

Users' guide on how to use and adapt an excel workbook for
conducting immunization coverage cluster survey,
based on a standard template.

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2. Abbreviations

BCG	Bacille-Calmette Guerin vaccine
DE	Design Effect
DTP	Diphtheria–Tetanus–Pertussis (vaccine)
HepB	Hepatitis B (vaccine)
Hib	<i>Haemophilus influenzae</i> type b (vaccine)
MCV	Measles - Containing Vaccine
OPV	Oral Polio Vaccine
PPS	Probability Proportional to Size (sampling)
PSUs	Primary Sampling Units
SIA	Supplemental Immunization Activity

3. Glossary

By Card

A dose is **by card** if its date is complete. This means that immunization dates are read from the immunization card.

By History

A dose is **by history** if the date of immunization on the immunization card is incomplete or absent, but history of immunization is reported by parents.

Confidence level

A level of confidence set in computing confidence limits. A level of 95% (or 0.95) is conventionally used but can be set higher or lower. A level of confidence of 95% implies that 19 out of 20 times the results from a survey using these methods will capture the true population value.

Confidence limits or Confidence Intervals

The upper and lower limits of the confidence interval in interval estimation. The interval itself is called the confidence interval or confidence range. Confidence limits are so called because they are determined in accordance with a specified or conventional level of confidence or probability that these limits will in fact include the population parameter being estimated. Thus, 95% confidence limits are values between which we are 95% confident that the population parameter being estimated will lie. Confidence limits are often derived from the standard error

Fully immunized child (FIC)

Usually, this is a child who has received doses of the “standard eight” antigens – BCG, DTP (3 doses), polio (3 doses), and measles vaccines. In countries at risk for yellow fever, this should be included. New vaccines (hepatitis B, and Hib) are not usually included in this definition; in some countries, BCG is excluded from this definition. The definition of FIC used in a survey should be specified and it may vary according to the national immunization policy

Fully immunized child (FIC) by 1 year of age

A child is considered as fully vaccinated by 1 year of age if s/he has received all recommended dose according to the national immunization policy by 1 year of age, and each administered dose was valid.

Minimum age and minimum interval

The minimum age and intervals are used to determine if a dose is valid (i.e. physiologically efficacious)

Valid doses:

Doses that were administered when the child had reached the minimum age for the vaccine, and were administered with the proper spacing between doses according to the national schedule.

4. Introduction

Immunization coverage is a crucial indicator of national immunization services and of the health system in general. In most countries, immunization coverage refers to the proportion of the target population that is immunized.

In addition to routine monitoring immunization coverage by the administrative method, an immunization coverage survey may be conducted to: (1) provide additional information about immunization coverage, (2) help verify the accuracy of the administrative coverage estimates, (3) assess the output and performance of the immunization system, and (4) identify areas of weak performance and/or high risk so that focused actions can be taken.

4.1 Immunization Coverage Survey

An immunization coverage survey involves a representative sample of individuals to determine their immunization status. It includes visiting homes and collecting information by either verbal history or immunization cards. The results can then be generalized to the entire population from where the sample was selected.

One of the survey methods, commonly used to assess immunization coverage, is the cluster sampling method based on probability proportional to population size.

The technical basis to use the method and field guide on how to implement the immunization coverage cluster survey is described in the WHO "Immunization Coverage Cluster Survey" manual.

5. The excel workbook

An immunization Coverage Cluster Survey implies a considerable amount of data to be computed in order to obtain reliable results.

The Excel workbook template was designed to electronically support and assist field investigators during an immunization coverage cluster survey, and it enables them to perform the following tasks:

- a. adapt the workbook to your survey, in terms of variables and analysis included in the survey
- b. perform data entry or accept (at certain conditions) imported databases
- c. analyse data
- d. estimate proportions with 95% Confidence Intervals of each surveyed variable
- e. put the results of the survey in graphics

6. Description of the excel workbook

In the excel workbook there are a total of 27 worksheets, grouped as follows (see in annex 1 for detailed information on each worksheet):

Worksheet 1-3:

They summarize the content of the workbook and provide general instructions on how to use the workbook. They also contain general information on the survey which have to be manually entered (i.e. overall parameters, National Immunization Schedule, etc). they are as follows:

- **Readme**
- **Overall parameters**
- **Immunization schedule**

Worksheet 4:

- **Raw data entry sheet**

It is the master data entry file. For further instruction on data entry options see paragraph 7 of this users' guide.

Worksheets 5-6: generic analysis worksheets

Data entry is not allowed, to prevent any mistakes in the formulas. Columns may be erased and added according to the survey (see "how to add a column/worksheet" later in this guide).

They are as follows:

- **No entry!!! Derived variables**
- **Cluster summary analysis**

Worksheet 7-27: specific analysis worksheets

Data entry is NOT expected in these worksheets, and calculation will be performed automatically. However, should you wish to do enter manually the data, in chapter 9 of this users' guide you find instructions on how to do data entry and information on denominators and numerators used for the calculations in each sheet.

