

# Step 2:

## Analyse problems, causes and possible solutions



### Step 2.1: Analyse problems

To analyse *problems*:

- Estimate the annual number of unimmunized children for a specific vaccine, for example: **Table 1**, number of children who have not received DTP3 or measles (from columns i or j)<sup>1</sup>

**Unimmunized children with measles:**

Unimmunized children (j) = target population (b) *minus* immunized children in target age group (g)

- Calculate annual drop-out rates, for example: **Table 1**, DTP1–DTP3, DTP1–measles (columns l, m), or for any other combination of vaccines you have selected.

**DTP1–DTP3 drop-out rate\*:**

$$\frac{\text{doses of DTP1 administered (c) minus doses of DTP3 administered (d)} \times 100}{\text{doses of DTP1 administered (c)}}$$

**DTP1–measles drop-out rate\*:**

$$\frac{\text{doses of DTP1 administered (c) minus doses of measles vaccine administered (e)} \times 100}{\text{doses of DTP1 administered (c)}}$$

\* For doses of vaccine administered in that case during the same period, in the previous year

<sup>1</sup> If the number of immunized children is greater than the target population, the reason should be identified (e.g. inadequate target population data, number of immunized children including other age groups than the target one, or including children from other areas.).

Using **Table 2**, the next part of the analysis is to categorize the problem present in each area: poor access, poor utilization, or both.<sup>2</sup>

There are four situations:

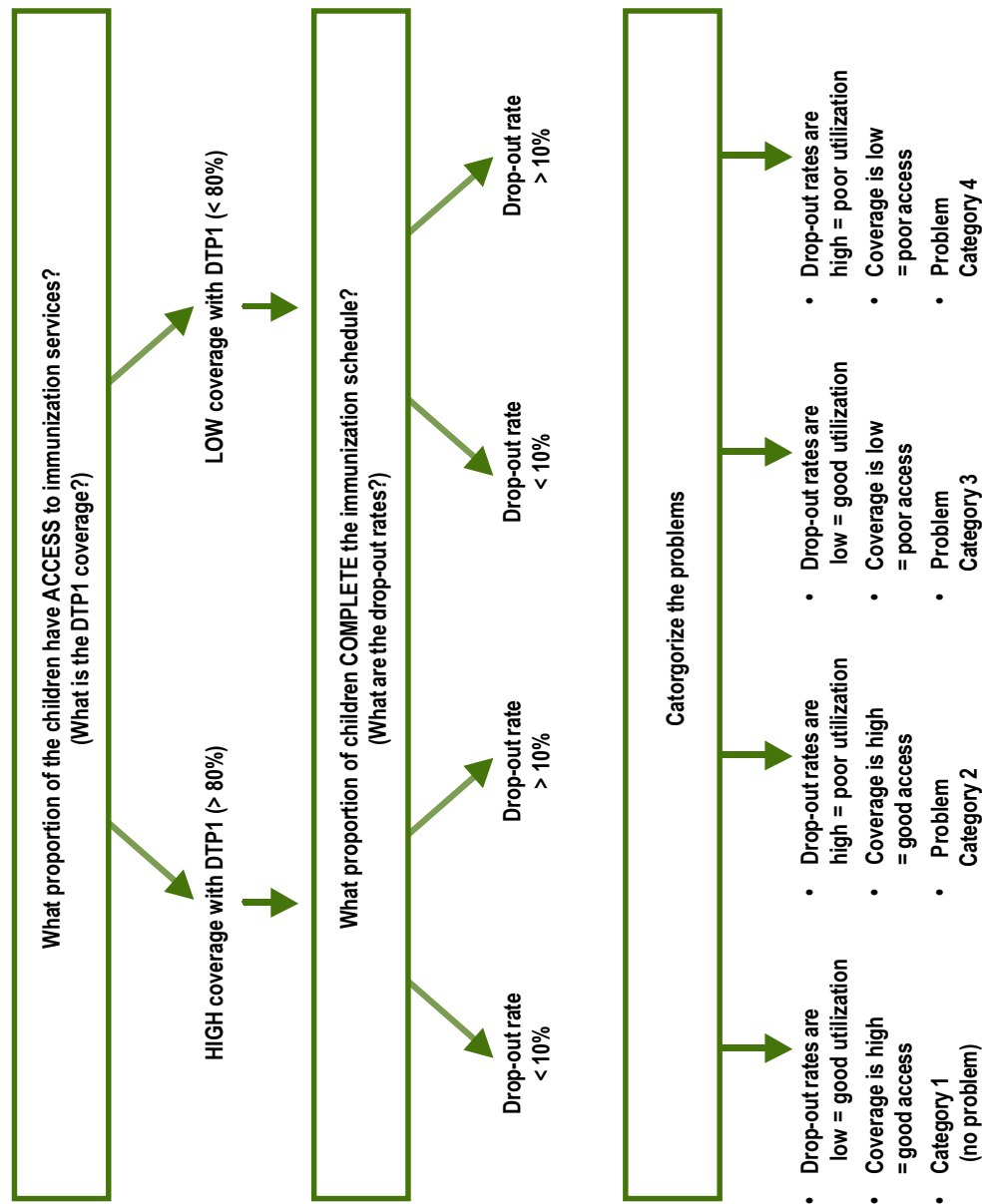
➤ <b>1: No problem</b>	Drop-out rates are low = <b>good</b> utilization DTP1 coverage is high = <b>good</b> access
➤ <b>2: Problem</b>	Drop-out rates are high = <b>poor</b> utilization DTP1 coverage is high = <b>good</b> access
➤ <b>3: Problem</b>	Drop-out rates are low = <b>good</b> utilization DTP1 coverage is low = <b>poor</b> access
➤ <b>4: Problem</b>	Drop-out rates are high = <b>poor</b> utilization DTP1 coverage is low = <b>poor</b> access

