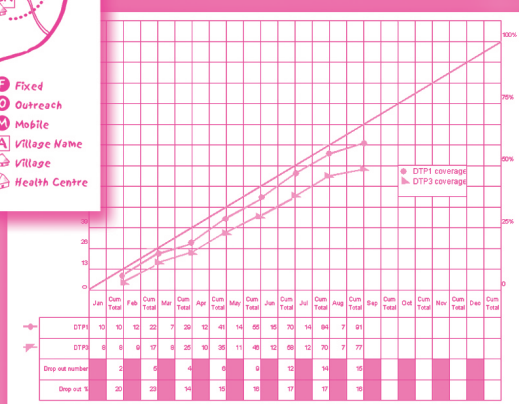
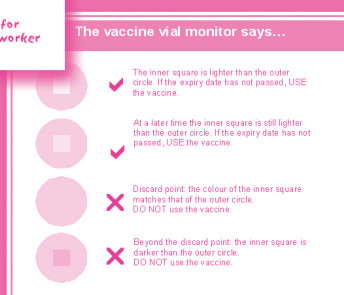
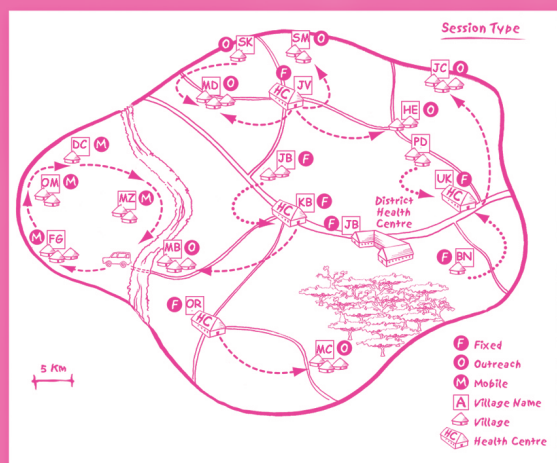
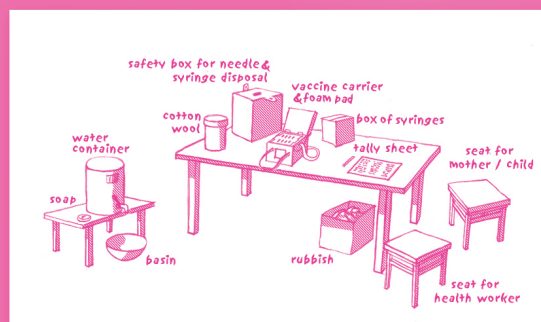


Training for mid-level managers (MLM)

7. The EPI coverage survey



Plan the survey

Conduct the survey

Tabulate data

Analyse data

Take action



Training for mid-level managers (MLM)

Module 7 : The EPI coverage survey

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Introduction to the series

This new series of modules on immunization training for mid-level managers replaces the version published in 1991. As there have been many changes in immunization since that time, these modules have been designed to provide immunization managers with up-to-date technical information and explain how to recognize management and technical problems and to take corrective action and how to make the best use of resources.

More and more new, life-saving vaccines are becoming available, yet the introduction of a new vaccine does not necessarily require a separate plan and separate training. This new series for mid-level managers integrates training for new vaccine introduction into each subject addressed by the modules. In this way, introduction of new vaccines is put into its day-to-day context as part of the comprehensive range of activities required to improve immunization systems.

In the context of these modules, mid-level managers are assumed to work in secondary administrative levels, such as a province; however, the modules can also be used at national level. For district managers (third administrative level), a publication on 'immunization in practice'¹ is widely available. As it contains a large amount of technical detail, it is also recommended for mid-level managers courses.

In writing these modules, the authors tried to include essential topics for mid-level managers, while keeping the modules brief and easy to use. They are intended to complement other published materials and guidelines, some of which are referred to in the text. Many more documents are available on the CD-ROM which accompanies this series. Each module is organized in a series of steps, in which technical information is followed by learning activities. Some knowledge and experience are needed to complete the learning activities, but even new readers should be imaginative and constructive in making responses. Facilitators should also be aware that the responses depend on the national context. Thus, there are no absolutely right or wrong answers, and the series does not set down new 'policies' or 'rules'. The authors hope that the readers of these modules will find them informative, easy to read and an enjoyable learning experience.

Modules in the mid-level managers series

Module 1 : Cold chain, vaccines and safe-injection equipment management

Module 2 : Partnering with communities

Module 3 : Immunization safety

Module 4 : Supportive supervision

Module 5 : Monitoring the immunization system

Module 6 : Making a comprehensive annual national immunization plan and budget

Module 7 : The EPI coverage survey

Module 8 : Making disease surveillance work

¹ *Immunization in practice: A practical guide for health staff*. Geneva, World Health Organization, 2004

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Contents

Introduction to the series	I
Modules in the mid-level managers series	I
Acknowledgements	II
Abbreviations and Acronyms	IV
Definitions of Terms	IV
Introduction to Module 7	1
Different ways of calculating coverage	2
What is new in this revision?	3
Some history	4
Learning objectives	5
Flowchart	5
1. Plan the survey	6
1.1 Planning based on national immunization schedule	6
1.2 Select the age group of children to be evaluated	7
1.3 Decide which sources of information to use	7
1.4 Decide how many interviewers are needed and the length of the survey	8
1.5 Identify clusters	9
2. Conduct the survey	16
2.1 Select the starting household	16
2.2 Select subsequent houses	18
2.3 Complete the cluster forms	20
2.4 Implement a control system on data collection	27
3. Tabulate data	34
3.1 Complete the cluster forms	34
3.2 Complete the summary forms	42
4. Analyse data	52
4.1 Evaluate infant immunization	52
4.2 Evaluate the reasons for immunization failure	55
4.3 Evaluate TT immunization of women	57
5. Take action	60
Annex A: How to use a random number table	62
Annex B: Immunization coverage: results of an EPI coverage survey	64
Annex C: Immunization coverage survey forms: Infant Immunization	66
Annex D: Calculating confidence intervals	78
Annex E: Other types of surveys	80

Abbreviations and Acronyms

ANC	antenatal care
BCG	bacille Calmette-Guérin (vaccine)
CDC	Centers for Disease Control and Prevention
DHS	Demographic and Health Survey
DTP	diphtheria-tetanus-pertussis vaccine
EPI	Expanded Programme on Immunization
HepB	hepatitis B (vaccine)
IIP	<i>Immunization in practice</i>
JE	Japanese encephalitis
MICS	Multiple Indicator Cluster Survey (UNICEF)
MLM	mid level manager
MMR	Mumps, Measles, Rubella (vaccine)
OPV	oral polio vaccine
PATH	Program for Appropriate Technology in Health
SIA	Supplemental Immunization Activities
TT	tetanus toxoid
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
YF	yellow fever

Definitions of Terms

Cluster: A small group that is part of a population that is being surveyed; for the purposes of evaluating immunization coverage, a cluster is defined as seven or more children in the age range being evaluated.

Cluster survey: A special study designed to measure the percentage of individuals in a given age group who are immunized.

EPI cluster sampling technique: A survey done in 30 systematically selected clusters of seven or more children to estimate the immunization coverage of all the children that live in the area (i.e. the population) being surveyed.

Immunization coverage: Proportion of individuals in the target population who are immunized.

Immunization coverage target: A goal that is prepared for a health facility that states what proportion of individuals in the target population will be immunized with specific vaccines in a given time period.

Morbidity: Sickness.

Mortality: Death.

Random number: A number selected by chance.

Target population: Group of individuals who are included in the immunization services based on their age and the area in which they live.

Introduction to Module 7

If you were requested to conduct an EPI coverage survey in your province, will you, as a mid-level manager, be able to organize your staff effectively to plan and conduct the survey? Surveys teams will need to be trained in survey techniques, forms should be prepared, and the data collected and analysed: what will be your role in these activities?

This module, MLM 7: The EPI coverage survey, follows the method that has been used successfully worldwide, for at least two decades, but makes it simpler to use and more practical for the mid-level manager. There are step-by-step instructions which can be used for learning activities, and blank forms which can be adapted for field use.

Immunization coverage refers to the proportion of individuals in the target population who have been immunized. In this module you will learn how to evaluate immunization coverage by conducting an immunization coverage survey.

An immunization coverage survey examines a small number of individuals to determine their immunization status. It involves visiting homes, examining immunization records and asking the individual, parent or caretaker about immunizations received. This is done in a systematic way so that only a small sample of homes and individuals need to be surveyed in order to obtain valid results for a larger population. The coverage survey will inform you about the following issues.

- Infant immunization, i.e. how well health centres have met their coverage target for immunizing infants. This is important because if a child does not receive the recommended immunizations as early as possible he/she will not receive the maximum protection from vaccine-preventable diseases.
- Tetanus toxoid immunization of women, i.e. whether mothers of infants have been immunized with tetanus toxoid (TT).
- Reasons for immunization failure, i.e. why people do not come, or do not return for immunization. This is important because it will help you find ways to increase your immunization coverage.

Routine reports from health centres also provide important information about immunization coverage. However, immunization coverage estimates based on health-centre records may be inaccurate or misleading. A coverage survey can validate the results of routine reports and provide additional information. For example, health-centre records may indicate that 60% of the children in a community were immunized, but would not show that an additional 20% of the children were immunized by private sector providers. An advantage of a coverage survey is that it tells you how many people were immunized correctly, as well as how many were immunized by other providers.

In some areas, the size of the target population may not be known. An immunization coverage survey can provide important information on the proportion of children that are being reached even if the absolute number of children requiring immunization is not known.

Information obtained from an immunization coverage survey should be used at all levels of the health system. Information provided by the immunization coverage survey helps you evaluate your performance and find ways to improve your immunization activities. Immunization coverage estimates can also be used to estimate reductions in morbidity and mortality from vaccine-preventable diseases.

Different ways of calculating coverage

There are several possible ways in which immunization coverage can be calculated in a survey. Coverage can be ascertained by the use of different sources of evidence, considering whether the dose is valid, and if immunization was given on time to provide the maximum possible protection to the child.

Sources of evidence: Evidence for immunization may be based solely on documented sources, such as immunization cards or health-facility records. Coverage estimate based only on immunizations which are documented (cards or other records) is called 'CARD' or 'CARD ONLY'. In settings where immunization cards are used and kept by the parents, or where health-facility records are available, the survey may assess immunization coverage based on data from cards only.

The survey may also include the child's immunizations based on a parent or caretaker's report of whether the child received the different immunizations. This is called evidence by 'HISTORY'. The disadvantage of this method is that the exact date of immunization may not be remembered. Surveys that count immunizations based on either information from immunization cards or from the child's primary caretaker are called 'CARD OR HISTORY' or 'CARD PLUS HISTORY'.

Validity of doses: There are recommendations for the earliest age at which a vaccine should be given. The earliest recommended age for Bacille Calmette-Guérin (BCG) and hepatitis B (HepB) vaccines is at birth. The earliest recommended age for diphtheria-tetanus-pertussis vaccine (DTP) is usually six to eight weeks of age. For measles vaccine it may be six, nine, twelve, or even fifteen months of age depending on the national recommendation. For vaccines for which multiple doses are recommended, such as DTP, oral polio vaccine (OPV), and hepatitis B vaccines, there is a minimum recommended interval between the doses. For example, the minimum recommended interval for DTP is usually around four weeks. Immunizations that respect the earliest age and minimum interval between doses are called 'VALID' and surveys may describe coverage of only 'VALID' doses, not counting the doses that were given too early (before the minimal age), or those for which the interval between doses was too short. Alternatively all immunizations could be counted regardless of whether the minimal age and intervals between doses were respected. These are called 'CRUDE' coverage estimates. In order to determine whether a dose was valid, information on the date on which the immunization was given is necessary, and hence valid immunization estimates require card evidence (see above). If cards are generally not available, information on the validity of the doses cannot be determined and 'CRUDE' coverage is calculated.

A dose is considered 'TIMELY' if it is given before 12 months of age. Because the survey includes children older than one year of age, some of the immunizations may have been given after their first birthday. Coverage can be calculated for only those doses that are 'TIMELY' or may include all doses given by the time the survey was conducted. If all doses are included these doses are called 'BY TIME OF SURVEY'.

Two calculations for immunization coverage are frequently calculated. The first is to calculate 'CRUDE' immunization coverage, ignoring whether the doses are valid or not, given 'BY TIME OF SURVEY', ignoring the age at which the doses were given, and based on evidence from either 'CARD PLUS/OR HISTORY'. This calculation is used when immunization cards are not commonly available and the date of immunizations is not available for most children. It relies heavily on the child's caretaker and their ability to recall the history of the child's immunizations. Calculations based on this method also tend to give the highest estimate of immunization coverage.

The second calculation is for 'VALID' doses (counting only the doses which were given after the minimum age and respecting the minimum interval between doses) that were given 'BEFORE TWELVE MONTHS OF AGE' based on evidence from 'CARD ONLY'. This calculation shows the immunization coverage of doses that were valid, timely, and based on documented evidence. It requires good records and tends to give the most conservative estimate of coverage. In a situation where not all parents or caretakers retain the cards and where health-centre records are not available, this calculation might introduce a bias by selecting only those children whose cards/records are available.

In this module we describe how to calculate the immunization coverage that is applicable to most situations – 'CRUDE' doses, administered 'BY TIME OF SURVEY', based on 'CARD OR/PLUS HISTORY'.

When reporting coverage numbers it is necessary to state what type of evidence was used ('CARD', 'HISTORY', 'CARD OR/PLUS HISTORY'), whether all doses or only valid doses were counted ('CRUDE' or 'VALID'), and whether only 'TIMELY' doses given before 12 months of age were counted, or if all doses 'BY TIME OF SURVEY' were included.

What is new in this revision?

The last version of this module was released in 1991. While the current version follows that module closely in style and content, several new features have been added.

- Coverage is calculated not only on valid doses, but on all doses. This avoids any unintentional bias due to the fact that parents or caretakers who retain the immunization cards may be more conscientious than those who did not.
- Coverage is calculated on all doses received by time of survey, not just on those received by twelve months of age. This is because in the absence of immunization cards the exact dates of immunization cannot be established.
- In households where there are two or more eligible children, information is taken only for the youngest eligible child. This yields the most recent information.
- In households where there are two or more eligible mothers, information is taken only for the mother of the youngest eligible child. This yields the most recent information.
- Identification of doses received in the last pregnancy is used to calculate TT2+ coverage. Protection at birth is calculated based on the Tetanus Toxoid (TT) history of the woman.²
- A method for calculating confidence intervals is included.
- A sample report describing the survey method and the results has been added.

This MLM module provides guidance for conducting an immunization coverage survey that provides useful results in most situations. The module describes a survey consisting of 210 children in 30 clusters of 7 each. This sample size was chosen because it guarantees that the results will be accurate within 10%. In some instances, however, a more accurate estimate of coverage may be desired and the required number of clusters and children in each cluster will need to be different. The *Immunization coverage cluster survey - Reference manual* (WHO/IVB/04.23, pages 53-62) available from WHO or online at <http://www.who.int/vaccines-documents/DocsPDF05www767.pdf> provides instructions for calculating the appropriate sample sizes to ensure more accurate estimates. It also provides additional information on the theoretical basis of the cluster sampling technique and additional guidance for planning and conducting a survey.

Some history

As with much else in the Expanded Programme on Immunization (EPI), the EPI 30 cluster survey method has its roots in the smallpox eradication programme. In 1968 and early 1969 the WHO Smallpox Eradication Programme Regional Office in Lagos conducted surveys in the Republic of the Niger, the Federal Republic of Nigeria, and the Togolese Republic, to ascertain smallpox vaccination rates (Henderson RE, Davis H, Eddins D, Foege W, 1973)³. In 1982 the experience gained from these surveys was adapted for infant immunization coverage and became the EPI 30x7 Cluster Survey described in this module (Henderson RE, Sundaresan T, 1982)⁴. Since then the EPI cluster survey has been used in hundreds of surveys to evaluate immunization coverage, and has been adapted to study coverage of other health services and diseases.

² The forms for recording and evaluating TT coverage in women in this MLM module reflect current WHO and UNICEF recommendations for measuring TT coverage in women by survey and should be used rather than those appearing in the *Immunization coverage cluster survey - reference manual* (WHO/IVB/04.23).

³ Henderson RE, Davis H, Eddins D, Foege W (1973). Assessment of vaccination coverage, vaccination scar rates, and smallpox scarring in five areas of West Africa. *Bulletin*, Geneva, World Health Organization, 48:183-194.

⁴ Henderson RE, Sundaresan T (1982). Cluster sampling to assess immunization coverage: a review of experience with a simplified sampling method. *Bulletin*, World Health Organization, 60:253-260.

Learning objectives

The purpose of this module is to provide you with the necessary skills to:

- plan a coverage survey
- conduct the survey
- tabulate the data
- calculate the results of the survey
- present the results of the survey.

Below are the major steps to follow in an immunization coverage survey.

Plan the survey > Conduct the survey > Tabulate data > Analyse data > Take action

1. Plan the survey

The survey method described in this module uses a cluster-sampling technique. This technique allows a small number of the target population to be sampled to provide statistically valid data. A cluster is a randomly selected group which in this case contains seven children in the age group you want to evaluate, or, if you want to evaluate Tetanus Toxoid (TT) coverage, the mothers of seven children in a specific age group. A coverage survey contains 30 clusters and meets the following standards of reliability.

- The results of the survey will have a level of accuracy of within 10%. For example, if the survey shows an immunization coverage of 70% in the sample, the coverage in the target population will be between 60% and 80%.
- The level of confidence is 95%, which means that in 19 out of 20 cases the results of the survey will be within the stated level of accuracy (i.e. plus or minus 10%). (Refer to Annex D for details on calculating confidence intervals).