Cells in each worksheet contain formulas to calculate the estimated proportion of the variable under study (with 95% Confidence Intervals, CI)

They are as follows:

- **% Immunization Cards**
- **BCG - any (by either history or card)**
- **BCG - card**
- **DTP1-any (by either history or card)**
- **DTP1 - card**
- **DTP3 - any (by either history or card)**
- **DTP3 - card**
- **Drop-out DTP1-DTP3**
- **MCV (routine) - any (by either history or card)**
- **MCV (routine) - card**
- **SIA (MCV) - any (by either history or card)**
- **SIA (MCV) - card**
- **Fully immunized - any (by either history or card)**
- **Fully immunized card**
- **Fully immunized - valid**
- **Fully immunized by 1 year of age**
- **Fully immunized by 1 year of age valid**
- **Fully immunized boys**
- **Ex place/time unknown**
- **Data set for the graph**
- **Ex of a graph**

7. Preliminary steps before using the excel workbook

Make a copy of the excel workbook by changing its name, as follows:

1. Open the excel workbook
2. On the **File** menu, click **Save As**.
3. In the **File name** box, type a new name for the workbook.
4. Click **Save**

By doing so, you have saved the original copy of the master worksheet in your PC, and can freely use the copy for the survey.

8. Adaptation of the excel workbook to the current survey

The excel workbook provided is a model and may be changed according to the objectives of the survey.

In the copy you have just created you may either remove or add worksheets and/or columns to adapt the workbook to your own needs:

8.1 To **remove** a worksheet from the copy of the template

8.1.1 **Open** the "RAW DATA ENTRY" sheet

8.1.2 **Delete columns that are not of your interest as follows:**

8.1.2.1 Select the column you want to delete

8.1.2.2 On the **Edit** menu, click **Delete**

8.2 Insert any possible column that may be of interest in the survey as follows:

8.2.1 **Open the "RAW DATA ENTRY" sheet**

8.2.2 **Insert a single column Click a cell in the column immediately to the right of** where you want to insert the new column. **For example**, to insert a new column to the left of **column B**, click a cell in **column B**, **left-click** on the top of the column, and click **Insert** in the **Edit** menu

8.2.3 **In the Insert menu, click Columns**

Important: if you add columns to the master file, make sure that formulas in the other worksheets are linked and correct, as they will influence the final results.



8.3 If you have **deleted** columns in the sheet, make sure that you have deleted also the linked analysis sheet.

Example: if in your survey, you are **NOT** interested in the MCV (SIA) immunization, then:

- a. **Open** the "RAW DATA ENTRY" sheet
- b. **Delete columns related to the MCV (SIA) data (i.e. AC, AD, AE, in the master file),** as explained above
- c. **Delete** worksheets related to the MCV (SIA) analysis (i.e. worksheet number 17, 18), as follows:

a) **Select** the sheets you want to delete, as follows:

When you enter or change data, the changes affect all selected sheets. These changes may replace data on the active sheet and other selected sheets.

To select	Do this
A single sheet	Click the sheet tab.  If you don't see the tab you want, click the tab scrolling buttons to display the tab, and then click the tab. 
Two or more adjacent sheets	Click the tab for the first sheet, and then hold down SHIFT and click the tab for the last sheet.
Two or more nonadjacent sheets	Click the tab for the first sheet, and then hold down CTRL and click the tabs for the other sheets.
All sheets in a workbook	Right-click a sheet tab, and then click Select All Sheets on the shortcut menu (shortcut menu: A menu that shows a list of commands relevant to a particular item. To display a shortcut menu, right-click an item or press SHIFT+F10.).

Note: If sheet tabs have been colour-coded, the sheet tab name will be underlined in a user-specified colour when selected. If the sheet tab is displayed with a background colour, the sheet has not been selected.

b) On the Edit menu, click Delete Sheet.

To modify then the graph accordingly, proceed as follows:

d. Open worksheet 26 and Delete rows related to the MCV (SIA) data (i.e. 15, 16)

- 8.4** On the worksheet "6. CLUSTER ANALYSIS SUMMARY", you must press the pink button after you imported your data¹.
- 8.5** In the generic analysis worksheet "No entry!!! Derived variables", you will have to look through the formulas and make sure that the definitions are what you want them to be. Pay special attention to valid and invalid doses and number of days put in the formulas.
- 8.6** Depending on the size of the database you import, you may have to copy the last row several times on these two sheets:
5.NO ENTRY!!! DERIVED VARIABLES
6. CLUSTER ANALYSIS SUMMARY

¹ Note that you must have ENABLED MACROS when you opened the file. If the macro is not enabled - often you can tell because the button will have small white dots showing at the corners - then go to Tools ->Macros -> Security and turn security to level MEDIUM. Then close all open excel files, and re-open them, enabling macros.

The workbook is geared towards assuming that you have (maximum) 2500 subjects, and no more than 250 clusters in total (and no more than 20 strata). If there are more, you will need to copy the last row in the relevant worksheets, and duplicated the correct number of times (using copy-paste, to ensure that formulas and not values are copied).

Make sure to check this before reading results in the specific analysis worksheets.

- 8.7** Then comes the adaptation of the specific analysis worksheets. If you want a weighted mean of different strata you have to add the weight in column A in front of each stratum. This has to be done in all the specific worksheets. Once you have imported the data you want to analyse, you should push the **green and blue button** at the top of the first specific worksheet "7. % IMMUNIZATIONCARDS".

9. Data entry

Once your worksheet has been adapted you may start the data entry. There are two possible options for doing data entry:

- a. enter manually the raw data in the "RAW DATA ENTRY" sheet
- b. enter manually the data using other software programs (i.e., Epi-Info, Epi Data, etc), and then export them to excel for analysis.

9.1. Data entry of the immunization coverage survey in the excel worksheet:

- 1- **Open** the "RAW DATA ENTRY " sheet in the excel workbook.
- 2- **Enter** you data manually
- 3- At the end of data entry you can see the results in the other excel sheets accordingly.

As you may see, in each cells of the "RAW DATA ENTRY" sheet the right up corner is red, and it contains a comment/suggestion of the Survey Guru to help you in the data entry. Put your cursor on the cell and the comment will be shown.

