



## Instructions for data-entry and data-analysis using Epi Info™

After collecting data using the tools for evaluation and feedback available in the Hand Hygiene Implementation Toolkit (available at [http://www.who.int/gpsc/5may/tools/evaluation\\_feedback/en/index.html](http://www.who.int/gpsc/5may/tools/evaluation_feedback/en/index.html)), data can be processed using Epi Info™ data-entry files developed specifically for these tools. These files can be downloaded from the website above. To enable their use, the Epi Info™ software also needs to be downloaded.

### Using Epi Info™ in 5 steps

- 1. Download Epi Info™**
- 2. Learn the basics on how to use Epi Info™**
- 3. Create a directory for your files on your PC**
- 4. Enter data from the completed evaluation tools into your PC**
- 5. Export data or do analyses in Epi Info™**

### 1. Download Epi Info™

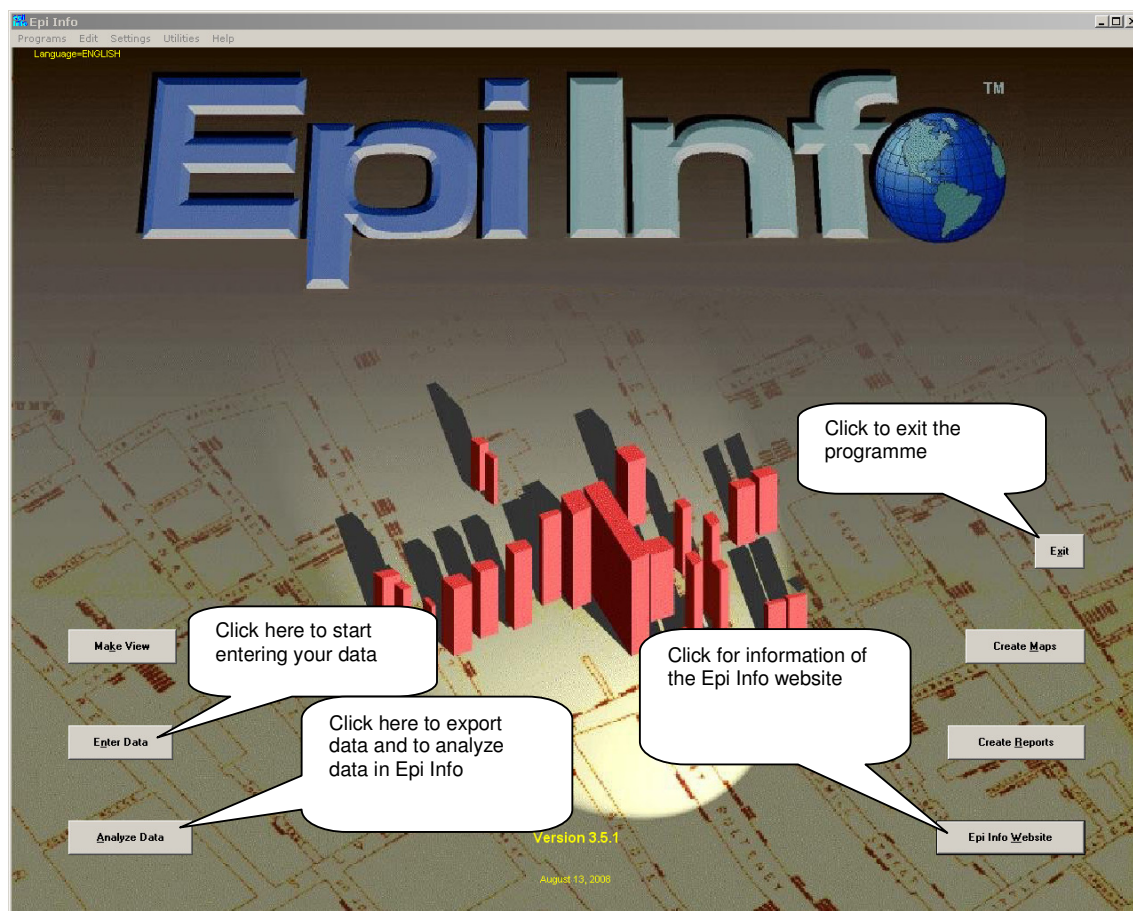
The objective of using Epi Info™ is to allow for concise electronic data processing to support analyses, and to provide valuable information for accurate and timely reporting. To use Epi Info™, you must have easy access to a working computer. If you do not have access to a computer, we still encourage the use of the evaluation tools and to find other ways to process data and present results.