Using **Table 1**:

- Specify in column “m” the quality of access (good or poor) depending on the value of DTP1 coverage (“good” is defined, in this exercise, as DTP1 coverage  $\geq 80\%$  in the target age group, and “poor” corresponds to a DTP1 coverage in the target age group  $< 80\%$ ).
- Specify in column “n” the quality of “utilization” (good or poor) depending on the value of drop-out rates (“good” is defined, in this exercise, as a drop-out rate in the target age group  $< 10\%$ , and “poor” corresponds to a drop-out rate in the target age group  $\geq 10\%$ ).
- Write the number of the problem category (1, 2, 3 or 4) in column “o”.

<sup>2</sup> The cut-off DTP1 coverage can be adjusted depending on your local situation/progress and what you consider “HIGH” or “LOW” coverage.

Table 2. Analyse problems of access and drop-outs





---

## Step 2.2: Identify causes of the problems

To identify the causes of the problems you have categorized in column “o” of **Table 1**, you will need to have discussions with the community you serve and your supervisor. You should promote completion of the full immunization series and ask the community how the service can be made more accessible to them. In addition, all health staff should join together and discuss why children do not begin or complete the immunization schedule. As a group, the health facility workers should complete the following steps using **Table 3** (see Annex 2 for a worked example).

- List main causes of problems associated with high drop-outs and poor access in your facility under the categories of:
  - supply
  - staffing
  - service delivery and demand.(You may wish to add other categories of problems. For simplicity, this module uses *only* three categories.)
  
- For each category, list the causes associated with *quality* and *quantity* separately, as in **Table 3**.

**Table 3. Causes and solutions**

	<b>CAUSES of problems</b>	<b>SOLUTIONS with existing resources</b>	<b>SOLUTIONS with extra resources</b>
<b>Supply quality</b>			
<b>Supply quantity</b>			
<b>Staffing quality</b>			
<b>Staffing quantity</b>			
<b>Service quality and demand</b>			
<b>Service quantity and demand</b>			

---

### Step 2.3: Identify possible solutions

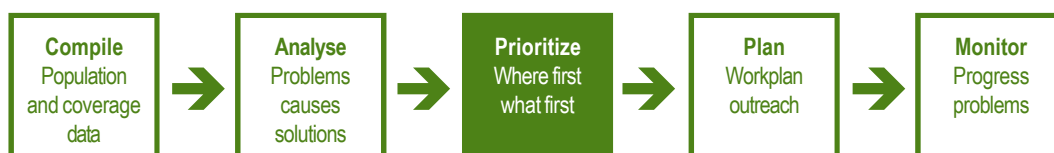
As with the previous step for identifying causes, solutions should be worked out after consultation with the community and discussions with all health workers, in the facility and your supervisor.

- Use **Table 3** to list causes of problems and solutions to these problems:
  - With *existing resources* already available at health facility, district or in the community.
  - Needing *extra resources*, which will have to come from either within or outside the district.

---

# Step 3:

## Prioritizing areas for the implementation of solutions



Review the data in **Table 1** and decide the area (listed under “a”) which should receive top priority when starting to implement the identified solutions.

To do this you will first need to look at the unimmunized population in columns “i” and “j” to prioritize the catchment area with the greatest number of unimmunized children.

Then look at the category of problem and prioritize areas that have category 4, high drop-outs and low access.

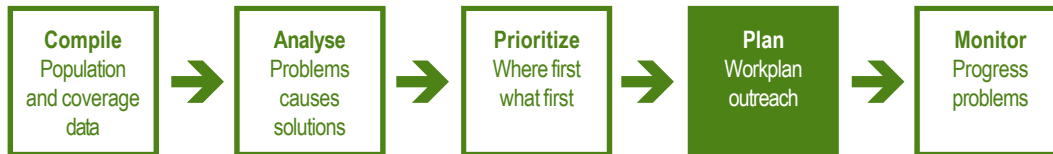
Complete column “p” in **Table 1**, writing the order of priority against each area.