9.1.1. Data entry of dates

When you have to enter dates (i.e. date of birth, immunization dates) in the data base, **make sure the computer is set on the right date system.**

In the template excel workbook, dates are set to be entered as 10 digits entry: **dd/mm/yyyy**.

Follow the following steps to set the computer to this system:

- 1- On the Microsoft Windows Start menu, point to Settings
- 2- Click **Control Panel**
- 3- Double click the **Regional Settings** or **Regional Options** icon
- 4- In the **Short date format** list, click a format that uses four digits for the year ("yyyy")
- 5- Choose " / " as **Date separator**

NOTE: for further information on dates data entry, see the Microsoft excel help (F1).

9.1.2 Data entry, number of digits and legal values

As follows you find the list of original variable (in the yellow cells) in the "raw data entry" sheet:

- **ID**

Numeric

Identification number of the surveyed child. It is the number of the form/questionnaire used for the survey

- **State**

Numeric

Geographical location of the child. To be either modify or removed accordingly.

- **Township**

Numeric

Geographical location of the child. To be either modify or removed accordingly.

- **Rural Health Centre**

Numeric

Geographical location of the child. To be either modify or removed accordingly.

- **Village**

Numeric

Geographical location of the child. To be either modify or removed accordingly.

- **Cluster number**

Numeric. The range will depend on the number of cluster in your survey (see the "Immunization Coverage Cluster Survey" manual for more details.

Cluster number of the surveyed child. To be either modify or removed accordingly.

- **Child number**

Numeric. The range will depend on the number of children in each cluster (see the "Immunization Coverage Cluster Survey" manual for more details.

Child number within his/her cluster

- **Date of birth of the child**

10 digits

Date format : dd/mm/yyyy

Important: read instructions on how to set your system dates on the users' guide (see chapter 9.1.1.)!!!

- **Sex (gender of the child)**

1 digit, numeric field

Legal value 1 = Male

2 = Female

- **IMMUNIZATION Card**

1 digit, numeric field

Legal value 1 = Yes (child with immunization card)

2 = No (child with no immunization card)

- **SIA (MCV) Supplementary Immunization Activity (SIA) for MCV**

1 = Yes

2 = No

- **Date (in the immunization card)**

1 digit, numeric field

Legal value : 1 = Yes (child immunized and with immunization card)
2 = Yes (child with history of immunization only)
3 = No (child not immunized)

Important: read instructions on how to set your system dates on the users' guide (see chapter 9.1.1.)!!!

- **VIT A**

1 digit, numeric field

Legal value : 1 (Yes)
2 (No)
3 do not know

- **BCG: immunization status**

1 digit, numeric field

Legal value : 1 = Yes (child immunized and with immunization card)
2 = Yes (child with history of immunization only)
3 = No (child not immunized)

- **BCG Date (date of the BCG immunization written in the card)**

10 digits date field

Date format : dd/mm/yyyy

Important: read instructions on how to set your system dates on the users' guide (see chapter 9.1.1.)!!!

- **OPV1 immunization status**

1 digit, numeric field

Legal value : 1 = Yes (child immunized and with immunization card)
2 = Yes (child with history of immunization only)
3 = No (child NOT immunized)

- **OPV1 Date (date of the OPV1 immunization written in the card)**

10 digits date field

Date format : dd/mm/yyyy

Important: read instructions on how to set your system dates on the users' guide (see chapter 9.1.1.)!!!

- **DTP1 immunization status**

1 digit, numeric field

Legal value : 1 = Yes (child immunized and with immunization card)
2 = Yes (child with history of immunization only)
3 = No (child NOT immunized)

- **DTP1 Date (date of the DTP1 immunization written in the card)**

10 digits date field

Date format : dd/mm/yyyy

Important: read instructions on how to set your system dates on the users' guide (see chapter 9.1.1.)!!!

- **MCV immunization status**

1 digit, numeric field

Legal value : 1 = Yes (child immunized and with immunization card)
2 = Yes (child with history of immunization only)
3 = No (child NOT immunized)

- **MCV Date (date of the MCV vaccination written on the card)**

10 digits date field
Date format : dd/mm/yyyy

Important: read instructions on how to set your system dates on the users' guide (see chapter 9.1.1.)!!!

- **OPV2 Immunization status**

1 digit, numeric field
Legal value : 1 = Yes (child immunized and with immunization card)
2 = Yes (child with history of immunization only)
3 = No (child NOT immunized)

- **OPV2 Date (date of the OPV2 vaccination written on the card)**

10 digits date field
Date format : dd/mm/yyyy

Important: read instructions on how to set your system dates on the users' guide (see chapter 9.1.1.)!!!

- **DTP2 immunization status**

1 digit, numeric field
Legal value : 1 = Yes (child immunized and with immunization card)
2 = Yes (child with history of immunization only)
3 = No (child NOT immunized)

- **DTP2 Date (date of the DTP2 vaccination written on the card)**

10 digits date field
Date format : dd/mm/yyyy

Important: read instructions on how to set your system dates on the users' guide (see chapter 9.1.1.)!!!

- **OPV3 immunization status**

1 digit, numeric field
Legal value : 1 = Yes (child immunized and with immunization card)
2 = Yes (child with history of immunization only)
3 = No (child NOT immunized)

- **OPV3 Date (date of the OPV3 vaccination written on the card)**

10 digits date field
Date format : dd/mm/yyyy

Important: read instructions on how to set your system dates on the users' guide (see chapter 9.1.1.)!!!