Epi Info™ is free statistical software developed by the Centers for Disease Control and Prevention (CDC) for data entry and data analyses. You will find the Epi Info™ webpage on the CDC website at the following address: <http://www.cdc.gov/epiinfo/>. (Accessed: October 2009.) On the Epi Info™ main page you will find the links to download the software and links to user support, including tutorials (that we encourage you to use!), and a web board. This webpage also lists the system requirements to be able to run Epi Info™ on your computer. You can access the download area by clicking on the download links or by going directly to the following address: <http://www.cdc.gov/epiinfo/epiinfo.htm>. On this page, click the "install" link of the "Web Install" and follow the instructions. The link to the Epi Info™ tutorials is: <http://www.cdc.gov/epiinfo/communityhealth.htm>.



## 2. Learn the basics on how to use Epi Info™

After installing Epi Info™ and starting the programme, the following screen will be displayed:



The buttons on this screen give access to the different functions of the programme. Those important for your data entry and data analysis are:

- **Enter data:** Click here to enter the data;
- **Analyze data:** Click here to either export the data to a Microsoft Excel file or to analyze data using Epi Info™;
- **Exit:** Click here to exit the programme;
- **Epi Info™ website:** This is a link to the Epi Info™ website for further support. We encourage you to use the tutorial to get familiar with the use of the programme.



### 3. Create a directory for your files on your PC

To start the data entry you need to create a directory on the PC in which you run the Epi Info™ programme, for example "C:\....\WHO hand hygiene". Copy the files provided by WHO to this map. (Please find the files at: [http://www.who.int/gpsc/5may/tools/evaluation\\_feedback/en/index.html](http://www.who.int/gpsc/5may/tools/evaluation_feedback/en/index.html)). Two types of files are provided:

1. Project files for each of the evaluation tools (see details below), including the data-entry screen and the data table. The extension of these files is ".mdb".
2. Programme files to be used for simple data analysis using Epi Info™. The extension of these files is ".pgm".

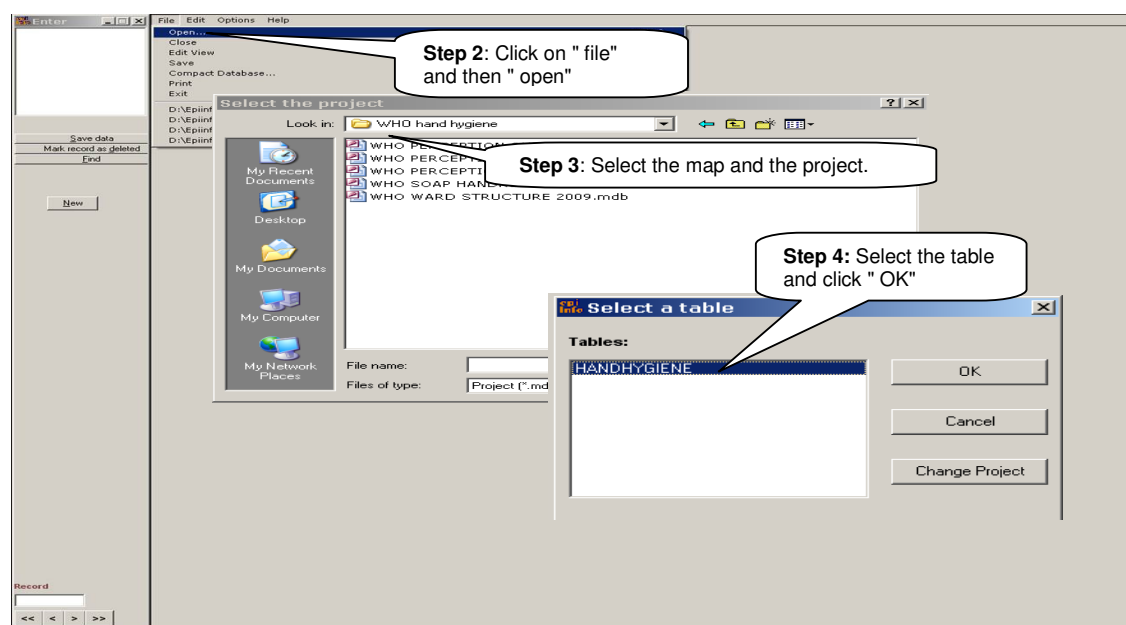
WHO provides project files (.mdb) for the following evaluation tools:

- the hand hygiene observation tool;
- the ward infrastructure survey;
- the hand hygiene knowledge questionnaire for health-care workers;
- the perception survey for health-care workers at baseline;
- the perception survey for health-care workers to follow-up;
- the perception survey for senior managers;
- the protocol for evaluation and comparison of tolerability and acceptability of different alcohol-based handrubs;
- the soap/handrub consumption survey.

### 4. Enter data from the completed evaluation tools into your PC

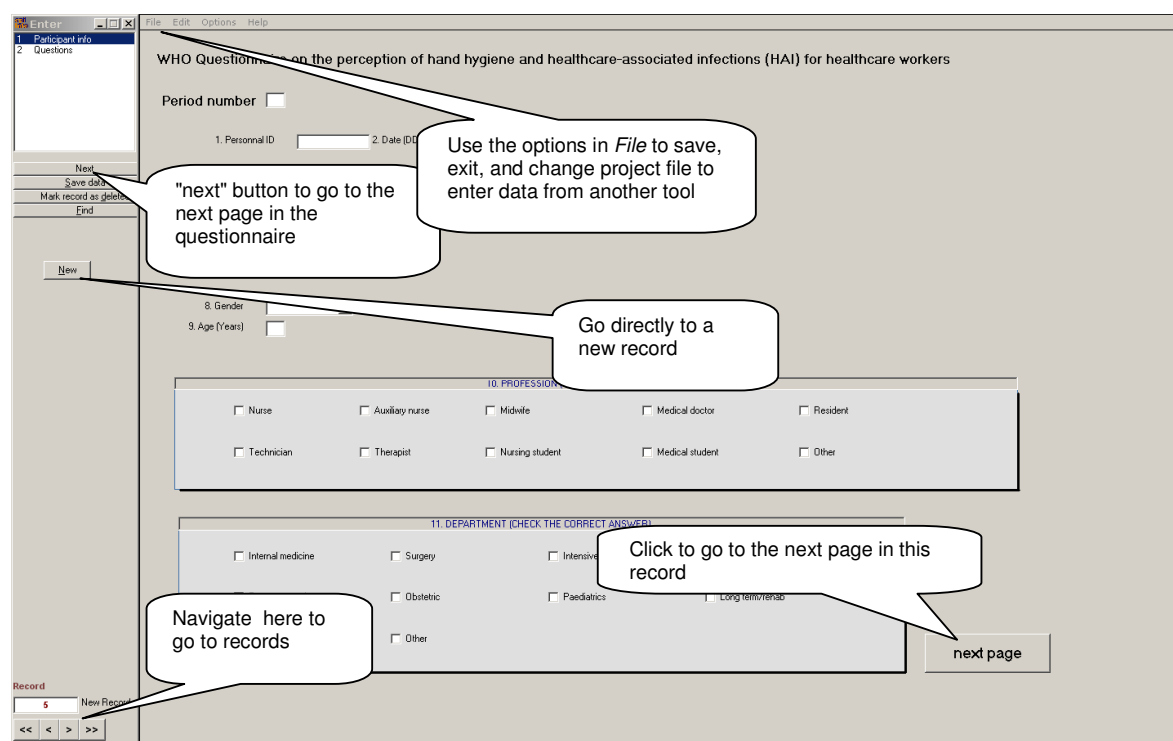
To get started, follow the next steps:

1. From the Epi Info™ main screen click "Enter Data";
2. Select "File" and click on "Open";
3. Select the directory (created by you, see instructions above) and choose the project file (.mdb) you want to work on;
4. Select a table and click "OK" on the screen "Select a table". In most project files there is only one table to choose from. For two evaluation tools, you can choose from two tables. For these tools, refer *Data-entry details of the evaluation tools*, found on page 5.