Ultimately, the decision on priority must be based on local situation and feasibility.

---

# Step 4:

## Create a workplan for outreach and other activities



### Outreach

Make an outreach workplan, using **Table 4**, to include all the areas you intend to reach over the year. Write the date of the planned visit against the area concerned. Add other details to the box such as staff responsible, special activities, other interventions to be added, etc. Annex 2 gives an example of how to do this.

### Activities this year

Include on the workplan some priority general activities you intend to carry out this year on the workplan, particularly the ones related to social mobilization and community involvement. These activities may be taken from the analysis of problems, causes and solutions.

For each area enter planned date, completed date, persons responsible, transport and resources needed

**Table 4. Workplan for outreach and other activities<sup>3</sup>**

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Villages/ areas												
1												
2												
3												
4												
5												
6												
Other tasks to do this year: 1. _____ 2. _____ 3. _____ 4. _____	Persons responsible			Date for completion			Remarks					

<sup>3</sup> Supervision dates should be indicated.



# Step 5:

## Monitor workplan



**Table 5** may be used as a model for the follow-up of activity implementation:

**Table 5. Monitoring planned activities**

Area: \_\_\_\_\_ Year: \_\_\_\_\_

Activity	Person (s) responsible	% complete	Obstacles to completion	Solutions to obstacles
1.				
2.				
3.				
4.				
5.				
6.				





---

# Annex 1:

## Tools to monitor immunization coverage and to assess community demand for immunization in the health facility

For immunization to be effective in preventing morbidity and mortality, every child should be fully immunized. There are two ways to measure the efficiency of immunization:

- Measure **immunization coverage** by each vaccine, by comparing the number of doses given to the number of infants eligible to receive them, and
- Measure **drop-out rates**, by comparing the number of infants that started receiving immunizations to the number of infants who received all needed doses of vaccines.

### **Definition**

Drop-out is a comparison of the number of children who start receiving immunizations and the number who do not receive later doses for full immunization.

Drop-out should be estimated for the following vaccine doses:

- BCG, DTP3
- BCG, measles
- DTP1, DTP3
- DTP1, measles
- HepB3, DTP3

### **Tools described in this section:**

*Annex 1a: Chart for monitoring doses administered and drop-outs in children less than one year of age*