- **DTP3 immunization status**

1 digit, numeric field
Legal value : 1 = Yes (child immunized and with immunization card)
2 = Yes (child with history of immunization only)
3 = No (child NOT immunized)

- **DTP3 Date (date of the DTP3 vaccination written on the card)**

10 digits date field

Date format : dd/mm/yyyy

Important: read instructions on how to set your system dates on the users' guide (see chapter 9.1.1.)!!!

- **SIA (MCV) immunization status**

1 digit, numeric field

Legal value : 1 = Yes (child immunized and with immunization card)

2 = Yes (child with history of immunization only)

3 = No (child NOT immunized)

- **SIA (MCV) Date (date of the SIA, written on the SIA card)**

10 digits date field

Date format : dd/mm/yyyy

Important: read instructions on how to set your system dates on the users' guide (see chapter 9.1.1.)!!!

- **Adverse Events Following Immunization (AEFI) (high fever)**

1 digit, numeric field

Legal value : 1 = Yes

0 = No

- **Adverse Events Following Immunization (AEFI) (vomiting)**

1 digit, numeric field

Legal value : 1 = Yes

0 = No

- **Adverse Events Following Immunization (AEFI) (abscess)**

1 digit, numeric field

Legal value : 1 = Yes

0 = No

- **Adverse Events Following Immunization (AEFI) (severe pain)**

1 digit, numeric field

Legal value : 1 = Yes

0 = No

- **Adverse Events Following Immunization (AEFI) (rash)**

1 digit, numeric field

Legal value : 1 = Yes

0 = No

- **Adverse Events Following Immunization (AEFI) (not immunized)**

1 digit, numeric field

Legal value : 1 = Yes

0 = No

- **Adverse Event Following Immunization (AEFI) and reporting**

1 digit, numeric field

Legal value : 1 = No adverse event

2 = Yes adverse event reported

3 = Yes adverse event BUT NOT reported

4 = Unknown

- **Reasons for Failure to Immunize Y/N**

1 digit, numeric field

Legal value : 1 = No

2 = Yes

- **Reasons for Failure to Immunize (type)**

1 digit, numeric field

Legal value : 1 = unaware of need for immunization

2 = unaware to return for 2nd and 3rd dose

3 = place/time of immunization unknown

4 = fear for side reactions

5 = wrong ideas about contraindications

6 = postponed

7 = no trust in immunization

8 = rumours

9 = place of immunization too far

10 = time of immunization inconvenient

11 = vaccinator absent

12 = vaccine not available

13 = mother too busy

14 = family problems

15 = child ill, not brought

16 = child ill not immunized

17 = child ill

18 = long waiting time

19 = on trip obstacles

20 = did not know the date of the campaign

21 = not free at the time

22 = religious reasons

23 = lack of information (general)

24 = forgot the child's age

9.2 Data entry using a different software

When you enter data entry using other software programs (i.e., Epi-Info, Epi Data, etc), there are few conditions that need to be respected:

9.2.1 Organize the data entry mask making sure that variables have the same name and the length, and they are put in the same sequence as in the master file ("RAW DATA ENTRY" sheet).

9.2.2 Dates have the same format as in the master file (for more info on dates setting see paragraph 9.1 of this users' guide)

9.2.3 At the end of the data entry, data should be stored in DBASE format and export to excel. As follows you find two possible examples:

9.2.3.1 How to export the database if data entry was performed with **Epi-Info 6**.

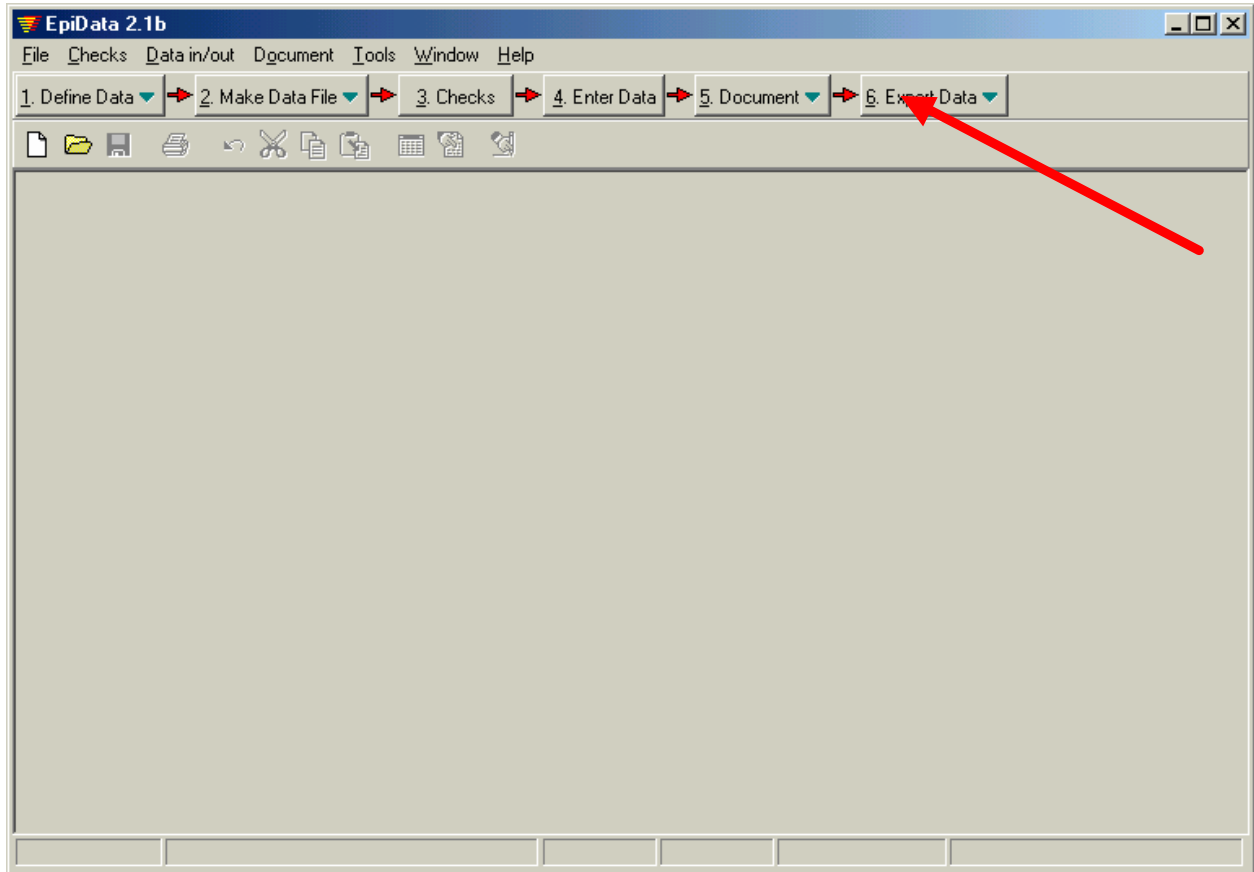
Proceed as follows:

- a. On the **Programs** menu click **Export files**
- b. Input file name and click on dBASE4
- c. Write an Output file name

- d. Click on OK

9.2.3.2 How to export the database if data entry was performed with Epi Data 2.1 b

- a. Click on the icon Export Data of the main Epi Data mask, as shown in the picture:



- b. Click on **Excel** in the **Edit** menu.

The software will ask you whether you want to export all your variables or select a sub-setting of variables you want to export. Select the option accordingly.

- c. Save the newly created excel file.

Regardless the software you worked on for the data entry, you have now an excel file with the survey data in it.

The database has been successfully exported, and it can be now opened with the Excel worksheet for analysis, as follows:

- a. Open Microsoft excel
- b. On the File menu click Open
- c. Select your file
- d. Click on Open

You have now to copy your set of data in the copy of the excel master file that you have created previously. Proceed as follows:

- a. Select the whole sheet (**Left-click** on the right top corner of the excel sheet)

- b. **Right-click** on the sheet and click on **Copy** on the **Edit** menu
- c. Open the "RAW DATA ENTRY" sheet of the excel workbook copy
- d. **Right-click** on the sheet and click on **Paste Special** on the **Edit** menu
- e. Click on **Values** in the **Edit** menu

Data have been successfully copied on the excel "RAW DATA ENTRY" worksheet and analysis is automatically performed.

Remember: On the worksheet "6. CLUSTER ANALYSIS SUMMARY", you must press the pink button after you imported your data, and the green and blue button at the top of the first specific worksheet called "7. % IMMUNIZATION CARDS".

Important: if you are working in a French environment, remember that the Epi-Info 6 data entry mask will NOT show accented vowels properly. You may wish to use another software instead for the data entry (i.e. Epi Data, excel). This is particularly important if data entry is performed by clerical support not necessarily familiar with the questionnaire survey and the survey objectives.

10. Data analysis

Once data have been copied in the Excel workbook data analysis is performed automatically by excel according to the formulas already present in the excel workbook template.

However, you may wish to do the data entry manually in these sheets, and as follows you find information on numerators and denominators on the calculations in **worksheet 7-27**.

Cells in each worksheet contain formulas to calculate the estimated proportion of the variable under study (with 95% Confidence Intervals, CI)

Detailed instructions on the computations are as follows:

7 % Immunization Cards

It calculates the estimated proportion (with 95% CI) of children with immunization card.

Numerator (E19:E138): number of children with routine immunization card

Denominator (D19:D138): number of children sampled in the cluster

8 BCG - any (by either history or card)

It calculates the estimated proportion (with 95% CI) of children with BCG immunization by either history or card.

Numerator (E19:E138): number of children with BCG immunization by either history or card

Denominator (D19:D138): number of children sampled in the cluster

9 BCG - card

It calculates the estimated proportion (with 95% CI) of children with BCG immunization card

Numerator (E19:E138): number of children with BCG immunization by card

Denominator (D19:D138): number of children sampled in the cluster

10 DTP1 - any (by either history or card)

It calculates the estimated proportion (with 95% CI) of children with DTP1 immunization by either history or card.

Numerator (E19:E138): number of children with DTP1 immunization by either history or card

Denominator (D19:D138): number of children sampled in the cluster

11 DTP1 - card

It calculates the estimated proportion (with 95% CI) of children with DTP1 immunization by card.

Numerator (E19:E138): number of children with DTP1 immunization by card

Denominator (D19:D138): number of children sampled in the cluster

12 DTP3 - any (by either history or card)

It calculates the estimated proportion (with 95% CI) of children with DTP3 immunization by either history or card.

Numerator (E19:E138): number of children with DTP3 immunization by either history or card

Denominator (E19:E138): number of children sampled in the cluster

13 DTP3 - card

It calculates the estimated proportion (with 95% CI) of children with DTP3 immunization by card.

Numerator (E19:E138): number of children with DTP3 immunization by card

Denominator (D19:D138): number of children sampled in the cluster

14 Drop-out DTP1-DTP3

It calculates the estimated proportion (with 95% CI) of those children who received DTP1 but NOT any DTP3.