A survey using this cluster-sampling technique will only allow you to draw conclusions about the population surveyed as a whole. It will not permit comparisons between the different clusters or subsections of the total population surveyed. If, for example, you want to compare urban with rural populations, or sections of the population using one immunization strategy with other sections using a different strategy, you would have to complete separate surveys in each section. If you want to compare coverage in populations in different parts of the country, you would do separate surveys in each area. Each survey could be done using the method described in the module.

1.1 Planning based on national immunization schedule

An assessment of routine immunization coverage must be based on the recommended immunization schedule. All parties involved with the coverage survey must be familiar with the recommended schedule and how vaccinations are recorded on the immunization record.

Determine how to define a 'fully immunized' child. This will depend upon the infant immunization schedule (Table 7.1), but you should use your judgement if there are variations within the country. For example, birth doses of OPV and HepB may only be given in certain areas or designated facilities, so you should decide whether or not to include these doses in assessing 'fully immunized' status. In addition some vaccines may only be used in certain areas where the subject diseases are prevalent, for example, use of yellow fever (YF), Japanese Encephalitis (JE) vaccines may apply only on a district-by-district basis. Table 7.1 below provides an example of a typical immunization schedule.

Table 7.1 : Immunization schedule for infants recommended by the Expanded Programme on Immunization

Vaccines		Age				
		Birth	6 weeks	10 weeks	14 weeks	9 months
BCG		X				
Oral polio		X ¹	X	X	X	
DTP			X	X	X	
Hepatitis B	Scheme A ^a	X	X		X	
	Scheme B ^a		X	X	X	
Haemophilus influenzae type b			X	X	X	
Yellow fever						X ^b
Measles						X ^c

¹ In polio-endemic countries.

^a Scheme A is recommended in countries where perinatal transmission of hepatitis B virus is frequent (e.g. in south-east Asia). Scheme B may be used in countries where perinatal transmission is less frequent (e.g. in sub-Saharan Africa).

^b In countries where yellow fever poses a risk.

^c A second opportunity to receive a dose of measles vaccine should be provided for all children. This may be done either as part of the routine schedule or in a campaign.

1.2 Select the age group of children to be evaluated

A first step in planning for the survey is to decide which age group of children to evaluate. For most surveys, EPI recommends:

- children aged 12–23 months for evaluating the immunization coverage among children against vaccine-preventable diseases if the last immunization is due at nine months of age;
- children aged 18–29 months if the last immunization is at 15 months of age; if measles is the last immunization recommended and is recommended at 12 months, you may choose to evaluate children 24–35 months of age.
- children aged 0–11 months for evaluating the TT coverage among their mothers.⁵

In most developing countries children in the age range of 12–23 months constitute approximately 3% of the total population. If all children were present, you would need a community of about 500 people to be sure to find seven children in this age range. Due to absenteeism, you may need a larger population to find seven children in the age range 12–23 months. Therefore, for practical reasons, you should plan to conduct a 30 cluster coverage survey in a population, or section of a population, greater than 30 000.

1.3 Decide which sources of information to use

As explained in the introduction to this manual, a manager should decide the type of evidence ('CARD', 'HISTORY', 'CARD OR/PLUS HISTORY'), whether all doses or only valid doses will be counted ('CRUDE' or valid) and whether the age of the child at the time he/she received the vaccination will be considered ('TIMELY' or 'BY TIME OF SURVEY').

⁵ The reason the age range of 0–11 months is used for evaluating TT coverage is that this will give you information about the most recent immunization activities (that is, those that occurred within the past year)

1.4 Decide how many interviewers are needed and the length of the survey

The number of interviewers and the number of days needed to conduct an immunization coverage survey will vary. Things to consider include the availability of personnel and transport, the time required to travel to the clusters, and how urgently the data on immunization coverage is needed.

It is recommended that:

- each interview team be composed of two members, so that interviewers can check each other's work and make sure information is recorded accurately and completely;
- one team of interviewers be expected to complete one cluster each day;
- the entire survey of 30 clusters should be completed as quickly as possible but always within one month, to ensure that the data are as close as possible to one point in time;
- the survey should be done by people who did not do the immunization;
- a supervisor should not be responsible for more than two interview teams;
- supervisors should have previous experience with survey fieldwork.

Where speed is important, personnel are available and can be trained, and transport is adequate, you could have 60 interviewers. They should complete the entire survey of 30 clusters in one day, with 30 interview teams surveying one cluster each. If personnel are very limited, it should be possible for one team to complete the survey in 30 work-days, doing one cluster per day. Determine the number of interviewers and the duration of your survey based on your resources and needs. For example, with 12 interviewers (six teams), you could complete the survey in five days. The following two-step formula can be used to determine the number of days required to complete the survey with the available number of interviewers.

1)	$\frac{\text{Number of interviewers available}}{2}$	=	Number of interview teams available
2)	$\frac{30}{\text{Number of interview teams available}}$	=	Number of days required to complete the survey

Time should be invested in training field supervisors and interviewers prior to each survey. It should not be assumed that because someone has participated in a similar survey before he/she does not need any further training. It is especially important that the field teams follow the procedure for identifying each house-

hold, they correctly administer the questionnaire, and that they correctly, clearly and carefully record the replies. Failure to do so may provide misleading results.

Training supervisors and interviewers with experience in immunization coverage surveys requires at least one and a half days, including field practice. If they are not experienced in such surveys, additional training may be necessary.

1.5 Identify clusters

To identify clusters you must know the total population of the area to be surveyed and the population of the cities, towns and villages in the area.

1.5.1 Calculate a sampling interval and select a random number

An important concept to understand when identifying clusters is the sampling interval. This is a number used to systematically select clusters. Calculate a sampling interval by using the formula below.

$$\frac{\text{Total population to be surveyed}}{30 \text{ clusters}} = \text{Sampling interval}$$

The sampling interval should be rounded off to the nearest whole number. To identify clusters, you will also need to know how to select a random number. A random number is a number chosen from many numbers, each of which has an equal chance of being selected. Choosing numbers from memory is not a satisfactory method for selecting random numbers because unconscious biases can occur.

You may select a random number by using a table of random numbers. See Annex A for a description of how to use a table of random numbers.

An alternative is to use the last digits of the serial number on currency notes. To find a random number using a currency note, first refer to your sampling interval. The random number must have the same number of digits as the number of digits in the sampling interval. For example, if the sampling interval is 345, then the random number must have three digits. Look at the currency note and identify your random number. If the random number you find from the currency note has a value that is greater than the sampling interval, you will need to use another note to identify another number. For more detailed information on identifying and selecting clusters refer to the *Immunization coverage cluster survey - Reference manual* (WHO/IVB/04.23), Annex D (pages 63-65).



Learning activity 7.1

Your facilitator will demonstrate how to use the serial number on a currency note to select a random number. When the demonstration is finished, use the table of random numbers or currency notes to complete this exercise on your own. Write your answers in the space provided.

1. Choose a three digit random number between 001 and 187 inclusive.
2. Assume the sampling interval is 12 685.
 - How many digits should the random number have?
 - Select a random number from a table of random numbers or a currency note to use when identifying clusters.
3. The total population of the community is 359 868. Calculate a sampling interval, and then select a random number to use when identifying clusters.

1.5.2 Complete a Cluster Identification Form

Use a Cluster Identification Form (Table 7.2 shows a sample) to identify the clusters to include in your survey. The guidelines below describe how to complete this form.

1. The first step is to obtain a list of all communities in the area to be surveyed with as up-to-date population data as possible. Omit from the list any areas which are not going to be accessible during the survey or which are known to no longer exist. List all communities (cities, towns and villages) included in the immunization target area to be evaluated. When the survey includes a big city, list all neighbourhoods.
2. List the population size of each community.
3. Calculate and write in the cumulative populations as each community is added. To obtain a cumulative population you must add the population of the next village to the combined total of all populations in preceding villages. The final cumulative population should be the same as the total population to be surveyed.
4. Using this formula determine the sampling interval.

$$\frac{\text{Total population to be surveyed}}{30 \text{ clusters}} = \text{Sampling interval}$$

Round all decimals off to the nearest whole number. Enter the number in the space provided at (a) on the bottom of the Cluster Identification Form.

5. Select a random number which is less than or equal to the sampling interval. The number must have the same number of digits as the number of digits in the sampling interval. Enter this number at (b) at the bottom of the Cluster Identification Form.
6. Identify the community in which Cluster 1 is located. This is done by locating the first community listed in which the cumulative population equals or exceeds the random number. Write '1' beside this community in the column entitled 'CLUSTER'.
7. Identify the community in which Cluster 2 is located. Use the formula below. The cumulative population listed for that community will equal or exceed the number you calculate.

Random number	+	sampling interval	=
---------------	---	-------------------	---	-------

Example:

If you obtain a random number of 5 734 and a sampling interval of 7 493 you would calculate the following population totals for the first two clusters.

Cluster 1 population = 5 734 (random number).

Cluster 2 population = 5 734 + 7 493 = 13 227 (random number + sampling interval).

Then write '2' beside the first community listed on the Cluster Identification Form in which the cumulative population equals or exceeds the Cluster 2 population.

8. Identify clusters 3–30. Use the formula provided below.

Number which identified the location of the previous cluster	+	sampling interval	=
--	---	-------------------	---	-------

Example:

Cluster 2 population = 5 734 + 7 493 = 13 227

Cluster 3 population = 13 227 + 7 493 = 20 720

(number for Cluster 2 + sampling interval).

Then write the number of clusters 3–30 beside the appropriate community. Remember that a single community may contain more than one cluster.



Learning activity 7.2

In this exercise you will practise identifying clusters. You will calculate a sampling interval and label the communities selected on the Cluster Identification Form providing information you need to complete the exercise as follows.

The immunization target area to be evaluated in the exercise is the coastal region of a hypothetical country. All cities, towns and villages of the coastal region have been listed. The cumulative population of each city, town or village has been calculated for you.

1. Calculate a sampling interval and record it at (a).
2. For this exercise use the number 12 762, which has been randomly selected. Record this number at (b) at the bottom.
3. Follow the guidelines for identifying clusters to identify clusters 1–5 (clusters 6–30 have already been identified for you).

Table 7.2: Cluster identification form (Sample format)

CITIES, TOWNS AND VILLAGES OF COASTAL REGION									
No.	Name of community	Population	Cumulative population	Cluster	No.	Name of community	Population	Cumulative population	Cluster
1	Utaral	12 888	12 888		26	Nozop	17 808	157 117	6
2	Bolama	3 489	16 377		27	Mapasko	3 914	161 031	7
3	Talum	6 826	23 203		28	Lothoah	15 006	176 037	
4	Wara-Yali	4 339	27 542		29	Voattigan	9 584	185 621	
5	Galey	2 203	29 745		30	Plitok	4 225	198 846	
6	Tarum	4 341	34 086		31	Dopoltan	2 643	201 489	8,9
7	Harntato	1 544	35 630		32	Cococopa	26 000	227 489	
8	Nayjaff	885	36 515		33	Famezgi	3 963	231 452	
9	Nuviya	2 962	39 477		34	Jigpelay	2 115	233 567	
10	Cattical	4 234	43 711		35	Mewoah	507	234 074	
11	Paralai	1 520	45 231		36	Odigala	3 516	237 590	10
12	Egala-Kuru	3 767	48 998		37	Sanbafl	14 402	251 992	
13	Uwanarpol	3 053	52 051		38	Andidwa	2 575	254 567	
14	Hiiandia	60 000	112 051		39	Ore-Mikam	3 105	257 672	
15	Puratna	2 297	114 348		40	Duno-Mikam	4 176	261 848	
16	Kagalni	1 355	115 703		41	Kedi-Sina	1 919	263 767	
17	Hamali-Ura	833	116 536		42	Panabalok	3 261	267 028	
18	Kameni	4 118	120 654		43	Rokini	4 270	271 298	
19	Kiroya	2 782	123 436		44	Talosso	3 301	274 599	
20	Yammia	3 285	126 721		45	Djaragna	3 250	277 849	
21	Baga	4 416	131 137		46	Bibachi	4 670	282 519	11
22	Atota	3 188	134 325		47	Bilam	757	283 276	
23	Kogouva	1 179	135 504		48	Sisse	12 037	295 313	
24	Ahekpa	612	136 116		49	Anda-Dali	2 155	297 468	
25	Yandot	3 193	139 309		50	Varok	3 702	301 170	

Sampling interval: (a) _____ Random number: (b) _____

Cluster identification form, cont.

CITIES, TOWNS AND VILLAGES OF COASTAL REGION

No.	Name of community	Population	Cumulative population	Cluster	No.	Name of community	Population	Cumulative population	Cluster
51	Boul	2 262	303 432	12	76	Wako	3 987	394 321	
52	Boul-Malal	791	304 223		77	Ganda	4 211	398 532	
53	Dapnan	3 468	307 691		78	Sapa-Barchi	2 541	401 073	
54	Umpybo	4 338	312 029		79	Nuwa	848	401 921	
55	Goumarn	3 930	315 959		80	Nangja	1 281	403 202	
56	Nzeiji	2 112	318 071	13	81	Kuwas	3 310	406 512	16
57	Wagasa	3 953	322 024		82	Wanid	4 313	410 825	
58	Onarn	2 198	324 222		83	Lukkumsa	4 762	415 587	
59	Koundo	9 891	334 113		84	Jopu	3 647	419 234	
60	Pacna	3 154	337 267		85	Thynupa	2 530	421 764	
61	Nagbi	2 548	339 815	14	86	Yanlasull	16 983	438 747	17
62	Ponakpo	1 034	340 849		87	Mali	2 730	441 477	
63	Auguromi	2 415	343 264		88	Papalc	4 869	446 346	
64	Pali	4 325	347 589		89	Agrakhan	3 300	449 646	
65	Ngoll	13 233	360 822		90	Tido	4 150	453 796	
66	Majagch	511	361 333		91	Jubara	3 760	457 556	18
67	Yarch	2 312	363 645		92	Pilasta	1 587	459 143	
68	Chandam	3 108	366 754		93	Lejaple	16 699	475 842	
69	Uvaspa	4 163	370 917		94	Lahisa	2 703	478 545	
70	Rhomastiput	4 250	375 167		95	Chapmar	747	479 292	
71	Anghor	784	375 951	15	96	Dhulisk	4 451	483 743	19
72	Ransilha	3 423	379 374		97	Briko	4 425	488 168	
73	Phaiip	4 098	383 472		98	Hummu	3 860	492 028	
74	Dumakpa	4 540	388 012		99	Bary	2 835	494 863	
75	Baktari	2 322	390 334		100	Lekdai	1 725	496 588	

Sampling interval: (a) _____ Random number: (b) _____

Cluster identification form, cont.

CITIES, TOWNS AND VILLAGES OF COASTAL REGION

No.	Name of community	Population	Cumulative population	Cluster	No.	Name of community	Population	Cumulative population	Cluster
101	Izigba	3 988	500 576		126	Waitu	2 115	653 196	
102	Loaz	4 124	504 700		127	Mobbay	4 507	660 703	
103	Jilkoud	4 389	509 089		128	Baidu	3 516	664 219	
104	Gopouda	1 126	510 215		129	Heraftw	2 402	666 621	
105	Akafo	2 166	512 381		130	Plitok	3 575	670 196	
106	Endera	3 393	515 774	20	131	Comoscli	14 005	684 201	26
107	Seyou	4 787	520 561		132	Churiz	676	684 877	27
108	Lallos	3 447	524 008		133	Caiecopa	45 000	729 877	
109	Dobaba	3 689	527 697		134	Angko	4 261	734 138	28
110	Sorndi	4 696	532 393		135	Luru-Ala	4 919	739 057	29
111	Gnmoli	60 000	592 393	21, 22	136	Kartaj	17 270	756 327	
112	Nehoa	3 990	596 383	23	137	Lernno	3 837	760 164	
113	Melo	4 754	601 137		138	Deysibba	2 149	762 313	
114	Tabli	4 121	605 258		139	Ongo-On	3 702	766 015	
115	Evot	3 214	608 472		140	Ullah	1 927	767 942	
116	Parntakapo	16 008	624 480	24	141	Ukkanj	4 971	772 913	
117	Otoyang	4 732	629 212		142	Alkla	2 468	775 381	
118	Tosi	2 769	631 981		143	Tagalo	3 383	778 764	
119	Sarsabba	532	632 513		144	Patto-in	3 930	782 694	
120	Olkode-Bua	3 394	635 907		145	Priclasu	2 211	784 905	
121	Toubussi	1 143	637 050	25	146	Ollimi	3 585	788 490	30
122	Domno	8 147	645 197		147	Hakuda	1 355	789 845	
123	Strip	4 555	649 752		148	Limaki	4 285	794 130	
124	Rakachi	695	650 447		149	Rutadupi	3 177	797 307	
125	Chelle	3 634	654 081		150	Alarn-Neki	2 693	800 000	

Sampling interval : (a) _____ Random number : (b) _____

2. Conduct the survey

When you conduct a coverage survey, data is collected by interviewing members of households and recording this information for analysis. This section describes how to select households, conduct the interview, and record the information.

2.1 Select the starting household

The first house to be visited in each cluster should be selected at random. The method for selecting the first house will vary according to the population density (rural versus urban areas) and whether household lists are available.