*Annex 1b: Tracking system to identify defaulters by month of birth*

*Annex 1c: Guidelines for community feedback on immunization services*

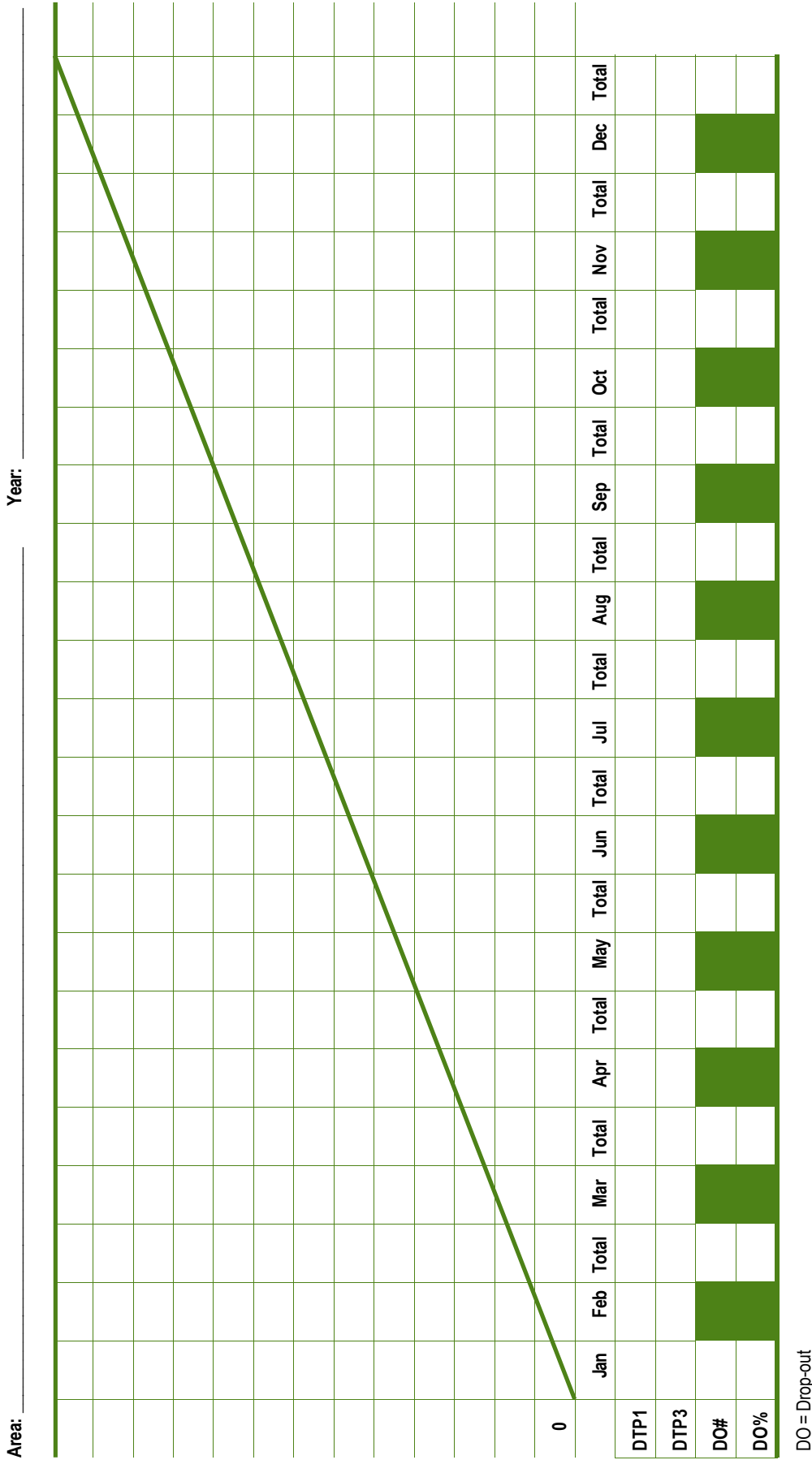


---

# **Annex 1a:**

**Chart for monitoring doses administered and drop-outs in children less than one year of age**

**DTP1 and DTP3 doses given and drop-outs in children < one year of age**



---

## How to prepare the chart for monitoring doses administered and drop-outs in children less than one year of age

This chart has been developed to observe 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. DTP3) or dropping out.

1. Calculate the annual and monthly target population to receive immunization services.

- a) Annual target

Use existing population figures for children under one year of age obtained from official census data or your own community census. If you do not have these numbers, obtain an estimate by multiplying the total population times 4%. This document uses 4% as the estimate to calculate the percentage of children less than one year of age and the percentage of pregnant women in a population. If you know a more precise percentage for your country or region, use this number instead. (If the total population is 30 000 then children under one year is  $30\,000 \times 4/100 = 1200$ .)

- b) Monthly target

To get a monthly target population, divide the number of children under one year of age by 12. (If annual target under one year is 1200, monthly target is  $1200/12 = 100$ .)

2. Label the chart

Complete the information on the top of the chart, i.e. area and year. Label the left and right side of the chart with the monthly target figures. Label the boxes at the bottom with the name of the vaccine and dose, e.g. DTP1 and measles or DTP1 and DTP3 as shown in the example in Annex 2.

3. Fill in the chart

This chart can be used to monitor any drop-out rates. At the end of each month, enter the number of doses of DTP1 and DTP3 given (see Annex 2).

- Locate the row of boxes underneath the graph. Locate the spaces for the month you are recording. Write the number of doses for that month in the space provided.
- Add the present month's total to the previous cumulative total to calculate the current cumulative total.
- Make a dot on the graph for the cumulative<sup>4</sup> total recorded on the right side of the month column you are recording.
- Connect the new dot to the previous month's dot with a straight line.
- Repeat above three steps every month until the end of the year.

---

<sup>4</sup> 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 DTP1 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.

- 
4. Calculate the total number of drop outs between DTP1 and DTP3 (DO#)
    - Subtract the cumulative total for DTP3 from the cumulative total for DTP1
  5. Calculate the cumulative drop-out rate (DO%) as follows:

$$\frac{\text{DO\# (DTP1 cumulative}^5 \text{ total minus - DTP3 cumulative total)} \times 100}{\text{DTP1 cumulative total}}$$

---

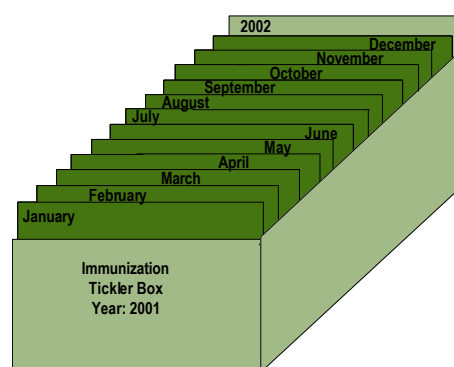
# Annex 1b:

## Tracking systems to identify defaulters by month of birth

To help you to identify “drop-outs” (children or women who do not return for immunizations when they are due), set up a tracking system. Tracking systems may be made with immunization registers (either in book form or in the form of a card box) or with individual patient charts. Stamps or stickers are used to identify children with incomplete immunization schedules.