In the data-entry screen you have several options to navigate, save, delete, change to another project file, etc. The screen has three parts where you can select actions; the menu at the top of the page, the panel on the left and the data-entry field (please see image below).

- In the **menu at the top of the page**, use the options in *File* to manage project files - open, close, save, print, or exit. In *Options* you can maximize the size of the screen by selecting "full screen". Choose *Edit* to find specific records or to delete records.
- In the **panel on the left side**, you have options to navigate pages in the data-entry. From this panel you can go to the next record, save data, delete a record, find a record or create a new record. This also gives access to go back to previously saved records for possible changes.
- In the **data-entry field** you can go to the items by either using the mouse or the keyboard. To move from one field to the next when entering the data, press the Enter or Tab key or use your mouse. At the end of a page you will go to the next page by answering the last question, possibly followed by an "Enter", or use the "Next" button at the bottom of the page.



The screenshot shows the WHO Questionnaire interface. Callouts provide the following instructions:

- Use the options in File to save, exit, and change project file to enter data from another tool** (pointing to the File menu at the top).
- "next" button to go to the next page in the questionnaire** (pointing to the 'Next' button in the left sidebar).
- Go directly to a new record** (pointing to the 'New' button in the left sidebar).
- Click to go to the next page in this record** (pointing to the 'next page' button at the bottom right).
- Navigate here to go to records** (pointing to the record navigation controls at the bottom left).

**When you want to stop your data entry**, follow these steps:

1. Go to *File* in the menu at the top of the page;
2. Choose "Save".

If you want to **stop all data-entry**:

- 3a. Choose "Exit" from the *File* menu and you will return to the main Epi Info™ page.

If you want to **continue data-entry for another evaluation tool**:

- 3b. Choose "Close" and then "Open" and select the project file you want to do data-entry for. If the window *Select a table* appears, click on "Change project" and select the project file for that evaluation tool.

Please take note of the following when entering the data:

- In *text* fields, letters or numbers can be freely entered. Therefore, take good care to be consistent. Use the same orthography and type of characters;
- When there is a *down arrow* in the field, always use this because there you will find the options for the answers you can select;
- The date pattern to use is DD-MM-YYYY (day-month-year).
- The time pattern to use is HH-MM-SS (hours-minutes-seconds) with 24 hours format. There is no need to enter seconds.

### Data-entry details of the evaluation tools

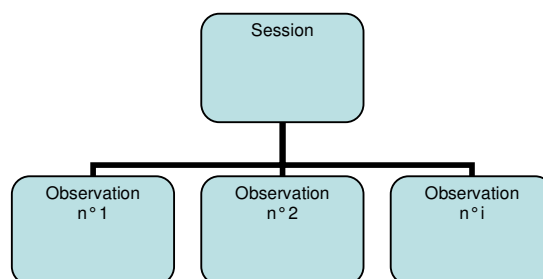
All questionnaires are designed the same way. However, some features may differ from one project file to another and key descriptions are presented here to guide you.

#### Hand hygiene observation tool

This Epi Info™.mdb file enables entry of data on the session and the data on hand hygiene observation recorded by using the Observation Form. These are linked as shown on the graphic below. Within each session there are multiple observations.

After selecting "WHO HAND HYGIENE OBSERVATION.mdb", two tables named "Observation" and "SESSION" are displayed. To start, select "SESSION"

- "Start time" and "End time" are time fields and Epi Info™ will automatically calculate the duration of the session in minutes. There is no need to enter seconds into the time fields.
- Some information, like country, will be copied automatically in subsequent entries of sessions after entry the first time.
- "Period number" is important to be able to analyze trends in time.