A. In rural areas where household lists are available :

- Obtain a list of households in the village being evaluated. Census records, tax lists and voting lists are the lists most commonly available, but any reasonably complete listing is acceptable. If none of these data are available, an ad hoc list should, if possible, be established with the help of community authorities. The list should be of all households in the cluster, not only those with children. Time allocated for constructing this list must be included in the survey plan and budget. The field supervisor should identify someone trusted and knowledgeable in the area to advise on whether the ad hoc household list is reasonably complete or not. If not complete, request assistance in finalizing the household list.
- Number the households on the list.
- Select a random number from one to the highest numbered household on the list (inclusively). Do this by using a table of random numbers or a currency note.
- Next find the household on the numbered list whose number corresponds to the random number selected. This will be the first household to visit.

B. In rural areas where household lists are not available

Method 1:

If there are more than 100 households in a village and it is not feasible to number them, you will need to use another method to randomly select the first household to be visited.

- Select a central location in the village or town, such as a market, a mosque or a church. The location should be near the approximate geographical centre of the village or area.
- Randomly select the direction from the centre. This can be done in a variety of ways; for example, you may choose to spin a bottle on even ground and wherever the bottle points when it stops indicates the direction.
- Walk in the selected direction, counting the number of houses until you reach the edge of the village.
- Select a random number between one and the total number of houses along the directional line selected and return to this house. For example, if you randomly select the number nine, you will visit the ninth house from the central location along the chosen direction.

This method should ONLY be used if efforts to construct an ad hoc list of households fail.

Method 2:

If most children attend school, randomly select one child from the attendance list and use the house of that child as the starting point.

C. In urban areas

- Determine if there are subdivisions (geographical, political) of the urban area which contain approximately equal populations, or which can be grouped to obtain equal population distribution.
- If such subdivisions exist, number each subdivision and select a random number between one and the total number of subdivisions. The selected number will indicate the subdivision in which the initial household is located.
- If a household list exists for the subdivision identified, select the first household to visit by following the procedure described for 'In rural areas where household lists are available'. If these lists are not available, follow one of the methods described under 'In rural areas where household lists are not available'.
- If there are no clear subdivisions, divide the urban area into subunits of approximately equal population; for example, blocks of about 100 houses. Do this by examining a map and discussing population distribution with government and health officials in the area. Once the subdivisions are established, number each subdivision and follow the procedure described in Method 1.

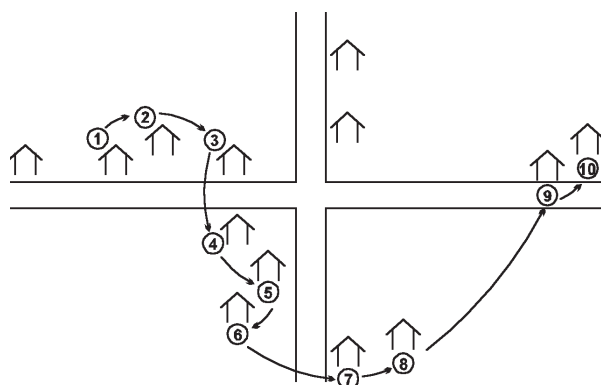
2.2 Select subsequent houses

The process you will use to select subsequent houses, after you have selected a starting household, depends on whether the houses are single-family dwellings or multi-family dwellings.

Single-family dwellings

The second household you should visit will be the one which is nearest to the first. The next nearest household is the one whose front door is closest to the front door of the household you have just visited. The diagram below illustrates how you should move from one household to the nearest household.

Figure 7.1 Sequence of next nearest households beginning with a randomly selected starting household



Multi-family dwellings

In densely populated urban areas where more than one family live in a single dwelling, a different method for selecting the first household is used. A household is defined as a group of people sharing the same kitchen, and in urban areas you may find many households in a single building. To ensure an unbiased selection of households in buildings such as apartment buildings, use the following system.

First, choose one floor at random. Then number the households on the selected floor and randomly select the first household to visit. The second household to visit is the door nearest to the first. After you have visited all the households on the floor, randomly choose a direction (i.e. up or down). Visit all the households on that floor. Continue from floor to floor visiting the next nearest floor which has not been visited previously. After the whole building has been visited, go to the nearest door of the nearest building and repeat the process. If multiple families live together (i.e. share cooking and sleeping quarters), this is defined as a single household, and only the youngest eligible child of the combined families should be included in the survey.

Hilly terrain with very scattered dwellings

Identifying the nearest household can be problematic in hilly terrain with highly scattered dwellings. If it is not feasible to map the area with dwellings in advance, field teams must rely on local informers to guide them to the nearest household.



Learning activity 7.3

The examples provided in this exercise describe three different types of situation that an interviewer could encounter. In the first two situations, select a starting household to visit. In the third situation, select subsequent households. There will be more than one possible answer.

1. The tax list of a village shows the following names :

(1) Aamoa

(2) Annoa

(3) Bdagdo

(4) Bru

:: _____

:: _____

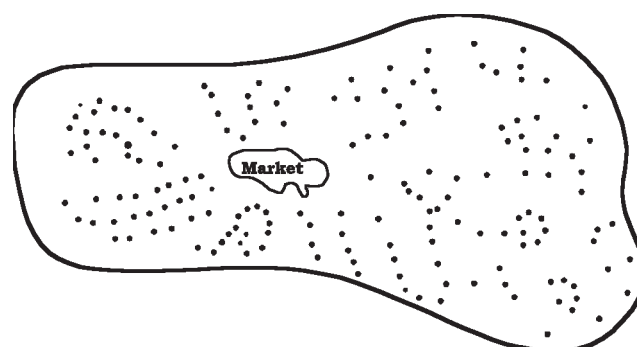
:: _____

Other names, numbered 5–98, are on the tax list but have not been reproduced here. For the exercise, however, consider that all names have been written and numbered.

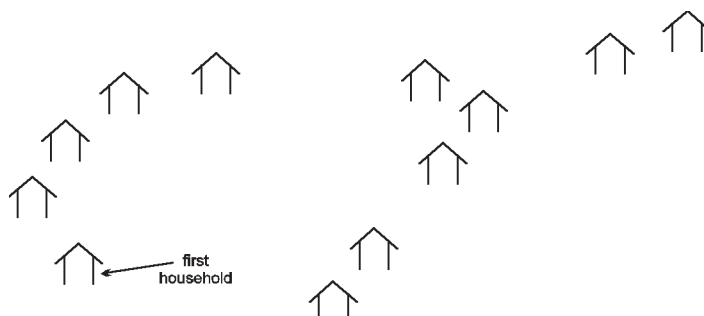
(99) Zye

Select the starting household and then describe in writing how you did it.

2. You must select a starting household in a village which has about 150 households. No household list and no map exist for this village. A picture of the village is given below. Each dot represents a household. Select the starting household and describe in writing how you selected it. Remember that in the real situation you would have no map.



3. In the diagram below, the first household has been selected for you. Number all of the houses in the order in which you would visit them.



2.3 Complete the cluster forms

The cluster forms list the questions to be asked at each house and provide space to record information about the seven children and seven mothers in the sample cluster. Three cluster forms will be completed.

- (1) Cluster form for Infant Immunization (Table 7.3).
- (2) Cluster form for Reasons for Immunization Failure (Table 7.4)⁶.
- (3) Cluster form for Tetanus Toxoid (TT) Immunization of Women (Table 7.5).

Refer to the forms as you read the explanation of how to fill them out. The first four items on the three forms are identical. Complete these items by following the guidelines below.

Introductory data on all forms (Items 1–4)

- Item 1 Record the cluster number.
- Item 2 Record the date of the interview.
- Item 3 Identify the city, town or village of the cluster by referring to the cluster identification form.
- Item 4 Identify the range of birthdates of children or their mothers who will be evaluated in the surveys. These dates will be based on the date of the interview. You will calculate two different ranges of birthdates:
 - a) for the cluster forms for *Infant Immunization* and the *Reasons for Immunization Failure*;
 - b) for the cluster form for *TT Immunization of Women*.

The method of calculating the range of birthdates is given below.

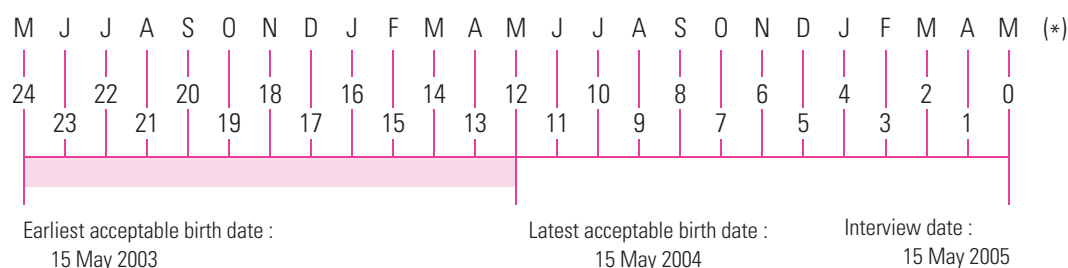
⁶ The Cluster Form for Reasons for Immunization Failure is used only at households with a child 12–23 months of age. There is no form for TT immunization failure because it is assumed that the reasons for infant immunization failure will be very similar to the reasons women fail to get TT immunization.

a. For the Infant Immunization and Reasons for Immunization Failure cluster forms :

To determine the earliest acceptable birthdate, subtract exactly 24 months from the date of the interview. (You subtract 24 months instead of 23 months because you wish to include all children who are even one day less than 24 months of age. By subtracting 24 months, you will also include children who are exactly 24 months of age. This is an acceptable error.)

To determine the latest acceptable birthdate, subtract exactly 12 months from the date of the interview.

- Example:**
- (1) Assume an interview date of 15 May 2005.
 - (2) Count back from the interview date exactly 24 months to determine the earliest acceptable birthdate.
 - (3) Count back from the interview date exactly 12 months to determine the latest acceptable date.



(*) The capital letters represent the months of the year

The shaded area in the figure above represents the birthdates of the age range to be evaluated if the interview date is 15 May 2005 (i.e. birthdates falling on or between 15 May 2003 and 15 May 2004). NOTE: If no immunization cards or birth records are available, you may need to use months of birth instead of specific dates.

b. For the Tetanus Toxoid Immunization of Women cluster form

To determine the earliest acceptable birthdate, subtract exactly 12 months from the date of the interview. The latest acceptable birthdate is the date of the interview.

After completing items 1–4 on all three forms, visit the first household.

- Ask to see the head of the household. If the head of the household is not present, ask to speak to the spouse, another adult or a mature child.
- Explain what you are doing and why you will be asking them questions. Ask the ages of the children living in the household.
- Determine if there are any resident children in the household aged 0–23 months. (A resident child is defined as one who spent the previous month in the household. The child does not have to be present for the interview.)
- Use the chart on the next page to decide which cluster form to use.

IF THERE IS A CHILD WHO IS:	THEN:
0-11 months	Complete the cluster form for <i>Tetanus Toxoid Immunization of Women</i> .
12-23 months (or 18-29 months if the immunization is due at 15 months)	Complete the cluster forms for <i>Infant Immunization</i> and <i>Reasons for Immunization Failure</i> .
24 months or more, or no children.	Do not fill out any form, but tally the household visited on the cluster forms for <i>Infant Immunization</i> and <i>Tetanus Toxoid Immunization of Women</i> . Go to the next nearest house and begin again.

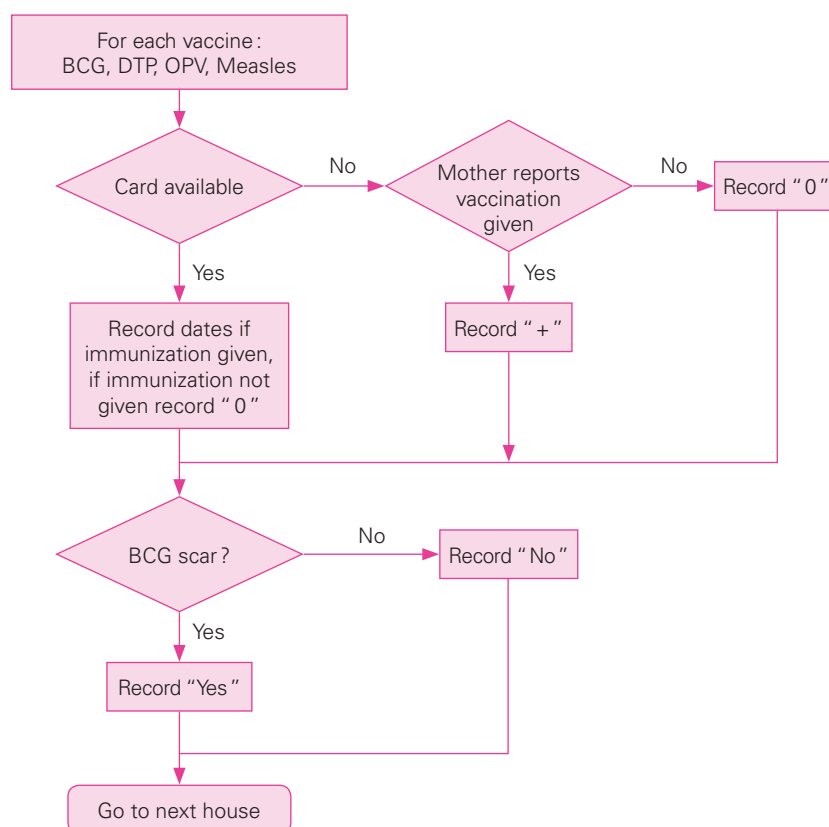
Specific guidelines on completing each of the three forms follow. The numbers listed in the guidelines correspond to the item numbers on the cluster forms.

The cluster form for Infant Immunization

- Item 5 Write the name of the child in the household whose age is between 12 and 23 months. If there is more than one child in the household between 12 and 23 months, record information for only the youngest of them.
- Item 6 Write the birthdate for the child listed.
- Item 7 Write 'M' if the child is male, 'F' if female.
- Item 8 Ask to see the immunization card for the child on the list. (It is possible that a single individual may have several immunization cards). Write 'Yes' in the appropriate box if the child has an immunization card. Write 'No' if he/she does not have an immunization card.
- Items 9–12 The row 'DATE/+/0' is completed by using a coding system. If the immunization card is present and the immunization was given, copy the date of the immunization. This is known as verifying the immunization 'by card'. If the immunization card is not present, ask the mother whether the child received the immunization. If the mother reports that the immunization was given, write '+' in the box. This is known as verifying the immunization 'by history'.
- If the immunization was not given, write '0' in the box. It does not matter whether that information is obtained from the mother or from the immunization card.

The chart below will help you to complete Items 9–12 correctly.

Figure 7.2: Flow chart for completing Items 9–12



Ask the mother where the child received the immunization, and record it in the relevant box in the row titled 'Source'. You can use the following abbreviations, although the suggested list can be modified.

HOS hospital OUT outreach HC health centre

PRIV private NGO Non-Governmental Organization

SIA dose received during Supplemental Immunization Activities. (For doses received during SIAs, only mark 'SIA' and not 'HOS', 'OUT', 'HC', 'PRIV' or 'NGO').

If the mother does not remember where the child received the immunization, mark '0' in the box.

After listing the information on all the children in the household aged 12–23 months, check the data recorded for any obvious errors. For example check for:

- blank spaces, which would indicate questions either not asked or data simply not recorded;
- immunization dates that occurred prior to the date of the child's birth;
- duplicate recordings, which would indicate that the same data were mistakenly recorded for more than one child.

- Item 13 Determine whether the child is fully immunized or not. Count immunizations that were recorded by card and by history. The immunization status is recorded as **fully**, **partially** or **not** immunized by marking 'X' in the relevant box.

Mark	If the child received
Fully immunized ⁷	All vaccines that are part of the national or local programme for at least two years.
Partially immunized	Fewer than all doses recommended in the national immunization schedule, but at least one immunization.
Not immunized	None of the immunizations.

- Item 14 Interviewers should leave this item blank; the supervisor will complete it.

- Item 15 Tally each household you visit. This keeps track of the total number of houses visited to find seven (or the specified number of) children and/or women in the cluster.

At this point, before the interview ends, complete the cluster form with reasons for immunization failure. You must complete Item 6 on this form for each of the seven children in the cluster, even if the child is fully immunized.

- Item 16 When the cluster form for *Infant Immunization* has been completed for seven children, print your name as the interviewer.

NOTE: Interviewers should leave the total columns blank. The supervisor will complete these.

The cluster form for Reasons for Immunization Failure

- Item 5 Write 'M' if the child is male; 'F' if female.
- Item 6 Record the immunization status of every child who is in the cluster. This information comes from Item 13 on the cluster form for infant immunization status.
- Item 7 If one or more immunization(s) have not been given, ask the responsible person to give the most important reason why the child did not receive all the immunizations in the series. This is an open-ended question. Wait until the respondent answers in her own words. Do not read the list of possible answers.

Mark 'X' in the box that states the most relevant reason. Remember, only the ONE most important reason should be marked. If a reason is given that is not on the list, then write it down in one of the blank spaces under the appropriate heading:

- lack of information
- lack of motivation
- obstacles.

NOTE: Interviewers should leave the 'Total' column blank. The supervisor will complete this.

⁷ If you want to assess coverage of an antigen not yet part of the immunization programme for two years, modify the acceptable age and birthdate range to be evaluated to allow for 'up-to-date immunization for age' rather than 'fully immunized'.

The cluster form for Tetanus Toxoid Immunization of Women

Upon reaching a household where there is a child aged 0–11 months, ask to speak to the mother of that child. If the mother is not available, then for the purpose of Td (or TT) coverage, go to the next household.

- Item 5 If there are any resident children in the household whose ages fall within the age range for their mothers to be evaluated, record the name of the mother.
- Item 6 Record the date of birth of the child. Ensure that the date falls within 0–11 months.
- Item 7 Record the total number of pregnancies the mother has had in her lifetime, including the pregnancy that lead to the birth of the child aged 0–11 months. This manual will call the pregnancy that led to the birth of the child aged 0–11 months, the 'last pregnancy'.
- Item 8 Previous versions of the coverage survey protocol did not allow for identification of doses received in the last pregnancy. This version will provide a possibility to compute these doses. The data requested under Item 8 can be obtained from history. The data will be used to compute TT coverage in the last pregnancy, and to calculate the protection at birth. Note the following definitions of terms.