### How to set-up a tracking system using immunization cards:

1. Obtain a box a little larger than the size of the immunization cards you will file. This is sometimes called a “tickler” or “reminder” box.
2. Obtain 12 dividers and mark them with each month of the year.
3. Keep a copy of each child’s immunization card (the parents keep the original) or a similar card with the following information (see example):
  - the child’s birth date (day/month/year)
  - the name of the child
  - the name of the child’s mother and father
  - the child’s address, name of village
  - dates when vaccinations were given to the child
4. Enter on the immunization card – the vaccine (lot number), the dose and the date of each immunization the child receives (beginning with the child’s first immunization). Always inform the parents or caretaker of the child about the next date to bring the child so as to complete his immunization schedule.
5. Put the card into the file box behind the divider for the month when the child is due for his/her next immunization.
6. Keep the cards in each month-divider in order of child’s last name so that the card can be found quickly when needed during a busy immunization session.
7. At the end of the month, the cards that remain behind the divider for that month will be for those who have not returned to complete their immunization.
8. Conduct follow-up activities (e.g. house-to-house visits) for any child whose card remains.





- 
9. If all follow-up activities for a specific month have been conducted, move the divider for the month to the back of the box.
  10. If follow-up is not complete for any child, move their cards to the next month.
  11. At the end of the year, move the remaining cards with the divider marker to the next month of the following year.

### **Immunization register book**

1. Record dates of all immunizations. (See page 27.)
2. At the end of each month, review the immunization register to identify children failing to receive immunizations due (e.g. if your programme gives measles vaccine at nine months of age, then children born in January should be vaccinated during the month of September. On 30 September you can see which children born in January have not received measles vaccine).
3. Note each child with immunizations due.
4. Conduct follow-up activities.

**Immunization register for children under one year of age (example)**

Village: \_\_\_\_\_

Name of health centre: \_\_\_\_\_

No.	Name of child	DOB*	Name of parent	Vaccinations (dates: day/month/year)													Fully Immunized child (Y/N)	Remarks (dates) moved out, moved in, died**		
				BCG	OPV1	OPV2	OPV3	DTP1	DTP2	DTP3	HepB1	HepB3	Measles	Vitamin A						

Note: Additional columns can be added to include other vaccines, i.e. yellow fever, Hib, etc.  
 \* DOB: date of birth  
 \*\* Moved out (MO), moved in (MI), died (D)

Child immunization card							
Name							
Name of mother							
Name of father							
Female or male							
Birth date of child		Day:	Month:	Year:			
Name of village							
Address, telephone, ...							
Vaccines		Date given			Due date for next immunization		
		Day	Month	Year	Day	Month	Year
BCG							
DTP1							
DTP2							
DTP3							
OPV1							
OPV2							
OPV3							
Measles							
Vitamin A							
HepB1							
HepB2							
HepB3							
Mother	Tetanus 1						
	Tetanus 2						
	Tetanus 3						
	Tetanus 4						
	Tetanus 5						

---

# Annex 1c:

## Guidelines for the community feedback on immunization services

This questionnaire provides feedback about the status of immunization services in areas close to the health centre. It describes the number of children/mothers of childbearing age (for TT immunization) who did not complete their immunization schedule, the number of people who are never reached, why children and women do not go or return for immunization, and how women think services can be improved. You will not need much time to do this, it can be carried out in one day. It is an opportunity to discuss these subjects directly with child caretakers and find out how services could be improved and why they are not used.

The results of this survey are not representative of any population other than the households you interview. It is intended to supplement, not replace, routine reporting.

The purpose is to investigate at least *five* children under two years of age/mothers of childbearing age not vaccinated or who did **not** complete their immunization schedule.

Follow the steps below:

1. Use the tally sheet and the questionnaire presented on the following page for the interviews and to compile data. If needed you can modify this questionnaire to fit your needs.
2. Collect and compile data.
  - a) Visit the households that are closest to the health centre until you identify at least five children under two years of age/mothers not vaccinated or who are overdue for the next vaccine dose (“partially immunized”). The households do not have to be randomly selected and they may be interviewed in any order. In each household having any children under two years of age and or mother(s) of childbearing age, please ask for their immunization card(s). If the child or woman is not completely immunized, each woman should be asked to give one reason why. Enter this information in Item C of the tally sheet. Each woman should also be asked for her suggestions on how to improve the health services – enter this in Item D.
  - b) Add up the number of households visited from Item A and the immunization status of children and women interviewed in the survey from Item B. Record the totals in the appropriate space on the form.

---

3. Analyse the data.

- a) Investigate why the children and women were not, or were only partially, immunized. Make a list of all the reasons given (Item C) and of suggestions for improvement (Item D). Discuss possible solutions with your team given current resources as well as with extra resources (see Step 2.2 above “Identify causes of the problems”).