Numerator (E19:E138): number of children who received DTP1 **BUT NOT** DTP3 by either history or card

Denominator (D19:D138): number of children who received DTP1

15 MCV (routine) - any (by either history or card)

It calculates the estimated proportion (with 95% CI) of children with MCV (routine) immunization by either history or card.

Numerator (E19:E138): number of children with MCV (routine) immunization by either history or card

Denominator (D19:D138): number of children sampled in the cluster

16 MCV (routine) - card

It calculates the estimated proportion (with 95% CI) of children with MCV (routine) immunization by card.

Numerator (E19:E138): number of children with MCV (routine) immunization by card

Denominator (D19:D138): number of children sampled in the cluster

17 SIA (MCV) - any (by either history or card)

It calculates the estimated proportion (with 95% CI) of children with a SIA (MCV) immunization by either history or card.

Numerator (E19:E138): number of children with SIA (MCV) immunization by either history or card

Denominator (D19:D138): number of children sampled in the cluster

18 SIA (MCV) - card

It calculates the estimated proportion (with 95% CI) of children with MCV (SIA) immunization by card.

Numerator (E19:E138): number of children sampled in the cluster

Denominator (D19:D138): number of children with SIA (MCV) immunization by card

19 Fully immunized - any (by either history or card)

It calculates the estimated proportion (with 95% CI) of children fully immunized by either history or card per each immunization included in the definition (see the glossary in this users' guide).

Numerator (E19:E138): number of children fully immunized by either history or card

Denominator (D19:D138): number of children sampled in the cluster

20 Fully immunized card

It calculates the estimated proportion (with 95% CI) of children fully immunized by card for each immunization included in the definition (see the glossary in this users' guide).

Numerator (E19:E138): number of children fully immunized by card

Denominator (D19:D138): number of children sampled in the cluster

21 Fully immunized - valid

It calculates the estimated proportion (with 95% CI) of fully immunized children with valid doses per each immunization included in the definition (see the glossary in this users' guide).

Numerator (E19:E138): number of children fully immunized by card with valid doses

Denominator (D19:D138): number of children with immunization card sampled in the cluster

22 Fully immunized by 1 year of age

It calculates the estimated proportion (with 95% CI) of children who were fully immunized by the 1 year of age (see the glossary in this users' guide).

Numerator (E19:E138): number of children fully immunized by 1 year of age

Denominator (D19:D138): number of children with immunization card among those sampled in the cluster

23 Fully immunized by 1 year of age valid

It calculates the estimated proportion (with 95% CI) of children who were immunized with valid doses by their 1 year of age.

Numerator (E19:E138): number of children fully immunized by 1 year of age with valid doses

Denominator (D19:D138): number of children with immunization card among those sampled in the cluster

24 Fully immunized boys

It calculates the estimated proportion (with 95% CI) of boys fully immunized according to the definition (see the glossary in this users' guide).

Numerator (E19:E138): number of fully immunized boys
Denominator (D19:D138): number of children with immunization card among those sampled in the cluster

25 Ex place/time unknown

Example of reason for failure to immunize: calculation of the estimated proportion (with 95% CI) of "place/time unknown".

Numerator (E19:E138): number of respondents who did not know place/time of immunization

Denominator (D19:D138): number of respondents for failure to immunize

26 Data set for the graph

It is an example of how to group, and arrange data for graphic representation of the estimated proportions with 95% CI.

27 Ex of a graph

It contains an example of a graph created from the data in the previous worksheet.

Annex 1 List of worksheet contained in the excel workbook

Worksheet number	Name	Role
1	README	summarizes the content of the workbook, and gives indication on how to use it.
2	OVERALL PARAMETERS	is supposed to contain the general parameters of the survey. Data entry is expected.
3	IMMUNIZATION SCHEDULE	contains an example of National Immunization Schedule of the country as a reference. Data entry is expected.
4	RAW DATA ENTRY SHEET	It is the master file. In this sheet data entry of the raw data is expected. Data entry is not allowed, to prevent any mistakes in the formulas. Columns may be erased and added according to the survey (see "how to add a column/worksheet" later in this guide)
5	NO ENTRY!!! DERIVED VARIABLES	It contains a number of derived variables generated by excel according to the formulas in the various cells. Cells are locked, to prevent involuntary mistakes. No data entry is expected. For further details on the calculations see annex 3
6	CLUSTER SUMMARY ANALYSIS	It contains the same variables as in the previous worksheet, and it performs the same calculation as in the previous worksheet but computed by cluster. No data entry is expected.
7	% Immunization Cards	It calculates the estimated proportion (with 95% CI) of children with immunization card.
8	BCG - any (by either history or card)	It calculates the estimated proportion (with 95% CI) of children with BCG immunization by either history or card.
9	BCG – card	It calculates the estimated proportion (with 95% CI) of children with BCG immunization card
10	DTP1-any (by either history or card)	It calculates the estimated proportion (with 95% CI) of children with DTP1 immunization by either history or card.
11	DTP1 – card	It calculates the estimated proportion (with 95% CI) of children with DTP1 immunization by card.
12	DTP3 - any (by either history or card)	It calculates the estimated proportion (with 95% CI) of children with DTP3 immunization by either history or card.
13	DTP3 – card	It calculates the estimated proportion (with 95% CI) of children with DTP3 immunization by card.
14	Drop-out DTP1-DTP3	It calculates the estimated proportion (with 95% CI) of those children who received DTP1 but NOT any DTP3.
15	MCV (routine) - any (by either history or card)	It calculates the estimated proportion (with 95% CI) of children with MCV (routine) immunization by either history or card