8a: Number of Td (or TT) doses received during the last pregnancy.

Include all Td (and TT) doses received during the last pregnancy, including those received during SIAs.

8b: Number of Td (or TT) doses received prior to last pregnancy.

Include all Td (and TT) doses received before the last pregnancy, including doses received during supplemental immunization activities (SIAs).

8c: Card available for Td (or TT) received in the last pregnancy.

Ask whether the mother can show you a card on which the Td (or TT) doses received during the last pregnancy have been recorded. Mark 'Y' (yes) only if the interviewer is shown the card.

8d: Was a card given? For women who have a card, the answer is yes. For those without a card, the question is to determine whether the mother lost/misplaced the card or whether she never received a card. A woman who does not have a card, but claims that she was given a card upon vaccination (in the last pregnancy), should be marked as 'Y' (yes). If she claims no card was given, mark 'N' (no).

8e: Date of last dose received in the last pregnancy. If a card is available write the date of the last dose received in the last pregnancy.

8f: Source of last dose in last pregnancy. For the last dose in the last pregnancy ask about the source of the dose, and use the following key:

- 'OUT' — dose received in outreach activity;
- 'HOS' — dose received in hospital;
- 'HC' — dose received in health centre;
- 'PRV' — dose received from a private practitioner;
- 'NGO' — dose received from a non-governmental organization;
- 'SIA' — dose received in a supplemental immunization activity (campaign);
- 'SCH' — dose received during a school immunization campaign;
- 'WCV' ('well-child visit') — dose received during a visit for child immunization;
- 'OTH' — dose received on any other occasion (e.g. after an injury).

If the mother does not remember where she received the immunization, mark '0' in the box.

- Item 9 Ask each respondent the number of times she went to antenatal care during the last pregnancy.
- Item 10 Ask each respondent the number of times she went to a health facility during the last pregnancy, except for antenatal care.
- Item 11 Ask where the child (now aged between 0 and 11 months) was born, and who assisted during the delivery, and mark a 'Y' in the corresponding box.
- Item 12 This is to be completed by the supervisor.
- Item 13 Tally all households visited, regardless of whether there was a child in the defined age range.
- Item 14 Print your name as interviewer and sign the form.

NOTE: Interviewers should leave the 'Total' columns blank for the supervisor to complete.

In the survey you would continue visiting houses within the cluster until the seventh child in the age range to be evaluated plus seven children whose mothers are to be evaluated have been located. At this point you would have completed one cluster. The survey is completed by repeating the same process for the remaining 29 clusters.

2.4 Implement a control system on data collection

During data collection the supervisor should observe and check that interviewers are collecting and recording data accurately, and that the forms are filled in completely. The forms must be checked by the supervisor before the interviewers leave so that, if necessary, they can be corrected. The supervisor must review every form to ensure the following.

- Thirty clusters have been surveyed. To do this, look through the cluster forms submitted by each team to see if there are forms for 30 clusters. When fewer than 30 clusters have been surveyed, the missing cluster(s) will need to be identified and surveyed.
- Seven children who are 12–23 (or 18–29) months of age have been listed on each cluster form for *Infant Immunization* and each cluster form for *Reasons for Immunization Failure*.
- Seven mothers of children who are 0–11 months of age have been listed on each cluster form for *TT Immunization of Women*.
- There are no blank items on the forms, except for the field that needs to be completed by the supervisor.



Learning activity 7.4

In this exercise you will practise completing the cluster forms for *Infant Immunization*, for *Reasons for Immunization Failure*, and for *Tetanus Toxoid Immunization of Women*. Use this information when doing the exercise.

- Assume the date of the interview is 7 March 2005.
- Complete the forms for three households in the first cluster of a survey, the village of Utaral (refer to the cluster identification form).
- Refer to the information recorded on the sample immunization cards below.

Record your answers on the sample cluster forms.

Household residents and immunization card

Household number 1

Persons in household :

Name	Sex	Birthdate
Okal Mbaye	M	1963
Mety Mbaye	F	1972
Onwa Mbaye	F	1974
Ayo Mbaye	F	1/3/04

Immunization card :

Health Centre Immunization Card

Name	Ayo Mbaye		
Name of mother	Mety Mbaye		
Name of father	Okal Mbaye		
Male or Female	Female		
	Day	Month	Year
Birthdate of child :	1	3	2004
Name of village :			
Vaccines :			
Date given :	Day	Month	Year
BCG	1	3	2004
DTP-HepB 1	10	5	2004
DTP-HepB 2	18	6	2004
DTP-HepB 3	20	8	2004
OPV 0	1	3	2004
OPV 1	10	5	2004
OPV 2	18	6	2004
OPV 3	20	8	2004
Measles	5	1	2005
Tetanus 1	5	9	2003
Tetanus 2	10	1	2004

Household number 2

Persons in household :

Bineta Mbaye	F	1996
Babi Mbaye	F	14/3/01
Atumane Mbaye	M	8/9/03
John Mbaye	M	1991

Information obtained from interviewing the mothers of Ayo and Atumane Mbaye:

Both children had a visible BCG scar on their arm, and Ayo's mother said that all of Ayo's immunizations were obtained at the health centre. There was no immunization card available for Atumane, but her mother said that Atumane had received the OPV 0 at birth in the hospital and received BCG, DTP 1 and OPV 1 at the health centre. She did not receive the other immunizations because she (Atumane's mother) had fallen very sick at that time and could not take Atumane for immunization.

Household residents and immunization card

Household number 3

Persons in household:

Name	Sex	Birthdate
Ljoma Kone	M	1969
Fati Kone	F	1979
Daba Kone	F	1/2/04
Biga Kone	F	9/1/02

Immunization card:

Health Centre Immunization Card

Name	Daba Kone		
Name of mother	Fati Kone		
Name of father	Ljoma Kone		
Male or Female	Female		
	Day	Month	Year
Birthdate of child:	1	2	2004
Name of village:			
Vaccines:			
Date given:	Day	Month	Year
BCG	5	2	2004
DTP-HepB 1	10	4	2004
DTP-HepB 2			
DTP-HepB 3			
OPV 0	5	2	2004
OPV 1	10	4	2004
OPV 2			
OPV 3			
Measles			
Tetanus 1	8	9	2004

Information obtained from interviewing the mother of Daba Kone

Daba had a visible BCG scar on her arm. Although the DTP-HepB 2, DTP-HepB 3, OPV 2, OPV 3 and measles immunizations were not marked on the immunization card, Daba's mother said that she had received all those immunizations by outreach.

Household residents and immunization card

Household number 4

Persons in household :

Name	Sex	Birthdate
Omar Koffi	M	1974
Fatima Koffi	F	1979
Emma Koffi	F	1/6/04

Immunization card :

Health Centre Immunization Card

Name	Emma Koffi		
Name of mother	Fatima Koffi		
Name of father	Omar Koffi		
Male or Female	Female		
	Day	Month	Year
Birthdate of child :	1	6	2004
Name of village :			
Vaccines :			
Date given :	Day	Month	Year
BCG	1	6	2004
DTP-HepB 1	5	9	2004
DTP-HepB 2	10	10	2004
DTP-HepB 3	1	12	2004
OPV 0	1	6	2004
OPV 1	5	9	2004
OPV 2	10	10	2004
OPV 3	1	12	2004
Measles			
Tetanus 1	2	2	2004
Tetanus 2	18	4	2004

Information obtained from interviewing Fatima Koffi :

Fatima Koffi received both TT immunizations at the health centre, received antenatal care twice in her last pregnancy, made two other visits to the health centre during her last pregnancy, and the baby was delivered at the health centre by health staff on duty. She has had two pregnancies.

Table 7.3: Cluster form for Infant Immunization

(1) Cluster number		(5) Name of the child							Total	
(2) Date		1	2	3	4	5	6	7	Card	Card plus history
(3) Area										
(4) Range of birthdates From Until										
Child number in the cluster										
(6) Birthdate										
(7) Sex (M,F)										
(8) Immunization card		Yes/No								
(9) BCG		Date/+0								
		Scar: Yes/No								
		Source								
(10)	DTP-HepB 1	Date/+0								
		Source								
	DTP- HepB 2	Date/+0								
		Source								
	DTP- HepB 3	Date/+0								
		Source								
(11)	OPV0	Date/+0								
		Source								
	OPV1	Date/+0								
		Source								
	OPV2	Date/+0								
		Source								
	OPV3	Date/+0								
		Source								
(12) Measles ⁸		Date/+0								
		Source								
(13) Immunization status		Not Imm.								
		Partially								
		Fully								
(14) Fully immunized before one year of age		Yes/No								
(15) Tally of households visited		(16) Name(s) of interviewer(s)							(17) Name of Field Supervisor	
Signature: (Interviewers)		(Supervisor)								

Date = Copy date of immunization from card, if available

+ = Mother reports immunization was given

0 = Immunization not given

OUT = Outreach

HOS = Hospital

HC = Health Centre

PRV = Private

NGO = Non Governmental Organization

SIA= Supplemental Immunization Activity

⁸ In countries where MR or MMR are used, 'measles vaccine' should be substituted accordingly.

Table 7.4 : Cluster form for Reasons for Immunization Failure⁹

(1)	Cluster Number		(4) Birthdates		From							
(2)	Date				Until							
(3)	Area											
Note : ASK ONLY ONE QUESTION 'Why was the child' — or 'why were you' if to woman about Td (or TT) — 'not fully immunized?' Mark (x) the single most important reason given ¹⁰												
Child/woman number in cluster			1	2	3	4	5	6	7	8	Total	
(5)	Sex (M or F)											
(6)	Immunization status	Not immunized										
		Partially immunized										
		Fully immunized										
(7)	Lack of information	• Unaware of need for immunization										
		• Unaware of need to return for 2nd or 3rd dose										
		• Place and/or time of immunization unknown										
		• Fear of side reactions										
		• Wrong ideas about contraindications										
		• Other										
	Lack of motivation	• Postponed until another time										
		• No faith in immunization										
		• Rumours										
		• Other										
	Obstacles	• Place of immunization too far										
		• Time of immunization inconvenient										
		• Vaccinator absent										
		• Vaccine not available										
		• Mother too busy										
		• Family problem, including illness of mother										
		• Child ill – not brought										
		• Child ill – brought but not given immunization										
• Long waiting time												
• Other												
(8)	Tally of households visited											
(9)	Name of Interviewer											

Signature: _____

⁹ To be used for both children and women (Td (orTT)) surveys, adapted as needed.¹⁰ If it is felt that categorization/pre-coding of possible responses may risk missing potentially important information from the respondents, the interviewers can be instructed simply to write down verbatim the reply given by the child's mother/caretaker or by the woman (provided a suitably-designed format for recording the information is given to the data collectors). The survey supervisors and coordinator will later review all responses and decide on appropriate categories for presentation of the analysis.

Table 7. 5: Cluster form for Tetanus Toxoid Immunization of Women

(1) Cluster number :		(5) Name Of Mother									Totals (to be completed by supervisor)	
(2) Date :												
(3) Area :												
(4) Range of birthdates : From : Until :												
Woman number in the cluster :			1	2	3	4	5	6	7			
(6) Birthdate of child :												
(7) Total number of lifetime pregnancies :												
(8) History of Td (or TT) immunization in last pregnancy	(a) Number of Td (or TT) doses received in last pregnancy?									Dose LAST Pregnancy TT0 = TT1 = TT2 = TT3 = TT4 = TT5 or more =	Cumulative Doses TT0 = TT1 = TT2 = TT3 = TT4 = TT5 or more =	
	(b) Number of Td (or TT) doses received prior to last pregnancy?											
	(c) Card available showing Td (or TT) received in last pregnancy? Y/N									Yes =	No =	
	(d) Whether or not card is available, was a card ever received on which the Td (or TT) received in the last pregnancy was marked? Y/N									Yes =	No =	
	(e) If card is available, mark the date of the last Td (or TT) dose received in the last pregnancy.											
	(f) Where was the last Td (or TT) dose in the last pregnancy received?									OUT = HC = NGO = SCH = OTH =	HOS = PRIV = SIA = WCV =	
(9) Antenatal care *	Number of visits in last pregnancy									One visit =	Two or more visits =	
(10) Other visits to health facility *	Number of visits in last pregnancy									One visit =	Two or more visits =	
(11) Delivery of baby *	a) Where	Home								Home =		
		Hospital/HC								HC/Hospital =		
		Other								Other =		
	b) By whom	Health staff								Health staff =		
		TBA								Traditional attendant =		
		Other								Other =		
	Nobody								Nobody =			
(12) Child protected against neonatal tetanus *	Yes (based on history)								Yes (History) =			

* Only indicate data related to 'last pregnancy', i.e. pregnancy that lead to a child now aged 0-11 months.

(13) Tally of households visited:

(14) Name of interviewer(s):

(15) Name of Field Supervisor:

3. Tabulate data

Collected data is useless unless and until it is analysed. Coverage immunization must be analysed quickly in order to serve a useful purpose. The first step in analysing the collected data is to complete the cluster form. The information on the cluster forms is then transferred to the summary forms.

3.1 Complete the cluster forms

Interviewers collected the basic information needed for the survey, but there are some additional steps supervisors must take to complete the cluster forms.

3.1.1 Complete the cluster form for Infant Immunization

To complete this cluster form (Table 7.6), the supervisor follows three steps: (1) checks that the immunizations recorded on the cluster form for *Infant Immunization* are valid; (2) determines which children were fully immunized before one year of age (Item 14); and (3) completes the 'Total' columns.

Step 1 : Check that immunizations are valid

'Valid' means that immunizations were given when the child was the appropriate age and, if the immunization is one of a series, that they were given after an appropriate interval of time. There are three situations that would cause an immunization to be considered not 'valid':

1. If the immunization did not follow the immunization schedule.
For example, a second or third DTP or OPV immunization which is given less than 28 days after the preceding immunization should be considered invalid. Appropriate ages for immunizations, and acceptable intervals, vary from country to country and will also vary according to the vaccine.
2. If the immunization is recorded 'by history'.
All immunizations (except BCG) recorded by a '+' are not considered 'valid'. This is because the dates of immunizations recorded 'by history' cannot be confirmed so it is impossible to determine whether the correct schedule was followed.
3. For BCG: If BCG is recorded 'by history' and there is no scar on the child's arm. If a child's BCG immunization is recorded by history, but no scar was visible, the immunization is considered not 'valid'. Note that a child's BCG immunization is considered 'valid' in all of the following situations:
 - recorded by history and a scar is visible;
 - recorded by card and a scar is visible;
 - recorded by card, but no scar is visible. (This is because the coverage survey is trying to determine how successful the immunization services have been at reaching people, rather than monitoring the immunological response to BCG vaccine).

Circle all immunizations that are not 'valid' according to the definitions given above. Then check that the 'Fully/Partially/Not' immunized row on the cluster form (Item 13) is marked correctly. The interviewers completed this item in the field, but they were not asked to consider whether the immunizations were 'valid'. At this point the supervisor must circle the infants that are marked as fully immunized but not all doses received were 'valid'.

Step 2: Determine which children were fully immunized before one year of age

Item 14 asks how many children were fully immunized before one year of age. By comparison, the category 'fully immunized' in Item 13 tells you how many children were immunized under the age of two years.

To identify children that were fully immunized with valid doses by their first birthday, consider only those children who were recorded as 'fully immunized with valid doses' in Item 13. Now eliminate any 'valid' immunizations that were given after the child was one year old. This can be easily done by looking at the birthdate of the child and comparing it to the date of immunization.

Mark any 'valid' immunization given to the child older than one year of age by drawing a triangle around the date. Then place a 'Y' in Item 14 for each child who was fully immunized before the age of one year. Record 'N' in Item 14 for all other children.

NOTE: Immunizations given after a child's first birthday may still be 'valid' and protect him/her from disease. These immunizations are not, however, included when evaluating how well a country has met its immunization coverage target.

Step 3: Complete the 'Total' columns

When completing the 'Total' columns on the cluster form for *Infant Immunization* remember the following.

- When calculating the 'Total/Card' column, only count the number of 'valid' immunizations that were verified by the presence of an immunization card (that is, for which a date was recorded).
- When calculating the 'Total/Card plus History' column, add together the immunizations that fall into the following three categories:
 - valid immunizations verified by card;
 - immunizations that were verified by card, but were determined to be not valid;
 - immunizations recorded by history (that is, a '+' was recorded).

3.1.2 Complete the cluster form for Reasons for Immunization Failure

To complete this cluster form (Table 7.7), you must complete the 'Total' column.

When completing the 'Total' column on the cluster form for *Reasons for Immunization Failure*, remember the following points.

- Every child in the cluster must be marked on this form in Item 6.
- If there are fewer than seven children, it is possible that only those children who were not fully immunized were recorded. If this is so, it is likely that the reason given for immunization failure does not correspond to the correct child in the cluster. Check with the interviewer of that cluster and correct the form so that all seven children are correctly recorded.