## Tally sheet and questionnaire for the convenience households survey

### Children under two years of age (0 to 23 months) and childbearing age women for TT

Health centre: \_\_\_\_\_ Date of questionnaire: \_\_\_\_\_

Response	Place tally marks here		Total	
A. Tally the number of households visited				
B. Immunization status:	Tally children (c)	Tally mothers (m)	(c)	(m)
Not immunized				
Partially immunized				
Adequately or fully immunized				
C. Child name	Reasons given for being partially or not immunized			
1.				
2.				
3.				
4.				
5...				
C. Mother's name	Reasons given for being partially or not immunized with TT			
1.				
2.				
3.				
4.				
5.				
D. Suggestions for improvement				
1.				
2.				
3...				



---

# Annex 2:

## Worked examples

### Example: determining target population

Ficticia District has 10 000 inhabitants, 4%<sup>5</sup> are children less than one year of age and 20% are children under five years of age.

#### Annual and monthly target population for immunization:

$$\text{Annual target population} = \frac{10\,000 \times 4}{100} = 400 \text{ children under one year of age}$$

$$\text{Monthly target population} = \frac{400}{12} = \text{approx. } 33 \text{ children under one year of age}$$

### Example: calculating immunization coverage

During the previous year, the health facilities in the *Peri-urban* area of Ficticia District administered 102 doses of DTP3 and 73 doses of measles vaccine to children less than one year of age.

If the number of doses of DTP3 immunizations given over the past year is 102 and the target population of children under one year of age is 150, then the coverage with DTP3 is 68%.

$$\text{DTP3 coverage is equal to} = \frac{102}{150} \times 100 = 68\%$$

$$\text{Measles coverage is equal to} = \frac{73}{150} \times 100 = 49\%$$

---

<sup>5</sup> This document uses 4% as the estimate to calculate the percentage of children less than one year of age and the percentage of pregnant women in a population (3%). If you know a more precise



### Example: Calculating the number of unimmunized children with DTP3

Unimmunized in population (e) = target population (b) *minus* immunized children in target age group (c)

or

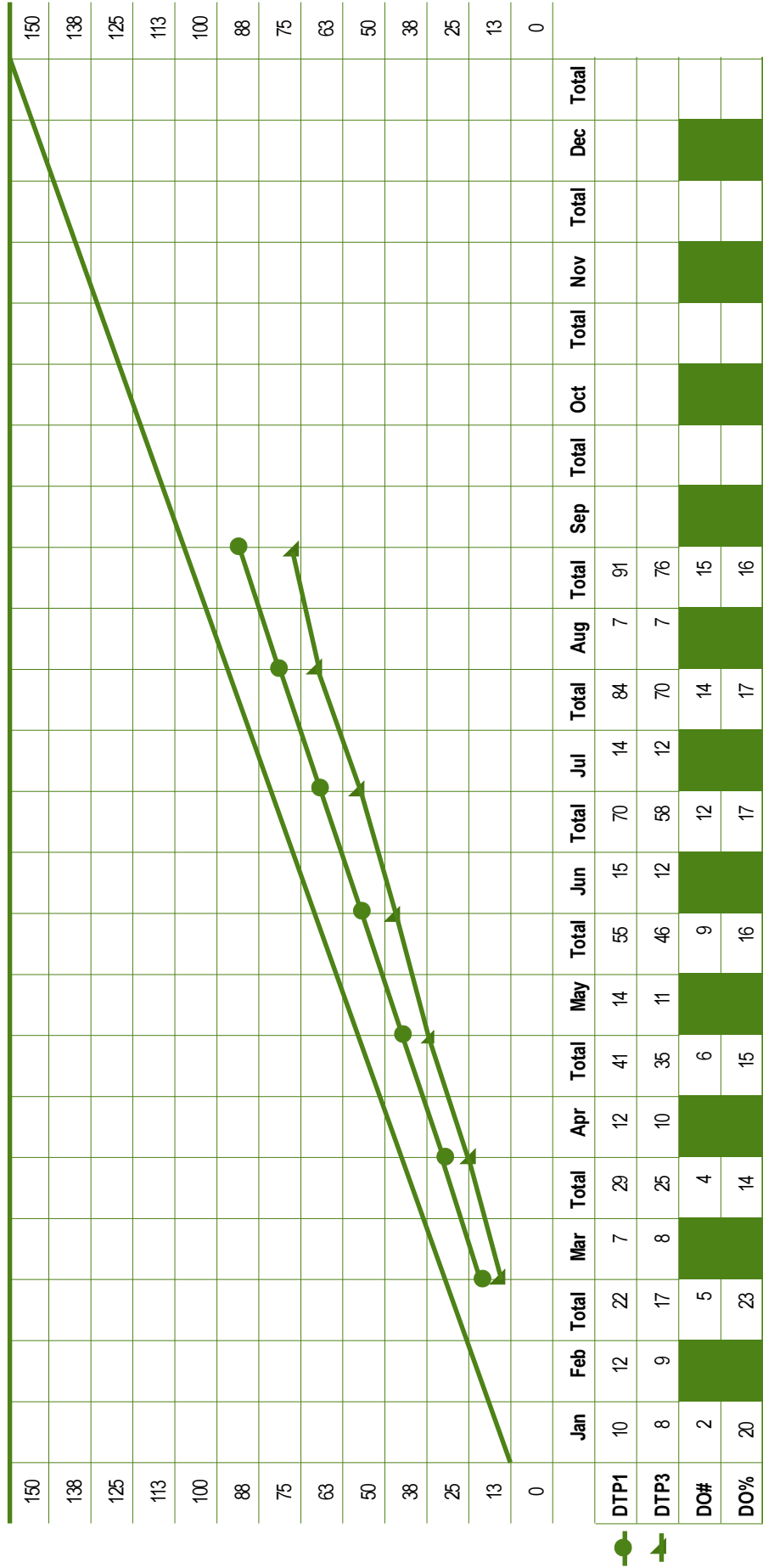
Unimmunized in population (e) = target population (b) *minus* [target population (b) X coverage in target age group (d)]