16	MCV (routine) - card	It calculates the estimated proportion (with 95% CI) of children with MCV (routine) immunization by card.
17	SIA (MCV) - any (by either history or card)	It calculates the estimated proportion (with 95% CI) of children with a SIA (MCV) immunization by either history or card.
18	SIA (MCV) – card	It calculates the estimated proportion (with 95% CI) of children with MCV (SIA) immunization by card.
19	Fully immunized - any (by either history or card)	It calculates the estimated proportion (with 95% CI) of children fully immunized by either history or card per each immunization included in the definition (see the glossary in this users' guide)
20	Fully immunized card	It calculates the estimated proportion (with 95% CI) of children fully immunized by card for each immunization included in the definition (see the glossary in this users' guide)
21	Fully immunized - valid	It calculates the estimated proportion (with 95% CI) of fully immunized children with valid doses per each immunization included in the definition (see the glossary in this users' guide)
22	Fully immunized by 1 year of age	It calculates the estimated proportion (with 95% CI) of children who were fully immunized by the 1 year of age (see the glossary in this users' guide)
23	Fully immunized by 1 year of age valid	It calculates the estimated proportion (with 95% CI) of children who were immunized with valid doses by their 1 year of age.
24	Fully immunized boys	It calculates the estimated proportion (with 95% CI) of boys fully immunized according to the definition (see the glossary in this users' guide)
25	Ex place/time unknown	Example of reason for failure to immunize: calculation of the estimated proportion (with 95% CI) of "place/time unknown"
26	Data set for the graph	It is an example of how to group, and arrange data for graphic representation of the estimated proportions with 95% CI.
27	Ex of a graph	It contains an example of a graph created from the data in the previous worksheet.

Annex 2 List of original variables

The following original variables (pale blue) may be entered manually either in the "RAW DATA ENTRY" sheet, or in another software (see chapter 7 "Data entry" of this users' guide)

- ID
- State
- Township
- Rural Health Centre
- Village
- Cluster number
- Child number
- Date of birth of the child
- Sex (gender of the child)
- IMMUNIZATION Card
- SIA (MCV) Supplementary Immunization Activity (SIA) for MCV
- Date (in the immunization card)
- VIT A
- BCG: immunization status
- BCG Date (date of the BCG immunization written in the card)
- OPV1 immunization status
- OPV1 Date (date of the OPV1 immunization written in the card)
- DTP1 immunization status
- DTP1 Date (date of the DTP1 immunization written in the card)
- MCV immunization status
- MCV Date (date of the MCV vaccination written on the card)
- OPV2 Immunization status
- OPV2 Date (date of the OPV2 vaccination written on the card)
- DTP2 immunization status
- DTP2 Date (date of the DTP2 vaccination written on the card)
- OPV3 immunization status
- OPV3 Date (date of the OPV3 vaccination written on the card)
- DTP3 immunization status
- DTP3 Date (date of the DTP3 vaccination written on the card)
- SIA (MCV) immunization status
- SIA (MCV) Date (date of the SIA, written on the SIA card)
- Adverse Events Following Immunization (AEFI) (high fever)
- Adverse Events Following Immunization (AEFI) (vomiting)
- Adverse Events Following Immunization (AEFI) (abscess)
- Adverse Events Following Immunization (AEFI) (severe pain)
- Adverse Events Following Immunization (AEFI) (rash)
- Adverse Events Following Immunization (AEFI) (not immunized)
- Adverse Event Following Immunization (AEFI) and reporting
- Reasons for Failure to Immunize Y/N
- Reasons for Failure to Immunize (type)

Annexe 3 List of derived variables

The following derived variables (yellow cells) are calculated by excel on the basis of the original variables, and they do not need therefore to be entered and will be automatically generated during data entry. For specific details on each variable see the comment in each cell of the worksheet

Order	Fieldname	Definition
1	State_Cluster	combination between geographical location of the child and the cluster number
2	Year	extracted from the date of birth
3	Identified as card holder	identifies those children who had an immunization card
4	Card holder reviewed	identifies those children having cards with any dates on it
5	SIA Card holder	identifies those children who had an immunization card for SIA immunization.
6	Vitamin A	assumption of Vit A
7	Days BCG	it calculates the number of days since the birth when BCG immunization was administered. It is used for the validation of the dose according to the current National Immunization Schedule of the country.
8	BCG any	if BCG immunization by either history or card was reported.
9	BCG No	if No BCG immunization was reported.
10	BCG by card	if BCG immunization by card was reported
11	BCG by history	if BCG immunization by history was reported.
12	BCG boys	it identifies the boys among those children with BCG immunization
13	OPV1 any	if OPV1 immunization by either history or card was reported.
14	OPV1 No	if No OPV1 immunization was reported.
15	OPV1 by card	If OPV1 immunization by card was reported
16	OPV1 by history	if OPV1 immunization by history was reported.
17	OPV1 boys	it identifies boys among those children with OPV1 immunization.
18	DTP1 days since birth	it calculates the number of days since the birth when DTP1 immunization was administered. It is used for the validation of the dose according to the current National Immunization Schedule of the country..
19	DTP1 valid	it identifies valid doses of DTP1(the dose in considered as valid if administered after 42 days of age)