3.1.3 Complete the cluster form for TT Immunization of Women

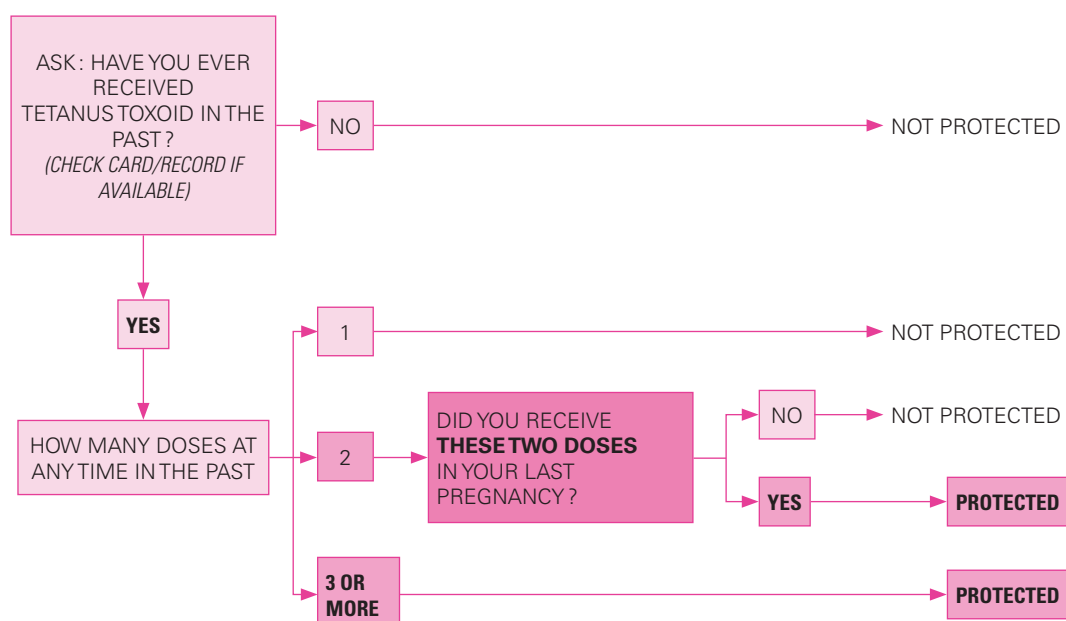
There are two steps to completing this cluster form (Table 7.8):

- completion of Item 12;
- completion of the 'Total' column.

Step 1 : Complete Item 12

Item 12 on the *Tetanus Toxoid Immunization of Women* cluster form asks whether the child was protected against neonatal tetanus. Refer to the flowchart below.

Figure 7.3: Assessment of protection at birth from neonatal tetanus.



Check whether the woman received two doses of Td (or TT) in her last pregnancy. If so, the child was born protected. In situations where no dose or one dose of Td (or TT) was received during the last pregnancy, check if at least three doses of Td (or TT) were received at any time in life,¹¹ i.e. during or before the last pregnancy. If so, consider the child to be 'protected at birth'. Three doses are an approximation for protection, and it is acknowledged that this may lack precision.

Step 2: Complete the 'Total' column

- Item 8 (a) Calculate which dose was received in the last pregnancy.
- If no dose was received in the last pregnancy (regardless of earlier doses), tally as TT0.
 - If one dose was received in the last pregnancy, add that to all previous doses to obtain the dose received. Example: if a woman had received three doses earlier and received one dose in the last pregnancy, tally as TT4.
 - If two doses were received in the last pregnancy, tally as TT2. However, if any doses had been received previously, only include one dose received in the last pregnancy, as the second dose will have been invalid. Example: if a woman had received two doses earlier in life, and received two doses in the last pregnancy, tally as TT3, not TT4. The reason is that, in this case, the minimum interval criterion (i.e. one-year interval between dose three and four) has not been met, and therefore the fourth dose is not 'valid'.
 - Tally (in the column 'Dose Last Pregnancy') behind the relevant dose.
- Item 8 (a)&(b) Calculate how many doses were received throughout life. This data is calculated so that the results of the survey can be compared to earlier survey results.
- Add all doses received (i.e. 8(a) plus 8(b)), and write a tally behind the relevant TT dose, plus behind all lower doses (in the column 'Cumulative Doses'). For example: a woman who has received one dose in the last pregnancy and had received three doses earlier in life, should be tallied as TT4, plus TT3, plus TT2, plus TT1.
 - When calculating this way, TT1 must be higher than TT2, TT2 higher than TT3, etc., which is not the case for the tallying of the dose received in the last pregnancy (see above).

¹¹ A woman who received one dose in the last pregnancy, and had received only one Td (or TT) dose prior to the last pregnancy, will be tallied as not 'protected at birth'. However, in reality, the last dose does provide protection. It is recognized that this is a drawback of the relatively easy way to compute 'protection at birth' that is being proposed in this manual. On the other hand, the simplified method will also consider women who received the last of three doses ten years ago as protected at birth, although in reality she probably was not.

- | | |
|----------------|--|
| Item 8 (c)&(d) | Add all 'Yes' and all 'No' answers on the questions whether a card is available, and whether the card was given, and fill the relevant box. The total of 'Yes' and 'No' answers should equal the number of women in the cluster. |
| Item 8 (f) | Tally the source of the doses. |
| Item 9 | Tally all women who had one antenatal care (ANC) visit, and all who went twice or more. |
| Item 10 | Tally all women who had one visit (other than ANC) to a health facility, and all who had at least two. |
| Item 11 | Tally the births by place of delivery and by person who attended the birth. |
| Item 12 | Tally all children protected at birth. |



Learning activity 7.5

In this exercise you will practice completing the cluster forms. Complete the following tasks on the forms.

- *Infant Immunization*
 - a) Complete the 'Total' column.
- *Reasons for Immunization Failure*
 - a) Revise Item 6.
 - b) Complete the 'Total' column.
- *Tetanus Toxoid Immunization of Women*
 - a) Complete the 'Total' column.

Table 7.6 : Cluster form for Infant Immunization

(1) Cluster Number : 1 (2) Date : 7 March 2005 (3) Area : Utaral (4) Range of birthdates : From : 7 March 2003 Until : 7 March 2004		(5) N A M E	Ayo Mbaye	Atumane Mbaye	Daba Kone	Muhammed Coli	Abo Mbakaie	Balla Diallo	Christopher Ofu	TOTAL	
										Card	Card plus history
Child number in cluster			1	2	3	4	5	6	7		
(6) Birthdate			1/3/04	8/9/03	1/2/04	8/8/03	12/12/03	14/1/04	1/1/04		
(7) Sex (M,F)											
(8) Immunization Card	Yes/No		Y	N	Y	Y	Y	Y	Y		
	Date/+0		1/3/04	+	5/2/04	2/8/03	0	10/3/04	1/1/04		
(9) BCG	Scar:Yes/No		Y	Y	Y	N	N	Y	Y		
	Source		HC	HC	Out	Hos	0	Hos	HC		
	Date/+0		10/5/04	+	10/4/04	10/11/03	21/3/04	10/3/04	0		
(10) DTP-HepB 1	Source		HC	HC	Out	HC	HC	HC	0		
	Date/+0		18/6/04	0	+	15/12/03	0	20/4/04	0		
DTP-HepB 2	Source		HC	0	Out	HC	0	HC	0		
	Date/+0		20/8/04	0	+	0	0	1/5/04	0		
DTP-HepB 3	Source		HC	0	Out	0	0	HC	0		
	Date/+0		1/3/04	+	5/2/04	2/8/03	0	10/3/04	1/1/04		
(11) OPV 0	Source		HC	HC	Out	Hos	0	Hos	HC		
	Date/+0		10/5/04	+	10/4/04	10/11/03	21/3/04	10/3/04	0		
OPV 1	Source		HC	HC	Out	HC	HC	HC	0		
	Date/+0		18/6/04	0	+	15/12/03	0	20/4/04	0		
OPV 2	Source		HC	0	Out	HC	0	HC	0		
	Date/+0		20/8/04	0	+	0	0	1/5/04	0		
OPV 3	Source		HC	0	Out	0	0	HC	0		
	Date/+0		5/1/05	0	+	1/10/04	2/7/04	0	0		
(12) Measles	Source		HC	0	Out	HC	HC	0	0		
	Not										
(13) Immunization Status	Partially			X		X	X	X	X		
	Fully		X		X						
	Yes/No										
(14) Fully immunized before one year of age											

(15) Tally of households visited : ##### //**(15)** Name of interviewer : A. Mutane

Table 7.7: Cluster form for Reasons for Immunization Failure

(1) Cluster Number : 1		(4) Range of birthdates : From : 7 March 2003 Until : 7 March 2004								
(2) Date : 7 March 2005										
(3) Area : Utaral										
NOTE : ASK ONLY ONE QUESTION : Why was the child not fully immunized ? Mark (x) the single most important reason according to your judgement.										
Child number in cluster		1	2	3	4	5	6	7	TOTAL	
(5) Sex (M/F)										
(6) Immunization Status	Not immunized									
	Partially immunized		X		X	X	X	X		
	Fully immunized	X		X						
(7)	Lack of information	a. Unaware of need for immunization				X				
		b. Unaware of need to return for 2 nd or 3 rd dose								
		c. Place and/or time of immunization unknown								
		d. Fear of side reactions								
		e. Wrong ideas about contraindications								
		f. Other								
	Lack of motivation	g. Postponed until another time								
		h. No faith in immunization							X	
		i. Rumours								
		j. Other								
	Obstacles	k. Place of immunization too far								
		l. Time of immunization inconvenient					X			
		m. Vaccinator absent								
		n. Vaccine not available								
		o. Mother too busy								
		p. Family problem, including illness of mother		X						
		q. Child ill — not brought								
		r. Child ill — brought but not given immunization						x		
s. Long waiting time										
t. Other										

Table 7.8: Cluster form for Tetanus Toxoid Immunization of Women

(1) Cluster number :		1		(5) Name Of Mother		Nagma Koffi	Lidija Kone	Lucie Musona	Anna Mbeya	Okol Lawamo	Metie Kone	Alle Mbabane	Totals (to be completed by supervisor)	
(2) Date : 7 March 2005														
(3) Area : Utaral														
(4) Range of birthdates : From : 7 March 2004 Until : 7 March 2005														
Woman number in the cluster :				1	2	3	4	5	6	7				
(6) Birthdate of child :				1/6/04	15/7/04	10/2/05	30/9/04	9/10/04	4/4/04	1/11/04				
(7) Total number of lifetime pregnancies :				3	1	5	7	3	2	4				
(8) History of Td (or TT) immunization in last pregnancy	(a) Number of Td (or TT) doses received in last pregnancy?			1	0	0	1	2	1	0	Dose LAST Pregnancy TT0 = 3 TT1 = 0 TT2 = 1 TT3 = 2 TT4 = 0 TT5 or more = 1		Cumulative Doses TT0 = 1 TT1 = 6 TT2 = 6 TT3 = 4 TT4 = 3 TT5 or more = 2-	
	(b) Number of Td (or TT) doses received prior to last pregnancy?			2	2	0	6	2	1	5				
	(c) Card available showing Td (or TT) received in last pregnancy? Y/N			N	N	N	N	Y	Y	N	Yes = 2	No = 5		
	(d) Whether or not card is available, was a card ever received on which the Td (or TT) received in the last pregnancy was marked? Y/N			N	N	N	N	Y	Y	Y	Yes = 3	No = 4		
	(e) If card is available, mark the date of the last Td (or TT) dose received in the last pregnancy.			-	-	-	-	3/7/04	2/1/04					
	(f) Where was the last Td (or TT) dose in the last pregnancy received?			HC	-	-	PRIV	HC	NGO	-	OUT = 0 HC = 3 NGO = 1 SCH = OTH =	HOS = 0 PRIV = SIA = WCV =		
(9) Antenatal care*		Number of visits in last pregnancy		0	2	3	0	3	2	2	One visit = 0 Two or more visits = 5			
(10) Other visits to health facility*		Number of visits in last pregnancy		2	1	0	0	3	0	0	One visit = 1 Two or more visits = 2			
(11) Delivery of baby*	a) Where	Home	Y	Y				Y		Y	Home = 4			
		Hospital/HC			Y	Y			Y		HC/Hospital = 3			
		Other									Other = 0			
	b) By whom	Health staff		Y	Y	Y			Y		Health staff = 4			
		TBA						Y			TBA = 1			
		Other								Y	Other = 1			
		Nobody	Y								Nobody = 1			
(12) Child protected against neonatal tetanus* (supervisor)		Yes (based on history)		Y	N	N	Y	Y	N	Y	Yes (History) = 4			

(13) Tally of households visited: |||| |||| |||| |||| |||| |||| ||||

(14) Name of interviewer(s):

(15) Name of Field Supervisor:

Signature(s): _____ Signature(s): _____

* Only indicate data related to 'last pregnancy', i.e. pregnancy that lead to a child now aged 0-11 months.

3.2 Complete the summary forms

To determine the number of people receiving valid immunizations in your survey of 30 clusters, you will need to transfer information from the cluster forms to a summary form. There are three types of summary forms:

- (1) the summary form for *Infant Immunization* (Table 7.9);
- (2) the summary form for *Reasons for Immunization Failure* (Table 7.10);
- (3) the summary form for *Tetanus Toxoid Immunization of Women* (Table 7.11).

Refer to these forms as you read the guidelines for completing each summary form below.

NOTE: The item numbers on the summary forms correspond to the item numbers on the cluster forms. Note that not all items on the cluster forms need to be transferred, and that the introductory information on the three forms is identical.

Introductory data on all three summary forms

- | | |
|--------|--|
| Item 2 | Write in the period of time over which the survey was conducted. Begin with the date of the first household interview and finish with the date of the final interview. |
| Item 3 | Write the name of the geographical area in which the 30 clusters are located. |
| Item 4 | Write the age in months of the children you have evaluated, or of the children whose mothers you have evaluated. (For infant immunization coverage, the age group is 12–23 months; for TT immunization of women, 0–11 months.) |

The summary form for Infant Immunization

- | | |
|--------|---|
| Item 6 | Record the total number of infants in the cluster. |
| Item 7 | Record the total number of 'Yes' answers for immunization card.

NOTE: You are not transferring the 'No' answers to the summary form. |
| Item 8 | Record the number of children that have BCG immunization confirmed by card. Get this number from the 'Total/Card' column on the cluster form.

Record the number of children that have BCG immunization confirmed by card plus the number confirmed by history. Get this number from the 'Total/Card plus History' column on the cluster form.

Record the number of children that have a BCG scar that was seen by the interviewer. Get this number from the 'Total' column on the cluster form.

Count, for the whole cluster, and record the total number of times each source was indicated for BCG. Use the figure below to tally each time a source is indicated. |

Figure 7.4: Tally source

Health Centre	Hospital
Outreach	Private
SIA	NGO

After having tallied all sources for BCG, summarize the times each source was indicated.

Items 9–11 Repeat the process described above for all vaccines in the infant schedule.

However, when recording the total number of times a source was listed for OPV and DTP-HepB, total the sources for the three/four doses of each antigen together.

Item 12 Record the number of 'Fully', 'Partially' and 'Not Immunized'. These numbers are found at the bottom of the 'Total' column on the cluster form.

Item 13 Record the number of children in each cluster who were fully immunized before one year of age.

Item 14 Record the number of households visited.

Complete the 'Total' column on the summary form by adding all numbers in each row.

The summary form for Reasons for Immunization Failure

Item 7 Transfer the information from the 'Total' column on the cluster forms to the corresponding column on the summary form. The reasons are listed in the same order on the summary form as found on the cluster form. Then calculate the subtotal for all clusters in the category 'Lack of information'.

Repeat the process described above for the categories 'Lack of motivation' and 'Obstacles'.

Complete the 'Subtotal' and 'Total' columns on the summary form by adding all numbers in each row.



Learning activity 7.6

In this exercise you will practice transferring information from a cluster form to a summary form for *Infant Immunization and Reasons for Immunization Failure*.

Transfer the information about Cluster 1 in Utaral from the cluster form to the summary form. Follow the guidelines on previous pages. Information about clusters 2–30 has already been transferred.