Name of catchment area	Population under one year of age	DTP3			Measles		
		Number of children immunized with DTP3	Coverage %	Number of <i>unimmunized</i> children with DTP3	Number of children immunized with measles	Coverage %	Number of <i>unimmunized</i> children with measles
a	b	c	d	e	f	G	h
Peri-urban	150	102	68	48	73	49	77
Area 2	100	52	52	48	45	45	55
Area 3	50	27	53	23	26	52	24
Area 4	100	86	86	14	85	85	15
<b>Total</b>	<b>400</b>	<b>267</b>	<b>67</b>	<b>133</b>	<b>229</b>	<b>57</b>	<b>171</b>

Example: Chart for monitoring doses administered and drop-outs in children less than one year of age

Year: 2001

Area: Ficticia, District, Peri-urban Area



DO = Drop-out

---

### Example: drop-out calculation

During the previous year, the health facilities in the Peri-urban area of Ficticia District administered up to the month of August 91 doses of DTP1, and 77 doses of DTP3 to children less than one year of age. The drop-out rates for the periurban area are as follows:

$$\text{DTP1-DTP3 drop-out rate} = \frac{91 \text{ minus } 77}{91} \times 100 = 15\%$$

If the drop-out rate is higher than 10%, the health workers in the peri-urban area should conduct an assessment of the reasons for these high drop-out rates.

On the graph, the difference between the DTP1 line (●) and the DTP3 line (▲) represents the drop-out. The difference with the DTP1 line and the diagonal “target” line (→) represents the population yet to received a dose of DTP vaccine (unreached).

**Example of Table 3. Analysis of causes and solutions for an area with high drop-out and poor access**

	Causes of problems associated with high drop-out and poor access	SOLUTIONS	
		with limited resources	with extra resources
<b>Supply quality</b>	Vaccine delivered with short shelf life. Refrigerator old, needs replacing.	Inform supervisor to ensure better supply of vaccine.	new refrigerator.
<b>Supply quantity</b>	Frequently out of stock. Not enough safety boxes. Not enough diluent.	Better local forecasting of needs and demand. Contact supervisor to ensure supply of sufficient of sufficient safety boxes. Contact supervisor to ensure that diluent is always shipped together with vaccine.	
<b>Staffing quality</b>	Staff not trained on use of VVMs or new vaccine introduction.	District supervisors to provide on-the-job training. Use OPV campaign planning to conduct VVM training.	
<b>Staffing quantity</b>	One health worker left three months ago, not yet replaced.		Recruit replacement.
<b>Service quality and demand</b>	Few mothers attend antenatal care (ANC) so TT coverage is low. Many mothers lose baby books.	Promote the value of ANC visit during all contact. Keep complete records at health centre and take these during outreach	
<b>Service quantity and demand</b>	Unable to do outreach during rainy season. Some outreach sessions poorly attended	Discuss the best days for sessions.	Need use of a 4WD vehicle.

**Example of Table 4. Workplan for outreach and other activities**

Villages/areas	January	February	March
Area 1		Planned 15/02/02 MCH team vehicle Completed 1/02/02	
Area 2	Planned 3/01/02 Outreach team and bicycle Completed 3/01/02		Planned 4/03/02 Outreach team and bicycle Not completed
Area 3			
<b>Other tasks to do this year:</b> 1. Training in VVM use 2. Double the number of TT2 doses administered to pregnant women 3. Meet village leaders monthly	<b>Person responsible:</b> - District supervisor - MCH staff - Health centre supervisor	<b>Date for completion:</b> - 31/03/02 - 31/12/02 - 31/12/02	<b>Remarks:</b> - - -

### Example of Table 5. Monitoring planned activities

Name of health facility: Area 2

Year: 2001

Activity	Person (s) responsible	% complete	Obstacles to completion	Solutions to obstacles
1. Training in VVM use	District supervisor	0 %	Supervisor not visited	Arrange training at next district monthly meeting
2. Outreach to remote villages four times this year	Outreach staff	50 %	Poor access in rainy season	Combine activity with malaria outreach team taking advantage of their vehicles
3. Double the number of TT2 doses administered to pregnant women	MCH staff	20 %	Poor attendance at antenatal clinics (ANC)	Promote ANC during outreach activities
4. Improve immunization coverage in district health centre	Health centre supervisor	50 %	No informational, educational and promotional material available	Prepare material for the health centre and make public announcement about immunization
5.				
6.				