20	DTP1 invalid (only those vaccinated)	it identifies invalid doses of DTP1 among immunized children
22	DTP1 any	if DTP1 immunization by either history or card was reported.
23	DTP1 No	if NO DTP1 immunization was reported.
24	DTP1 by card	if DTP1 immunization by card was reported
25	DTP1 by history	if DTP1 immunization by history was reported.
26	DTP1 boys	it identifies boys among those children with DTP1 immunization.
27	MCV any	if MCV immunization by either history or card was reported.
28	MCV No	if NO MCV immunization was reported.
29	MCV by card	if MCV immunization by card was reported.
30	MCV by history	if MCV immunization by history was reported.
31	MCV boys	it identifies boys among those children with MCV immunization.
32	MCV days since birth (card only)	it calculates the number of days since the birth when MCV immunization was administered. It is used for the validation of the dose according to the current National Immunization Schedule of the country.
33	MCV valid (card only)	it identifies valid doses of MCV, according to the immunization date in the immunization card. Valid dose means a dose of MCV administered after 240 days of age
34	MCV invalid (only those vaccinated)	it identifies invalid doses among those children received MCV immunization
35	OPV2 any	if OPV2 immunization by either history or card was reported.
36	OPV2 card	if OPV2 immunization by card was reported
37	DTP2 any	if DTP2 immunization by either history or card was reported.
38	DTP2 card	if DTP2 by card was reported
39	OPV3 any	if OPV3 immunization by either history or card was reported
40	OPV3 No	if NO OPV3 immunization was reported.
41	OPV3 by card	if OPV3 immunization by card was reported
42	OPV3 by history	if OPV3 immunization by history was reported.

43	OPV3 boys	it identifies boys among those children who received OPV3 immunization.
44	Days DTP1-DTP3	it calculates the number of days between DTP1 and DTP3 immunization according to immunization dates written on the immunization card
45	DTP days since birth	it calculates the age of the child when the DTP3 immunization was administered
46	DTP3 valid	it defines as valid a dose of DTP3 according to the age when it was administered. Valid is a dose which was administered after 56 days of age.
47	DTP3 invalid	it defines as invalid a dose of DTP3 according to the age when it was administered. Invalid is a dose which was administered before 56 days of age.
48	DTP3 any	if DTP3 immunization by either history or card was reported.
49	DTP3 No	if NO DTP3 immunization was reported.
50	DTP3 by card	if DTP3 immunization by card was reported
51	DTP3 by history	if DTP3 immunization by history was reported.
52	DTP3 boys	it identifies boys among those children who received DTP3 immunization.
53	Numerator DTP1-DTP3 drop-out	calculates the numerator for DTP1-DTP3 drop-out calculation. Number of children who have received DTP1 but not DTP3 by either card or history
54	SIA (MCV) No	if NO SIA (MVC) immunization was reported.
55	SIA (MCV) by card	if SIA (MCV) immunization by card was reported
56	SIA (MCV) by history	if SIA (MCV) immunization by history was reported.
57	Identified by interviewer as fully immunized	it identifies those children who were fully immunized according to interviewer (who had no reasons for failure to immunize)
58	Boys	It identifies the boys among children in the sample
59	Boys fully immunized (according to interviewer)	it identifies boys fully immunized according to the interviewer
60	Fully immunized with valid doses only (according to interviewer)	It identifies fully immunized children with valid doses according to the interviewer
61	Fully immunized by card	it identifies fully immunized children with immunization card
62	Fully immunized any (history and/or card)	it identifies fully immunized children either by history or by card
63	Interviewer failed to identify missing immunization	it identifies those children for whom a reason for failure to immunize was reported and who were not fully immunized

64	Fully immunized by 1 year of age	it identifies children who were fully immunized by 1 year of age
65	Fully immunized by 1 year of age with valid doses	it identifies children who were fully immunised by 1 year of age and received valid doses
66	Adverse events (any)	it identifies those children who had any adverse events following immunization
67	No adverse events	it identifies those children who had NO adverse events
68	Adverse events reported	it identifies those children who had adverse events which were reported to the AEFI surveillance
69	Adverse events not reported	it identifies those children who had adverse events which were NOT reported to the surveillance system
70	Unaware of need for immunization	it identifies those children for whom this was the reason for failure
71	Unaware to return for 2nd and 3rd dose	it identifies those children for whom this was the reason for failure
72	Place/time immunization not known	it identifies those children for whom this was the reason for failure
73	Fear of side reaction	it identifies those children for whom this was the reason for failure
74	Wrong ideas about contraindications	it identifies those children for whom this was the reason for failure
75	Postponed	it identifies those children for whom this was the reason for failure
76	No trust in immunization	it identifies those children for whom this was the reason for failure
77	Rumours	it identifies those children for whom this was the reason for failure
78	Place of immunization too far	it identifies those children for whom this was the reason for failure
79	Time of immunization inconvenient	it identifies those children for whom this was the reason for failure
80	Vaccinator absent	it identifies those children for whom this was the reason for failure
81	Vaccine not available	it identifies those children for whom this was the reason for failure
82	Mother too busy	it identifies those children for whom this was the reason for failure
83	Family problems	it identifies those children for whom this was the reason for failure
84	Child ill, not brought	it identifies those children for whom this was the reason for failure

85	Child ill, not immunized	it identifies those children for whom this was the reason for failure
86	Child ill	it identifies those children for whom this was the reason for failure
87	Long waiting time	it identifies those children for whom this was the reason for failure
88	On trip obstacles	it identifies those children for whom this was the reason for failure
89	Did not know date of campaign	it identifies those children for whom this was the reason for failure
90	Not free at the time	it identifies those children for whom this was the reason for failure
91	Religious reasons	it identifies those children for whom this was the reason for failure
92	Lack of information (general)	it identifies those children for whom this was the reason for failure
93	Forgot the child's age	it identifies those children for whom this was the reason for failure