Table 7.9 : Summary form for Infant Immunization

(1) Date of first interview : 7 March 2005										(2) Date of last interview : 22 March 2005										(3) Area: Coastal Region										(4) Age group evaluated : 12-23 months													
Cluster Number										1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total			
(6) Number in cluster											7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	210		
(7) Card-Yes											7	6	6	7	6	6	5	6	6	5	7	6	7	7	4	6	5	4	6	5	4	6	6	7	4	5	7	7	5	7	6	178	
(8) BCG Card											5	6	6	7	6	6	5	6	6	7	7	6	5	7	4	6	5	4	6	5	4	6	6	7	5	5	5	7	6	7	6	176	
Card plus history											5	7	7	7	7	7	7	6	7	6	7	6	5	7	7	6	7	6	7	6	7	7	5	5	5	7	6	7	6	6	191		
BCG Scar											5	7	7	7	7	6	5	6	7	6	7	5	7	6	5	5	6	7	5	6	7	7	5	5	5	6	6	7	5	5	177		
Source : HOS											2	5	5	4	1	3	5	5	5	2	3	1	3	3	2	6	5	3	5	3	5	4	5	2	3	2	3	3	1	2	103		
HC											3	2	2	2	4	4	2	1	2	3	2	5	2	4	5	0	2	3	0	2	3	0	2	3	0	3	2	5	3	2	5	4	77
OUT											0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	9	
PRIV											0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
NGO											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SIA											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
(9) DTP-HepB 1 Card											6	6	6	7	6	5	5	4	6	5	6	5	6	7	5	6	5	4	6	5	4	6	6	4	4	3	6	6	5	6	5	162	
Card plus history											6	7	7	7	7	5	7	4	7	7	7	5	6	7	6	6	7	6	7	6	7	7	5	5	5	6	6	7	6	5	5	184	
DTP-HepB 2 Card											6	6	6	7	6	3	5	4	6	5	6	3	6	7	5	6	5	4	6	5	4	6	6	4	4	3	6	5	5	6	3	153	
Card plus history											6	7	7	7	7	3	7	4	7	7	7	3	6	7	6	6	7	6	7	6	7	6	7	4	4	5	6	6	6	7	3	3	174
DTP-HepB 3 Card											5	5	6	7	6	3	5	4	5	5	6	3	5	6	3	4	5	4	5	4	6	5	4	4	4	5	5	3	5	6	3	3	140
Card plus history											5	5	7	7	6	3	7	4	5	6	6	3	5	6	3	4	7	4	6	5	4	6	5	4	4	4	5	5	6	6	3	3	148
Source : HOS											2	5	5	4	1	3	5	5	5	2	3	1	3	3	2	6	5	3	5	3	5	5	4	5	2	3	2	3	3	2	2	104	
HC											3	2	2	2	3	4	2	1	2	3	2	5	2	4	5	0	2	3	0	2	3	0	2	3	0	3	2	5	4	2	5	5	88
OUT											12	12	14	14	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	62	
PRIV											0	0	0	1	13	4	14	6	12	15	13	5	12	13	8	10	14	10	12	12	6	8	9	12	10	12	13	4	4	252			
NGO											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SIA											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
(10) OPV 0 Card											5	6	6	7	6	6	5	6	6	7	7	6	5	7	4	6	5	4	6	6	7	5	5	5	7	6	7	6	7	6	6	176	

Cluster Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
Card plus history		5	7	7	7	7	7	7	6	7	6	7	6	5	7	7	6	7	6	7	7	7	5	5	5	7	6	7	6	6	191
OPV 1 Card		6	6	6	7	6	5	5	4	6	5	6	5	6	7	5	6	5	4	6	6	4	4	3	6	6	5	6	5	5	162
Card plus history		6	7	7	7	7	5	7	4	7	7	7	5	6	7	6	6	7	6	7	7	5	5	5	6	6	7	6	5	5	184
OPV 2 card		6	6	6	7	6	3	5	4	6	5	6	3	6	7	5	6	5	4	6	6	4	4	3	6	5	5	6	3	3	153
Card plus history		6	7	7	7	7	3	7	4	7	7	7	3	6	7	6	6	7	6	7	7	4	4	5	6	5	7	7	3	3	174
OPV 3 card		5	5	6	7	6	3	5	4	5	5	6	3	5	6	4	4	5	4	6	5	4	4	3	5	4	5	6	3	3	140
Card plus history		5	5	7	7	6	3	7	4	5	6	6	3	6	4	3	4	7	4	6	5	4	4	4	5	5	6	6	3	3	147
Source: HOS		0	4	0	4	0	0	0	0	4	6	0	0	0	6	0	0	5	4	0	4	2	3	0	0	2	3	0	2	2	51
HC		16	14	15	13	5	10	21	12	14	11	15	10	16	8	12	14	10	12	6	14	11	10	14	16	12	17	15	8	8	373
OUT		1	1	6	0	14	1	0	0	1	0	5	1	1	0	3	2	5	0	13	1	0	0	0	1	3	0	3	1	1	67
PRIV		0	0	0	5	0	0	0	0	0	3	0	0	0	5	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	14
NGO		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SIA		5	7	7	6	8	7	7	6	7	6	7	6	6	6	7	6	7	6	8	7	7	5	5	5	6	6	8	6	6	191
(11) Measles card		4	5	6	6	6	4	5	3	5	5	5	3	5	6	3	3	5	4	6	5	3	3	3	5	3	5	5	3	3	130
Card plus history		4	5	6	6	7	4	6	4	5	6	6	3	5	6	3	3	6	4	6	5	3	3	4	5	4	5	6	3	3	139
Source HOS		0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	0	0	0	9
HC		4	5	3	3	2	4	3	2	4	3	3	2	5	4	1	3	2	4	2	5	1	3	2	5	2	5	3	2	2	92
OUT		0	0	3	3	5	0	3	2	1	0	3	1	0	2	2	0	4	0	4	0	0	0	0	0	0	0	3	1	1	38
PRIV		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NGO		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SIA		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(12) Not immunized		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Partially immunized		4	2	1	1	1	3	2	3	2	1	2	3	2	1	2	3	2	2	1	2	4	3	2	2	4	1	2	3	3	67
Fully immunized		3	5	6	6	6	4	5	3	5	6	5	3	5	6	3	3	5	4	6	5	3	2	3	5	3	5	5	3	3	129
(13) Fully immunized before 1 year of age		5	1	4	5	4	1	2	4	5	4	4	5	4	5	2	4	5	2	4	5	3	4	4	4	3	5	3	3	3	107
(14) Households visited		32	27	33	40	42	38	29	40	45	31	33	41	33	27	32	35	28	31	35	43	46	40	30	31	25	37	35	24	34	1025

Table 7.10: Summary form for Reasons for Immunization Failure

- 1) Date of first interview: 7 March 2005
 2) Date of last interview: 22 March 2005
 3) Area: Coastal Region
 4) Age group evaluated: 12-23 months

Cluster Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	TOTAL
Lack of information	a. Unaware of need for immunization	1	0	1	0	0	0	0	0	2	1	0	0	1	0	0	0	0	0	1	1	0	2	0	2	0	0	1	0	0	14
	b. Unaware of need to return for 2 nd or 3 rd dose	1	0	0	0	0	0	2	2	0	0	0	0	2	0	0	3	1	0	0	0	0	0	0	0	0	2	0	1	2	16
	c. Place and/or time of immunization unknown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	d. Fear of side reactions	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0	0	1	0	7
	e. Wrong ideas about contraindications	0	1	0	0	0	0	0	0	0	0	0	0	1	2	0	0	1	0	1	0	0	0	0	0	1	0	0	1	0	8
	f. Other	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	3
SUBTOTAL		2	2	1	0	0	0	2	2	3	1	1	0	4	2	0	3	2	1	3	1	1	3	1	3	1	3	1	3	2	49
Lack of motivation	g. Postponed until another time	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	h. No faith in immunizations	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	7
	i. Rumours	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	4
	j. Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	SUBTOTAL	0	1	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	1	3	0	1	1	1	0	1	13

Cluster Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	TOTAL
k. Place of immunization too far to go		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
l. Time of immunization inconvenient		0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	4
m. Vaccinator absent		0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
n. Vaccine not available		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	3
o. Mother too busy		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
p. Family problem, including illness of mother		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
q. Child ill —not brought		0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
r. Child ill —brought but not given immunization		1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	5
s. Long waiting time		0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
t. Other		0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	5
SUBTOTAL		2	1	1	1	1	0	1	1	0	1	1	2	0	0	0	1	1	1	0	1	1	0	1	2	0	0	2	0	0	25
TOTAL		4	4	2	1	1	0	3	4	3	2	2	3	4	2	1	4	3	2	3	2	2	4	5	5	2	4	3	4	3	87

The summary form for Tetanus Toxoid Immunization of Women

- Item 5 Record the total number of mothers in the cluster.
 - Item 8 (a) Record the number of women with a specific dose of Td (or TT) in the last pregnancy.
 - Item 8 (b) Record the number of women with their cumulative number of doses.
 - Item 8 (c)(d) Record the total number of 'Yes' answers for immunization card available and received. (The 'No' answers for Item 8 are not transferred to the summary form).
 - Item 8 (f) Record source of Td (or TT)
 - Item 9 Record the total number of women with one ANC visit and those with two or more visits.
 - Item 10 Record the total number of women with one visit (other than ANC) to a health facility and those with two or more visits.
 - Item 11 Record the total number for each of the delivery locations and for each of the types of delivery assistance.
 - Item 12 Record the total number of 'Yes' answers for children aged 0–11 months who were protected against neonatal tetanus.

NOTE: The 'No' answers are not transferred to the summary form.
 - Item 13 Record the number of households visited.
- Complete the 'Total' column on the summary form by adding all the numbers in each row.



Learning activity 7.7

In this exercise you will practise transferring information from a cluster form to a summary form for *Tetanus Toxoid Immunization of Women*.

Transfer the information about Cluster 1 in Utaral from the cluster form to the summary form on the next page. Information about clusters 2–30 has already been transferred.

Table 7.11: Summary form for Tetanus Toxoid Immunization of Women

(1) Date of first interview: 7 March 2005										(2) Date of last interview: 22 March 2005										(3) Area : Coastal region										(4) Age group children whose mothers are evaluated: 0–11 months										Total
Cluster number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total									
(5) Number in cluster	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	210									
(5a) Td (or TT) last pregnancy	TT0	1	1	1	1	5	1	2	5	4	2	2	4	3	4	5	2	2	2	4	2	4	2	1	2	1	1	2	4	5	75									
	TT1	1	1	1	1	2	1	2	2	1	3	2	1	2	1	2	3	3	3	1	2	1	2	1	1	1	2	1	2	47										
	TT2	0	3	1	1	0	1	2	0	1	1	3	1	2	1	0	1	2	1	1	2	1	2	0	3	1	1	2	1	0	35									
	TT3	2	1	1	1	0	1	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	1	2	1	1	1	0	0	0	15									
	TT4	0	0	0	0	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	1	1	0	0	0	0	0	1	1	0	9									
	TT5 or >	3	1	3	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	22									
(5b) Td (or TT) cumulative doses	TT0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	2	1	1	1	1	1	1	1	1	1	1	1	26									
	TT1	6	7	6	6	6	6	6	6	6	6	6	6	6	6	7	7	7	5	6	6	6	6	6	6	6	6	6	6	6	177									
	TT2	6	5	5	5	5	5	5	5	4	6	6	6	6	6	5	5	6	4	4	4	5	5	4	4	4	4	4	5	5	143									
	TT3	3	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	71									
	TT4	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	1	1	13									
	TT5 or >	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3									
(8c) Card available	2	2	3	3	3	3	1	2	1	2	3	1	0	2	2	4	0	0	0	0	2	2	2	0	3	3	3	3	1	1	51									
(8d) Card ever received	2	3	4	4	3	1	1	3	4	3	2	3	1	3	4	0	2	2	4	4	4	4	2	2	5	4	3	3	2	2	80									
(8f) Source of Td (or TT) received in last pregnancy	OUT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
	HOS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
	HC	0	3	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	7									
	PRV	1	1	1	1	2	1	2	2	1	2	2	1	1	1	2	3	3	3	1	2	1	2	1	1	1	1	2	1	2	45									
	NGO	0	0	1	1	0	1	2	0	1	1	3	1	2	1	0	1	2	1	1	2	1	2	0	3	1	1	1	1	0	31									
	SIA	2	1	1	0	0	1	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	1	2	1	1	1	0	0	0	14									
	SCH	0	0	0	0	0	0	1	0	1	0	0	1	0	1	0	0	0	0	1	1	1	0	0	0	0	0	1	1	0	9									
	WCV	3	1	3	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	22									
OTH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0										

Cluster number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
(9) ANC			1	1	3	2	3	2	4	5	4	0	0	3	3	3	3	4	4	4	4	2	1	4	2	2	2	2	3	3	72
			3	3	2	2	2	0	0	1	1	2	2	4	2	2	2	2	2	2	3	4	1	1	3	5	5	4	4	4	70
(10) Other visits			3	3	1	1	2	1	2	4	1	2	1	3	4	1	4	1	0	1	0	0	0	4	3	5	2	6	5	4	66
			2	3	2	2	0	0	3	3	3	4	3	2	2	2	1	2	2	2	1	1	1	3	4	2	3	1	2	2	62
(11a) Delivery location			2	4	4	5	3	3	2	2	2	4	4	5	4	3	2	4	4	3	4	5	2	3	3	3	3	3	3	3	95
			4	3	3	2	4	4	4	4	3	3	2	3	4	4	3	3	4	4	3	2	5	4	4	4	4	4	4	4	102
			1	0	0	0	0	1	1	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
(11b) Delivery assistance			4	3	3	2	4	4	4	4	3	3	2	3	4	4	3	3	4	4	3	2	5	4	4	4	4	4	4	4	102
			2	4	4	5	3	3	2	2	3	4	5	4	3	2	4	4	3	3	4	5	2	3	3	3	3	3	3	3	96
			0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
			0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
(12) Protected at birth			2	5	4	4	4	4	4	4	3	4	2	6	2	2	4	3	5	5	3	3	5	4	3	3	4	4	5	3	108
(13) Households visited			41	50	39	41	32	45	39	55	51	35	35	47	46	44	50	32	45	34	32	45	36	39	37	41	43	44	38	37	1208

4. Analyse data

The purpose of collecting and analysing immunization coverage data is to evaluate the extent to which immunization coverage targets are being achieved. Is the target age group being reached? Why are mothers not bringing their children for immunization? Are women being immunized with TT? These are some of the questions that you may want to answer.

4.1 Evaluate infant immunization

Completion of the evaluation form for *Infant Immunization* coverage (Table 7.12) will help evaluate the extent to which the immunization target age group has been immunized. Follow the guidelines below to complete the evaluation form.

1. Complete the introductory data on the top of the evaluation form for *Infant Immunization* coverage.
2. Transfer the data from the 'Total' column on the summary form to the appropriate 'Number' columns on the coverage evaluation form.
3. Calculate the percentage coverage for each immunization and for BCG scars. This can be done by using the formula below.

$$\frac{\text{Number of children who received the immunization or had visible BCG scar}}{\text{Total number of children in the survey}} \times 100 = \text{Percentage coverage for immunization}$$

Example: 162 children have received DTP-HepB1 immunization. This is confirmed by card. There are a total of 215 children in the survey.

$$\frac{162}{215} \times 100 = 75\%$$

To get the percentage for the 'Source' of the immunization, first add up the total number of doses of each antigen given by card plus history. Then use the formula below.

$$\frac{\text{Number of immunizations from the source}}{\text{Total number of doses of the antigen given by card plus history}} \times 100 = \text{Percentage given by this source}$$

Example: The total number of doses of OPV0, OPV1, OPV2 and OPV3 given confirmed by card and history is 509. The source 'HC' was indicated 377 times.

$$\frac{377}{509} \times 100 = 74\%$$

4. Calculate the percentage for 'Fully', 'Partially' and 'Not Immunized', and for 'Fully immunized before age one' (Items 10 and 11) by using the formula below.

$$\frac{\text{Number of children with the immunization status}}{\text{Total number of children in the survey}} \times 100 = \text{Percentage with the immunization status}$$

5. Calculate the average number of households per cluster by dividing the total number of households by 30.



Learning activity 7.8

In this exercise you will practise completing an evaluation form for *Infant Immunization* and then analysing the data it contains. To do so, follow the instructions given below.

1. Fill in all blank lines on the evaluation form. Refer to the completed cluster summary form, and follow the guidelines on the previous two pages. The rest of the form has been completed for you.
2. Examine the completed evaluation form. How would you judge the immunization performance that you have evaluated?
 - a) Were a large percentage of infants 'fully immunized' at the time of the survey? Were a large percentage of infants 'fully immunized before age one'? Compare the numbers. What does this tell you about the immunization services?
 - b) Which antigen had the highest coverage?
 - c) Which source was used most frequently?
 - d) Was there a big difference between immunization coverage calculated 'by card' and coverage calculated 'by card plus history'?
 - e) Does the programme have a problem with drop-outs?
 - f) What are the implications of the answers to these questions for the future of these immunization services?

Table 7.12: Evaluation form for Infant Immunization

(1) Area:	Coastal Region	(2) Age group evaluated:	12–23 months	
(3) Date of first interview:	7 March 2004	(4) Date of last interview:	22 March 2004	
(5) Number in survey:	210			
	Total card		Total card plus history	
	Number	Percentage	Number	Percentage
(6) BCG	176	83.81	191	
BCG scar	177	84.29		
Source:HOS			103	53.93
HC			77	40.31
OUT			9	4.71
PRIV			2	1.05
NGO			0	0.00
SIA			0	0.00
(7) DTP- HepB1				
DTP-HepB2				
DTP-HepB3				
Source:HOS				
HC				
OUT				
PRIV				
NGO				
SIA				
(8) OPV0	176	83.81	191	90.95
OPV1	162	77.14	184	87.62
OPV2	153	72.86	174	82.86
OPV3	140	66.67	147	70.00
Source:HOS	51	24.29	51	7.33
HC	373	177.62	373	53.59
OUT	67	31.90	67	9.63
PRIV	14	6.67	14	2.01
NGO	0	0.00	0	0.00
SIA	191	90.95	191	27.44
(9) Measles[1]	130	61.90	139	66.19
Source:HOS	9	4.29	9	6.47
HC	92	43.81	92	66.19
OUT	38	18.10	38	27.34
PRIV	0	0.00	0	0.00
NGO	0	0.00	0	0.00
SIA	0	0.00	0	0.00
(10) Immunization status:				
Not immunized			14	6.67
Partially immunized			67	31.90
Fully immunized			129	61.43
(11) Fully immunized before one year of age	107	50.95		
(12) Total number of households	1025			
(13) Average number of households per cluster	34.17			

4.2 Evaluate the reasons for immunization failure

The *Infant Immunization* coverage data should be analysed with the data for *Reasons for Immunization Failure*. This information will enable you to take the action necessary to improve your immunization services. If your coverage figures are high, there will be very little information on reasons for immunization failure. If your coverage figures are low, the evaluation form for *Reasons for Immunization Failure* will provide useful information about why the mothers did not bring their children for immunization.

The guidelines for completing the evaluation form for *Reasons for Immunization Failure* (Table 7.13) are as follows.

1. Complete the introductory data on the top of the form.
2. Transfer the data from the 'Total' column on the summary form to the 'Total' column on the evaluation form.
3. Complete the 'Partially/Not Immunized' total line by adding the three subtotals on the evaluation form.
4. Calculate the percentage for each total, using the formula provided below.