**Example: Identifying problems and their causes during discussions  
between health staff and the community**

Problems	Possible causes of problems
Parents do not bring children in for additional immunizations (utilization problem)	<ol style="list-style-type: none"> <li>1. Health workers have not clearly explained to parents what vaccinations are due, when they are due and why they are needed.</li> <li>2. Health workers do not understand what vaccinations are due, when they are due and why they are needed.</li> <li>3. Barriers discourage parental return, e.g. hours of clinic operation, cost, long waits.</li> <li>4. Health workers do not clearly explain to parents when vaccinations are administered at the clinic.</li> <li>5. Health workers have not shown parents respect or conveyed an interest in the child's health.</li> </ol>
Children and mothers are not immunized when coming to the clinic for sick visits (utilization problem)	<ol style="list-style-type: none"> <li>1. Health workers forget to check records or ask about what vaccines and doses a child/mother has received.</li> <li>2. Health workers do not understand the contraindications for immunizations or health workers do not understand that immunizations may be given to mildly ill children.</li> <li>3. Health workers fail to explain to parents that it is often acceptable to immunize a mildly ill child.</li> <li>4. Immunizations are not available on that day.</li> <li>5. Immunization supplies are not available.</li> </ol>
Health workers cannot determine what immunizations a child has received (utilization problem)	<ol style="list-style-type: none"> <li>1. Health workers forget to remind parents to bring the immunization card.</li> <li>2. Clinic records are not organized so that it is easy to find a child's records.</li> </ol>
Pregnant women do not seek immunization for tetanus (utilization problem)	<ol style="list-style-type: none"> <li>1. Health workers failed to use every contact with women of childbearing age to explain the need for, and importance of, tetanus toxoid immunization (particularly when they bring their children to get immunized).</li> <li>2. Barriers discourage women from seeking immunization, e.g. cost, gender and cultural issues.</li> </ol>
Children are not receiving all vaccines that they are eligible to receive during a visit (utilization problem)	<ol style="list-style-type: none"> <li>1. Health workers do not understand what vaccinations are due, when they are due and why they are need.</li> <li>2. All immunizations are not available or offered at the clinic on the same day.</li> <li>3. Supplies of some immunizations are not sufficient.</li> </ol>
Children and pregnant women never come to the clinic to begin immunization (access problem)	<ol style="list-style-type: none"> <li>1. The clinic is located too far away.</li> <li>2. Clinic hours are not convenient or are not understood by the community.</li> <li>3. Outreach activities are too infrequent, or their timing is not understood by the community.</li> <li>4. Cultural, financial, racial, gender or other barriers are preventing use of immunization services.</li> </ol>

The Department of Vaccines and Biologicals was established by the World Health Organization in 1998 to operate within the Cluster of Health Technologies and Pharmaceuticals. The Department's major goal is the achievement of a world in which all people at risk are protected against vaccine-preventable diseases.

Five groups implement its strategy, which starts with the establishment and maintenance of norms and standards, focusing on major vaccine and technology issues, and ends with implementation and guidance for immunization services. The work of the groups is outlined below.

The *Quality Assurance and Safety of Biologicals team* ensures the quality and safety of vaccines and other biological medicines through the development and establishment of global norms and standards.

The *Initiative for Vaccine Research* and its three teams involved in viral, bacterial and parasitic

diseases coordinate and facilitate research and development of new vaccines and immunization-related technologies.

The *Vaccine Assessment and Monitoring team* assesses strategies and activities for reducing morbidity and mortality caused by vaccine-preventable diseases.

The *Access to Technologies team* endeavours to reduce financial and technical barriers to the introduction of new and established vaccines and immunization-related technologies.

The *Expanded Programme on Immunization* develops policies and strategies for maximizing the use of vaccines of public health importance and their delivery. It supports the WHO regions and countries in acquiring the skills, competence and infrastructure needed for implementing these policies and strategies and for achieving disease control and/or elimination and eradication objectives.

## Department of Vaccines and Biologicals

Health Technology and Pharmaceuticals

World Health Organization

CH-1211 Geneva 27

Switzerland

Fax: +41 22 791 4227

Email: [vaccines@who.int](mailto:vaccines@who.int)

or visit our web site at: <http://www.who.int/vaccines-documents>



WHO



unicef