(NOTE: The number of children not fully immunized is the sum of the number partially immunized plus the number not immunized).

$$\frac{\text{Number of children with a given reason for failure}}{\text{Total number of children not fully immunized}} \times 100 = \text{Percentage of children with this reason for failure}$$

Example: A total number of 88 children were not fully immunized. Out of these, 14 carers gave as the reason for not bringing the child for immunization, 'unaware of need for immunization'.

$$\frac{14}{88} \times 100 = 16\%$$



Learning activity 7.9

In this exercise you will practise completing an evaluation form for *Reasons for Immunization Failure* and then analysing the data it contains.

1. Complete the first three lines of the evaluation form.
2. Examine the completed evaluation form. How would you judge the reasons for immunization failure that you have evaluated?
 - a) What is the most common reason that children are not immunized?
 - b) Is the major problem lack of information, lack of motivation, or the presence of obstacles?
 - c) Are there actions that you and other health workers could take that would eliminate the reasons for immunization failure?

Table 7.13: Evaluation form for Reasons for Immunization Failure

(1) Area:	Coastal region	(2) Age group evaluated:	12–23 months
(3) Date of first interview:	7 March 2004	(4) Date of last interview:	22 March 2004
(5) Number in survey:	210		
	Total	Percentage	
(6) Partially or not immunized	87		
(7) Lack of information			
a. Unaware of need for immunization			
b. Unaware of need to return for 2nd or 3rd dose			
c. Place and/or time of immunization unknown			
d. Fear of side reactions	7		8.05
e. Wrong ideas about contraindications	8		9.20
f. Other	3		3.45
Subtotal	49		56.32
(8) Lack of motivation			
g. Postponed until another time	1		1.15
h. No faith in immunization	7		8.05
i. Rumours	4		4.60
j. Other	1		1.15
Subtotal	13		14.94
(9) Obstacles			
k. Place of immunization too far	0		0.00
l. Time of immunization inconvenient	4		4.60
m. Vaccinator absent	1		1.15
n. Vaccine not available	3		3.45
o. Mother too busy	2		2.30
p. Family problem, including illness of mother	1		1.15
q. Child ill – not brought	2		2.30
r. Child ill – brought but not given immunization	5		5.75
s. Long waiting time	2		2.30
t. Other	5		5.75
Subtotal	25		28.74

4.3 Evaluate TT immunization of women

For each of items 8–13, transfer from the last column (the 'Total' column) of the summary form on *Tetanus Toxoid Immunization of Women* the corresponding number into the 'Number' column on the evaluation form. Calculate the percentage by dividing by the total number of mothers surveyed (Item 5) and multiplying by 100.

However, for calculating the percentage from 'Source' use this formula.

$$\frac{\text{Number of TT immunizations given by this source}}{\text{Total number of doses of TT1, TT2, TT3, TT4, TT5 given in last pregnancy}} \times 100 = \text{Percentage of TT immunization given by the source}$$

TT2+ in the last pregnancy (Item 8) is calculated by adding all doses of TT2, TT3, TT4 and TT5 received during the last pregnancy, divided by the number of women in the survey with a child aged 0–11 months (Item 5). To obtain the percentage, multiply by 100.

For Item 14, divide the entry in Item 13 by the number of clusters surveyed.



Learning activity 7.10

In this exercise you will practise completing an evaluation form for *TT Immunization of Women* (Table 7.14) and then analysing the data it contains. To do so, follow these instructions.

1. Complete the last six lines of the evaluation form for *TT Immunization of Women* on the next page. Refer to the completed summary form and follow the guidelines. The rest of the form has been completed for you.
2. Examine the completed evaluation form. How would you judge the immunization performance that you have evaluated?
 - a) What percentage of children were protected against neonatal tetanus at birth?
 - b) If there is a high percentage of mothers receiving antenatal care, yet you have low TT coverage, what does this tell you about your immunization services?
 - c) Where was the most common place of delivery?
 - d) Did a large percentage of mothers receive at least two doses of TT?
 - e) Which immunization source was used most frequently?
 - f) What are the implications of the answers to these questions for the future of the immunization services?

Table 7.14 : Evaluation form for Tetanus Toxoid Immunization of Women

(1) Area :		Coastal region	(2) Age group of children whose mothers are to be evaluated :	0–11 months
(3) Date of first interview :		7 March 2005	(4) Date of last interview :	22 March 2005
(5) Number in survey :		210		
		Total card plus history		
		Number	Percentage	
(8a) Td (or TT) last pregnancy	TT0	77	36.67	
	TT1	49	23.33	
	TT2		TT2+	
	TT3			
	TT4			
	TT5 or more			
(8b) Td (or TT) cumulative doses	TT0	32	15.24	
	TT1	183	87.14	
	TT2	147	70.00	
	TT3	74	35.24	
	TT4	15	7.14	
	TT5 or more	4	1.90	
(8c) Card available		53		
(8d) Card ever received		82		
(8f) Source of last Td (or TT)	OUT	0	0	
	HOS	0	0	
	HC	7	14.29	
	PRV	47	95.92	
	NGO	33	67.35	
	SIA	14	28.57	
	SCH	10	20.41	
	WCV	22	44.90	
	OTH	0	0.00	
(9) ANC		73	34.76	
		73	34.76	
(10) Other visits		69	32.86	
		64	30.48	
(11a) Delivery location		97	46.19	
		106	50.48	
(11b) Delivery assistance		7	3.33	
		106	50.48	
		98	46.67	
		5	2.38	
		1	0.48	
(12) Protected at birth		111	52.86	
(13) Number of households visited		1243		
(14) Average number of households per cluster		41.43		

5. Take action

A coverage survey not only tells you whether your immunization coverage is high or low. It also tells you which components of the immunization services need to be improved. The next step is to decide how to improve the services, and to inform others of the survey results and any changes that are made.

- If immunization coverage in your health area was only 30%, you would try to determine the reasons.
- If you found that staff were not immunizing children and mothers at every possible opportunity, you could inform them that the new immunization policy is to immunize at every opportunity rather than only on immunization days, and monitor their performance to ensure that this was done.
- If you found that health-centre staff were not following the correct immunization schedule, you might retrain them.
- If very few children had immunization cards, you could obtain additional cards so that adequate supplies were available.
- If very few infants were protected from neonatal tetanus yet the measles coverage was quite high, you would know that mothers were not getting immunized with TT when they brought their children to the health centre. A solution to this problem would be to retrain your health workers about TT immunization of women, and to supervise this aspect of the immunization services more closely.

It is important to inform others of the survey results and any changes planned for the services. This includes health-centre workers, other providers in the area, and senior health officials. Feedback should be provided within one month, and is most effective if communicated by way of meetings or newsletters.

Essential features of an immunization coverage survey report

The report should communicate the information obtained from the survey rather than simply be a record of the activities undertaken during the survey. Tables, diagrams and other illustrations should be accompanied by commentary — pointing out levels and trends.

Body of the report

The body of the report should be brief, but concise, with the following chapters:

- an executive summary;
- survey objectives and terms of reference;
- background to the survey including its planning, methods and execution;
- results with analytical comments (elaborating the meaning and limitations of the results);
- recommendations.

Additional material

Copies of the data-collection forms should take the form of annexes to the report, together with the sampling frame/cluster list.

Report presentation

The report should be attractively prepared and presented to encourage readership.

REMEMBER THIS ABOUT THE EPI COVERAGE SURVEY



PLAN the survey.

- Select age group of children to be evaluated.
- Decide which sources of information to use.
- Determine how many interviewers are needed.
- Identify clusters.

CONDUCT the survey.

- Select the starting household.
- Select subsequent households.
- Complete the cluster forms.

TABULATE data.

ANALYSE data.

- Evaluate infant immunization.
- Evaluate the reasons for immunization failure.
- Evaluate the TT immunization of women.

TAKE action.

Annex A: How to use a random number table

Choosing a random number is an important step in a coverage survey because it is the only way to ensure that there is no unconscious bias in the selection of houses and individuals to be interviewed. There are several ways to select a random number,¹² but using a random number table is one common method. This Annex describes how to use a random number table. The following page contains an example of a random number table that you can use when conducting a survey.

- Step 1 Choose a direction (right, left, up or down) in which you will read the numbers from the table.
- Step 2 Select a starting point by using one of the following methods.
- a) Using a currency note, select a single-digit random number between 0 and 9 to identify a column. Select a two-digit random number between 1 and 25 to identify a row. (NOTE: The numbers 1–9 each count as two-digit numbers). The five-digit number in the table that is at the intersection of the column and row you have selected is the starting point.
 - b) Close your eyes, and touch the random number table with a pointed object. Open your eyes. The digit closest to the point where you touched the table is the starting point.
- Step 3 Read the number of digits required (determined by the sampling interval) in the direction chosen in Step 1. Because each individual digit in the table is random, the sequence(s) of digits can be used across spaces between the five-digit numbers. The number you end up with is your random number.

For example, let us say you decided to read numbers to the right, and by using method b) in Step 2 you identified your starting point as the number 7 in row 1, column 8 (see the random number table below). If your sampling interval had four digits, then your random number would be '7813'. The numbers 1 and 3 come from row 1, column 9.

NOTE: Remember that your random number must be equal to or smaller than your sampling interval. If it is not, then you must select another random number.

¹² The Immunization coverage cluster survey - Reference manual Annex M, pages 109–11 describes additional methods for selecting random numbers.

Table of Random Numbers

		Column									
		0	1	2	3	4	5	6	7	8	9
ROW	1	44689	54994	14911	62414	78085	18910	39772	00017	01178	13563
	2	56811	20730	65177	89748	84459	06043	72385	84402	14200	93511
	3	56412	15949	73584	59593	46841	18463	06845	07974	63016	30136
	4	04576	04739	79884	49252	06132	96840	41028	85689	51396	54599
	5	81564	50271	88625	89193	97979	96982	37730	83983	72478	08333
	6	38926	89980	54322	63699	18475	91018	13286	06243	71666	02529
	7	97132	51838	31847	30237	68016	41288	57395	51333	36202	89595
	8	55618	40873	60069	94816	02205	26176	97712	85777	36870	89633
	9	10287	07237	95759	44055	26247	48886	81309	15868	95587	41042
	10	19420	10916	03096	67942	94577	81085	54619	50538	07305	61411
	11	19131	29434	31739	94747	14453	40565	83631	87159	61073	69904
	12	54092	38575	58042	98087	04520	73553	38448	00982	07557	78757
	13	03268	12734	19706	86182	81681	03026	51892	85384	90730	01614
	14	49655	98461	04291	28133	33212	78497	87176	99490	64457	68355
	15	35948	59176	34140	34788	16403	28186	18121	04584	66607	99740
	16	59327	46487	63343	84466	14499	56617	25399	00394	57966	07036
	17	80425	01071	66643	49957	26089	24045	01807	41623	63599	10666
	18	87190	03835	32110	43505	40826	50931	03658	85049	56774	94075
	19	08610	63708	55971	31543	10283	37737	48744	43042	42796	01853
	20	25461	08322	26316	22349	84347	40611	49930	80833	19803	15878
	21	63672	72054	98586	94559	59237	31180	89565	61427	25626	47515
	22	12899	24245	36391	55611	01626	09836	33368	98272	21570	16498
	23	97374	28121	40007	75107	13590	51321	7990	83518	45569	98357
	24	23764	31267	88976	84872	53035	19542	79593	32987	08248	17390
	25	81881	24337	18893	66195	22709	79534	87746	26584	53251	03096

Annex B: Immunization coverage: results of an EPI coverage survey

September 2005

Abstract

Between 5 and 9 September 2005, the Ministry of Health, Ficticia, conducted an immunization coverage survey of children 12–23 months of age in Ficticia-A district. Immunization status was based on a review of immunization cards held in the child's place of residence and upon recollection of the child's primary care provider (usually the mother). The analysis presented is for immunizations received prior to the survey.

Coverage for vaccines and doses given early in life was high; BCG = 93.9% and the first dose of hepatitis B vaccine was 94.8%. Coverage of vaccines recommended at two months of age was much lower (DTP1 = 82.6%, OPV1 = 83.6%), and drop-out was fairly high with measles vaccine coverage (recommended at 9 months of age) at only 72.3%. Only 67.6% of children aged between 12 and 23 months of age were fully immunized by the time of survey.

Uptake for vaccines given at or soon after birth is high. Lower rates for immunizations requiring a revisit suggest that health workers are not adequately referring mothers for immunization services and that the immunization service needs to improve follow-up of children requiring vaccination.

Introduction:

In September 2005 the Ministry of Health in Ficticia conducted a survey to assess the levels of immunization coverage in Ficticia-A district. Planning and preparation of the survey began in June 2005 with the selection of the survey district, and identification of the survey coordinator and local field supervisor. Vaccination was confirmed by the child's immunization record held in the household and by questioning the child's primary care provider (usually the mother).

Immunization calendar Ficticia: 1995–present (September 2005)

	Birth	2 months	3 months	4 months	9 months
BCG	X				
Hepatitis B	X	X		X	
OPV	X	X	X	X	
DTP		X	X	X	
Measles					X

Fully immunized: BCG; HepB 1,2,3; OPV 0,1,2,3; DTP 1,2,3; Measles.

Children aged 12 to 23 months of age with dates of birth between 5 September 2003 and 9 September 2004 were considered eligible.

Evidence of immunization was based on either the child's immunization card held in the household, or upon the reported immunization history by the child's primary caretaker.

Clusters within Ficticia-A were selected proportionally to the population aged 12–23 months in 2001 in the 50 villages and three cities. The selected clusters were in 22 of the 50 villages, and the remaining eight clusters in the cities (four in city A, three in city B, and one in city C).

Using the village/city birth registers, a random date between 1 July 2002 and 30 June 2003 was used to identify the household in which the first birth following the random date occurred. This household served as the first or starting household within the cluster.

The upper age was chosen to ensure that no survey of eligible children would be included in the selection of starting households. The lower age of 30 June 2003 was chosen to allow for complete registration of births.

If the household did not exist, or was not available for assessment, the interviewers proceeded to the nearest household. The nearest household was defined as the one that could be reached in the shortest walking time.

If the household initially identified had an eligible child, the child's name, address, and date of birth was recorded. The caretaker was asked if they had the child's vaccination card, and if so, the card was reviewed for the date of immunizations administered and the date recorded on the infant immunization form. If the card was not available or the immunization record seemed incomplete, the interviewer questioned the caretaker on the child's immunization history and recorded the responses.

The survey team then proceeded to the next nearest household seeking an eligible child. This process continued until seven eligible children were identified in each cluster. Results are presented below.¹³

Immunization Coverage Survey: Ficticia-A

Data collected: 5–9 September 2005

Children: 12–23 months of age

Sample size: 210

Clusters: 30

Card & History by time of survey

Vaccine	% Coverage	95% Confidence interval (+/-)
BCG	93.9%	90.4% - 97.4%
HepB 1	94.8%	91.7% - 97.9%
HepB 2	82.2%	77.7% - 86.7%
HepB 3	76.1%	70.5% - 82.0%
OPV 0	77.5%	71.2% - 83.8%
OPV 1	83.6%	77.6% - 89.6%
OPV 2	80.8%	76.1% - 85.5%
OPV 3	77.9%	74.4% - 81.4%
DTP 1	82.6%	77.7% - 87.5%
DTP 2	80.3%	75.1% - 85.5%
DTP 3	77.9%	71.9% - 83.9%
Measles	72.3%	65.6% - 79.0%
Fully immunized	67.6	60.8% - 73.4%

¹³ Additional results from evaluations of infant immunization, reasons for immunization failure, and TT immunization coverage in women should be presented following the summary table.

Annex C : Immunization coverage survey forms

Infant Immunization

(1) Cluster number			(5) Name of the child							Total	
(2) Date			1	2	3	4	5	6	7	Card	Card plus history
(3) Area											
(4) Range of birthdates From Until											
Child number in the cluster			1	2	3	4	5	6	7		
(6) Birthdate											
(7) Sex (M,F)											
(8) Immunization card			Yes/No								
(9) BCG			Date/+0								
			Scar : Yes/No								
			Source								
(10)	DTP-HepB1	Date/+0									
		Source									
	DTP- HepB2	Date/+0									
		Source									
	DTP- HepB3	Date/+0									
		Source									
(11)	OPV 0	Date/+0									
		Source									
	OPV1	Date/+0									
		Source									
	OPV2	Date/+0									
		Source									
	OPV3	Date/+0									
		Source									
(12) Measles ¹⁴		Date/+0									
		Source									
(13) Immunization status		Not Imm.									
		Partially									
		Fully									
(14) Fully immunized before one year of age		Yes/No									

(15) Tally of households visited

(16) Name(s) of interviewer(s)

(17) Name of Field Supervisor

Signature : (Interviewers)

(Supervisor)

Date/+0:

Date = Copy date of immunization from card, if available
 + = Mother reports immunization was given
 0 = Immunization not given

Source

OUT = Outreach
 HOS = Hospital
 HC = Health Centre

PRV = Private
 NGO = Non Governmental Organization
 SIA= Supplemental Immunization Activity

¹⁴ In countries where MR or MMR are used, 'measles vaccine' should be substituted accordingly

Cluster Form : Reasons for Immunization Failure

(1) Cluster Number :										
(2) Date :										
(3) Area :										
(4) Range of birthdates : From : Until :										
NOTE : ASK ONLY ONE QUESTION : Why was the child not fully immunized ? Mark (x) the single most important reason according to your judgement.										
Child number in cluster		1	2	3	4	5	6	7	8	TOTAL
(5)	Sex (M/F)									
(6)	Immunization Status	Not immunized								
		Partially immunized								
		Fully immunized								
	Lack of information	a. Unaware of need for immunization								
		b. Unaware of need to return for 2 nd or 3 rd dose								
		c. Place and/or time of immunization unknown								
		d. Fear of side reactions								
		e. Wrong ideas about contraindications								
		f. Other								
	Lack of motivation	g. Postponed until another time								
		h. No faith in immunization								
		i. Rumours								
		j. Other								
(7)	Obstacles	k. Place of immunization too far								
		l. Time of immunization inconvenient								
		m. Vaccinator absent								
		n. Vaccine not available								
		o. Mother too busy								
		p. Family problem, including illness of mother								
		q. Child ill — not brought								
		r. Child ill — brought but not given immunization								
		s. Long waiting time								
t. other										
(8)	Tally of households visited									
(9)	Name of Interviewer									

Cluster Form : Tetanus Toxoid Immunization of Women

(1) Cluster number :		(5) Name Of Mother								Totals (to be completed by supervisor)	
(2) Date :											
(3) Area :											
(4) Range of birthdates : From : Until :											
Woman number in the cluster :			1	2	3	4	5	6	7		
(6) Birthdate of child :											
(7) Total number of lifetime pregnancies :											
(8) History of Td (or TT) immunization in last pregnancy	(a) Number of Td (or TT) doses received in last pregnancy ?									Dose LAST Pregnancy TT0 = TT1 = TT2 = TT3 = TT4 = TT5 or more =	Cumulative Doses TT0 = TT1 = TT2 = TT3 = TT4 = TT5 or more = 2
	(b) Number of Td (or TT) doses received prior to last pregnancy ?										
	(c) Card available showing Td (or TT) received in last pregnancy ? Y/N									Yes =	No =
	(d) Whether or not card is available, was a card ever received on which the Td (or TT) received in the last pregnancy was marked ? Y/N									Yes =	No =
	(e) If card is available, mark the date of the last Td (or TT) dose received in the last pregnancy.										
	(f) Where was the last Td (or TT) dose in the last pregnancy received ?									OUT = HC = NGO = SCH = OTH =	HOS = PRIV = SIA = WCV =
(9) Antenatal care*	Number of visits in last pregnancy									One visit = Two or more visits =	
(10) Other visits to health facility*	Number of visits in last pregnancy									One visit = Two or more visits =	
(11) Delivery of baby*	a) Where	Home								Home =	
		Hospital/HC								HC/Hospital =	
		Other								Other =	
	b) By whom	Health staff								Health staff =	
		TBA								TBA =	
		Other								Other =	
Nobody									Nobody =		
(12) Child protected against neonatal tetanus* (supervisor)	Yes (based on history)									Yes (History) =	

* Only indicate data related to 'last pregnancy', i.e. pregnancy that lead to a child now aged 0–11 months.

(13) Tally of households visited :

(14) Name of interviewer(s) :

(15) Name of Field Supervisor :

Signature(s) : _____ Signature(s) : _____

Summary Form : Infant Immunization

Cluster Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
(6) Number in cluster																															
(7) Card-Yes																															
(8) BCG Card																															
Card plus history																															
BCG Scar																															
Source : HOS																															
HC																															
OUT																															
PRIV																															
NGO																															
SIA																															
(9) DTP-HepB 1 Card																															
Card plus history																															
DTP-HepB 2 Card																															
Card plus history																															
DTP-HepB 3 Card																															
Card plus history																															
Source : HOS																															
HC																															
OUT																															
PRIV																															
NGO																															
SIA																															
(10) OPV 0 Card																															

Cluster Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
Card plus history																															
OPV 1 Card																															
Card plus history																															
OPV 2 card																															
Card plus history																															
OPV 3 card																															
Card plus history																															
Source : HOS																															
HC																															
OUT																															
PRIV																															
NGO																															
SIA																															
(11) Measles card																															
Card plus history																															
Source HOS																															
HC																															
OUT																															
PRIV																															
NGO																															
SIA																															
(12) Not immunized																															
Partially immunized																															
Fully immunized																															
(13) Fully immunized before age one year																															
(14) Households visited																															

Summary form for Reasons for Immunization Failure

- 1) Date of first interview :
- 2) Date of last interview :
- 3) Area :
- 4) Age group evaluated :

Cluster Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	TOTAL
Lack of information	a. Unaware of need for immunization																														
	b. Unaware of need to return for 2 nd or 3 rd dose																														
	c. Place and/or time of immunization unknown																														
	d. Fear of side reactions																														
	e. Wrong ideas about contraindications																														
	f. Other																														
SUBTOTAL																															
Lack of motivation	g. Postponed until another time																														
	h. No faith in immunizations																														
	i. Rumours																														
	j. Other																														
	SUBTOTAL																														

Cluster Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	TOTAL
k. Place of immunization too far to go																															
l. Time of immunization inconvenient																															
m. Vaccinator absent																															
n. Vaccine not available																															
o. Mother too busy																															
p. Family problem, including illness of mother																															
q. Child ill —not brought																															
r. Child ill —brought but not given immunization																															
s. Long waiting time																															
t. Other																															
SUBTOTAL																															
TOTAL																															

Summary form for Tetanus Toxoid Immunization of Women

(1) Date of first interview :		(2) Date of last interview :										(3) Area :										(4) Age group of children whose mothers are evaluated :										
Cluster number		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
(5) Number in cluster																																
	TT0																															
	TT1																															
	TT2																															
	TT3																															
(8a) Td (or TT) last pregnancy	TT4																															
	TT5 or >																															
	TT0																															
	TT1																															
	TT2																															
(8b) Td (or TT) cumulative doses	TT3																															
	TT4																															
	TT5 or >																															
	(8c) Card available																															
	(8d) Card ever received																															
(8f) Source of Td (or TT) received in last pregnancy	OUT																															
	HOS																															
	HC																															
	PRV																															
	NGO																															
	SIA																															
	SCH																															
	WCV																															
OTH																																

Cluster number		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
(9) ANC	1 visit																															
	2 or more visits																															
(10) Other visits	1 visit																															
	2 or more visits																															
(11a) Delivery location	Home																															
	Hospital / HC																															
	Other																															
(11b) Delivery assistance	Health staff																															
	TBA																															
	Other																															
	Nobody																															
(12) Protected at birth	By card + history																															
(13) Households visited																																

Evaluation form for Infant Immunization

(1) Area :		(2) Age group evaluated :	
(3) Date of first interview :		(4) Date of last interview :	
(5) Number in survey :			
	Total card		Total card plus history
	Number	Percentage	Number Percentage
(6) BCG			
BCG scar			
Source :HOS			
HC			
OUT			
PRIV			
NGO			
SIA			
(7) DTP- HepB1			
DTP- HepB2			
DTP- HepB3			
Source :HOS			
HC			
OUT			
PRIV			
NGO			
SIA			
(8) OPV0			
OPV1			
OPV2			
OPV3			
Source :HOS			
HC			
OUT			
PRIV			
NGO			
SIA			
(9) Measles ¹⁵			
Source :HOS			
HC			
OUT			
PRIV			
NGO			
SIA			
(10) Immunization status :			
Not immunized			
Partially immunized			
Fully immunized			
(11) Fully immunized before one year of age			
(12) Total number of households			
(13) Average number of households per cluster			

¹⁵ In countries where MR or MMR are used, 'measles vaccine' should be substituted accordingly.

Evaluation form for Reasons for Immunization Failure

(1) Area :		(2) Age group evaluated :	
(3) Date of first interview :		(4) Date of last interview :	
(5) Number in survey :			
	Total	Percentage	
(6) Partially or not immunized			
(7) Lack of information			
a. Unaware of need for immunization			
b. Unaware of need to return for 2nd or 3rd dose			
c. Place and/or time of immunization unknown			
d. Fear of side reactions			
e. Wrong ideas about contraindications			
f. Other			
Subtotal			
(8) Lack of motivation			
g. Postponed until another time			
h. No faith in immunization			
i. Rumours			
j. Other			
Subtotal			
(9) Obstacles			
k. Place of immunization too far			
l. Time of immunization inconvenient			
m. Vaccinator absent			
n. Vaccine not available			
o. Mother too busy			
p. Family problem, including illness of mother			
q. Child ill – not brought			
r. Child ill – brought but not given immunization			
s. Long waiting time			
t. Other			
Subtotal			

Evaluation form for Tetanus Toxoid Immunization of Women

(1) Area :		(2) Age group of children whose mothers are to be evaluated :	
(3) Date of first interview :		(4) Date of last interview :	
(5) Number in survey :			
		Total card plus history	
		Number	Percentage
(8a) Td (or TT) last pregnancy	TT0		TT2+
	TT1		
	TT2		
	TT3		
	TT4		
	TT5 or more		
(8b) Td (or TT) cumulative doses	TT0		
	TT1		
	TT2		
	TT3		
	TT4		
	TT5 or more		
(8c) Card available showing Td in last pregnancy			
(8d) Card ever received on which Td in last pregnancy was marked			
(8f) Source of last Td (or TT)	OUT		
	HOS		
	HC		
	PRV		
	NGO		
	SIA		
	SCH		
	WCV		
	OTH		
(9) ANC	1 visit		
	2 or more visits		
(10) Other visits	1 visit		
	2 or more visits		
(11a) Delivery location	Home		
	Hospital/HC		
	Other		
(11b) Delivery assistance	Health staff		
	TBA		
	Other		
	Nobody		
(12) Protected at birth			
(13) Number of households visited			
(14) Average number of households per cluster			

Annex D: Calculating confidence intervals

The EPI 30x7 cluster survey gives information on immunization coverage for a target population. From this population 30 clusters were selected, and within each cluster information on seven children or mothers meeting the eligibility criteria was collected.

Because the survey is only a sample of all the eligible children in the target population, the final coverage results should not be considered exact. If, however, the methods for selecting the clusters and households in each cluster are followed correctly, we can calculate the level of accuracy or range within which the true value lies. This range is called the 'confidence interval' and the degree of certainty we have that the true value lies within this range is called 'level of confidence'. (Please note that the confidence level or the degree of confidence we have in the results is different from the confidence interval or range within which the results lie).

The confidence interval is particularly important when comparing survey results, either from two different target populations or the same population at two different times. If the confidence intervals of the two surveys overlap we cannot say there is a difference between the coverage because the accuracy was not high enough to measure the true difference; the apparent difference occurs because we have taken a sample.

The confidence interval or level of accuracy depends on both the sample size and the coverage level. For a cluster sample it also depends on the differences in coverage between the clusters. The 30 clusters and the seven children or mothers in each cluster have been chosen because this sample size gives an accuracy within 10%. That is, for any level of coverage the true results will be within at least plus or minus 10% of the coverage results.

This level of accuracy is based on an assumption of a coverage level of 50% and a fairly high level of difference in coverage between clusters. (The difference between coverage is called the 'design effect').

If, however, the coverage is not 50%, or if the coverage between clusters is not very different, the level of accuracy will be higher. The method below, taken from *A simplified general method for cluster sample survey of health in developing countries* (Bennet et al, 1991)¹⁶, allows you to calculate the accuracy of the coverage results. *The Immunization coverage cluster survey - Reference manual*, Annex L, pp 106-108, provides a simpler method for calculating confidence intervals. As mentioned in that manual, the method described therein produces an approximation of the true confidence interval. If that formula is used it should be noted in the description of the results.

For more information on confidence intervals see Altman DG et al. *Statistics with Confidence*. 2nd ed. London: BMJ Books, 2000:45-56.

¹⁶ Bennet, S et al (1991). A simplified general method for cluster sample survey of health in developing countries. *World Health Statistics Quarterly*, Geneva, World Health Organization, 1991, 44: 98-106.

Calculating confidence intervals

C1	C2	C3	C4	C5	C6
Cluster number	Number of children in the cluster	Number of children in the cluster that were immunized	C2 * C3	C2 * C2	C3 * C3
1	7	4	28	49	16
2	6	5	30	36	25
3	7	4	28	49	16
4	7	5	35	49	25
5	7	5	35	49	25
6	7	5	35	49	25
7	7	7	49	49	49
8	6	4	24	36	16
9	7	6	42	49	36
10	7	7	49	49	49
11	7	6	42	49	36
12	7	6	42	49	36
13	7	5	35	49	25
14	7	4	28	49	16
15	7	5	35	49	25
16	7	4	28	49	16
17	7	5	35	49	25
18	7	4	28	49	16
19	7	4	28	49	16
20	7	5	35	49	25
21	7	4	28	49	16
22	7	5	35	49	25
23	7	4	28	49	16
24	7	4	28	49	16
25	7	7	49	49	49
26	7	6	42	49	36
27	7	6	42	49	36
28	7	4	28	49	16
29	7	6	42	49	36
30	7	6	42	49	36
Total	208	152	1055	1444	800
	C2t	C3t	C4t	C5t	C6t

Step	Description	Formula	Example	Results
1	Coverage (or proportion immunized)	C3t / C2t	152 / 208	0.731
2	Coverage squared	(Step 1 results) * (Step 1 results)	0.731 * 0.731	0.534
3	Number of clusters / Number of children	Number of clusters / C2t	30 / 208	0.1443
4	Sum (children immunized squared)	C6t	800	800
5	Coverage * sum (children * immunized) * 2	Step 1 results * C4t * 2	0.731 * 1055 * 2	1541.9
6	Coverage squared * sum (children * children)	Step 1 results * C5t	0.534 * 1444	771.1
7	Number of clusters * (Number of clusters - 1)	30 * (30-1)	30 * 29	870
8	(Step 4 results - Step 5 results + Step 6 results) / (Step 7 results)		(800 - 1541.9 + 771.1) / 870	0.0336
9	Square root of Step 8	Sqrt (0.0336)		0.18
10	Standard error	(Step 3 results) * (Step 9 results)	0.1443 * 0.18	0.026
11	95% confidence interval	Step 10 results * 2	0.026 * 2	0.052

Immunization coverage = 73.1% (+/-95% CI = 5.2%)
or
Immunization coverage = 73.1%, 95% CI (67.9% - 78.3%)

Annex E: Other types of survey

Surveys are frequently used in conjunction with administrative data; in other instances they constitute the sole source of data on immunization coverage levels. Estimates based on surveys have advantages and disadvantages. The principal advantages of surveys are that an estimate of immunization coverage can be obtained if the denominator is unknown, and that vaccinations given by the private sector can be included. The principle disadvantage is that they provide information on the previous birth year's cohort (making it difficult to use for timely programme intervention).

The principle types of survey are:

- Expanded Programme on Immunization (EPI) 30-cluster survey described in this manual;
- UNICEF Multiple Indicator Cluster Survey (MICS);
- Demographic and Health Survey (DHS);
- Lot Quality Survey.

The EPI 30-cluster survey is designed specifically for measuring immunization coverage (as well as reasons for not immunizing), is simple to administer, and easy to conduct. Such surveys are frequently conducted by EPI staff. Although the method specifies visiting households to find children, the EPI 30-cluster survey is not a true household survey. In most household cluster surveys, households to visit are selected randomly prior to visiting the field. If no one is at home, the household is revisited.

In the EPI 30-cluster survey only the first household in the cluster is selected at random. Subsequent households are chosen by selecting the 'nearest neighbour', until information has been collected on the number of children required. Countries are now using several variants to EPI cluster survey; a qualified statistician should work with the country team to ensure that variations to the standard method are valid.

The MICS and DHS are true household surveys and collect information on more than just immunization status. They follow a more rigorous design involving random selection of households and revisiting the household if no one is home. They are more expensive to run, are logistically more complex, and the questionnaire is more difficult to administer.

The Lot Quality Survey can also be used to measure coverage, but rather than providing a 'point' estimate of coverage, it provides information on whether or not a certain level of coverage has been achieved. This manual does not provide information on what the actual coverage is; simply 'above or below' the threshold. The principle advantage of a Lot Quality Survey is that it requires a smaller sample and can usually be conducted much more quickly.

The World Health Organization has provided technical support to its Member States in the field of vaccine-preventable diseases since 1975. The office carrying out this function at WHO headquarters is the Department of Immunization, Vaccines and Biologicals (IVB).

IVB's mission is the achievement of a world in which all people at risk are protected against vaccine-preventable diseases. The Department covers a range of activities including research and development, standard-setting, vaccine regulation and quality, vaccine supply and immunization financing, and immunization system strengthening.

These activities are carried out by three technical units: the Initiative for Vaccine Research; the Quality, Safety and Standards team; and the Expanded Programme on Immunization.

The Initiative for Vaccine Research guides, facilitates and provides a vision for worldwide vaccine and immunization technology research and development efforts. It focuses on current and emerging diseases of global public health importance, including pandemic influenza. Its main activities cover: i) research and development of key candidate vaccines; ii) implementation research to promote evidence-based decision-making on the early introduction of new vaccines; and iii) promotion of the development, evaluation and future availability of HIV, tuberculosis and malaria vaccines.

The Quality, Safety and Standards team focuses on supporting the use of vaccines, other biological products and immunization-related equipment that meet current international norms and standards of quality and safety. Activities cover: i) setting norms and standards and establishing reference preparation materials; ii) ensuring the use of quality vaccines and immunization equipment through prequalification activities and strengthening national regulatory authorities; and iii) monitoring, assessing and responding to immunization safety issues of global concern.

The Expanded Programme on Immunization focuses on maximizing access to high quality immunization services, accelerating disease control and linking to other health interventions that can be delivered during immunization contacts. Activities cover: i) immunization systems strengthening, including expansion of immunization services beyond the infant age group; ii) accelerated control of measles and maternal and neonatal tetanus; iii) introduction of new and underutilized vaccines; iv) vaccine supply and immunization financing; and v) disease surveillance and immunization coverage monitoring for tracking global progress.

The Director's Office directs the work of these units through oversight of immunization programme policy, planning, coordination and management. It also mobilizes resources and carries out communication, advocacy and media-related work.

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