At the bottom of the data-entry page on "SESSION" there is a button called "Observation". By clicking this button, you will open the "Observation" file. This questionnaire is for entering data on hand hygiene observation.

- Next to the checkbox for profession you may add the code in the drop down list for WHO category (e.g. 1.1).
- The number of observations that can be linked to a session is unlimited.
- The "number of indications" is a separate field when entering the data for "Observations". This field is not present on the paper registration form. Please fill in this field by taking the total of the number of indications you have indicated in the tick boxes. If you for example ticked two moments within an opportunity, fill in "2" as the number of indications.
- The number of professionals that was observed is indicated at the top of each column of the hand hygiene observation form. In the data-entry forms, this information should be filled in the "SESSION" screen.

Once the data about the observations have been entered, by clicking the blue arrow in the left column, you will return to the "Session" file.

#### Ward infrastructure survey

After selecting "WHO WARD INFRASTRUCTURE.mdb", select the only table presented "wardinfrastructureWG2009".

- On page 3 of the data-entry, enter the total number of the three tables, as filled in at the bottom row of each table. The three tables relate to the observations made in **A)** Patient rooms, **B)** Treatment rooms, and **C)**



Corridors and other areas. The analysis will focus on the total numbers of the registration, hence the data entry of the last rows only, indicating the totals.

### **Hand hygiene knowledge questionnaire for health-care workers**

After selecting "WHO KNOWLEDGE QUESTIONNAIRE.mdb", select the only presented table "HANDHYGIENE".

- The correct answer to the questions is indicated with " \* " as a symbol added at the end of the answer. This will be used in the data analyses, as described later in this document.

### **Perception survey for health-care workers at baseline and follow-up**

After selecting "WHO PERCEPTION QUESTIONNAIRE BASELINE.mdb" or "WHO PERCEPTION QUESTIONNAIRE FOLLOW-UP.mdb", select the only presented table "HANDHYGIENE".

- Please note that the baseline and the follow-up questionnaires are different. There are additional questions in the follow-up questionnaire.
- Although there are separate questionnaires for baseline and follow-up, it is useful to pay attention to the assigning of the "Period number". Period number can be used in longitudinal analyses and should therefore be defined explicitly in order to structurally examine changes over time.

### **Perception survey for senior managers**

After selecting "WHO PERCEPTION QUESTIONNAIRE FOR SENIOR MANAGERS.mdb", select the only presented table "HANDHYGIENE".

### **Protocol for evaluation (and comparison) of tolerability and acceptability of alcohol-based handrubs:**

#### **Method 1 and Method 2.**

The data entry for *tolerability of alcohol-based handrubs* contains two parts (tables):

1. "Participants" is used to enter information on the health-care workers and;
2. "Products" is used to enter the results of the product evaluation.

The field "Participant number" will be used in analysis to link each participant to the product evaluations. The number of product evaluations that can be linked to a participant is unlimited.

The structure of the data-entry forms of Method 1 and Method 2 are comparable.

After selecting "WHO EVALUATION TOLERABILITY HANDRUBS.mdb", select the table "Participants". After filling in details of the participant, click the button "product evaluation" to enter the results of the product evaluation.

- Please make sure that "participant number" is a unique identifier of the health-care worker and is used correctly in all data entry. This is to assure that the person and the results are correctly linked, however still maintains anonymity.

### **Soap/ handrub consumption survey**

After selecting "WHO SOAP HANDRUB CONSUMPTION SURVEY.mdb", select the only presented table "consumption".

- The narrative parts of the questionnaire describing the process of purchase cannot be entered.
- At the end of page 1 you are asked for which product you want to enter data: handrub, soap, or both. Depending on the answer you will be directed further in the data entry.
- The evaluation forms are designed for monthly registration during a six-month period. However, in practice this may not happen with these time intervals. Make sure that you fill in the dates correctly, so you can make analyses over time.

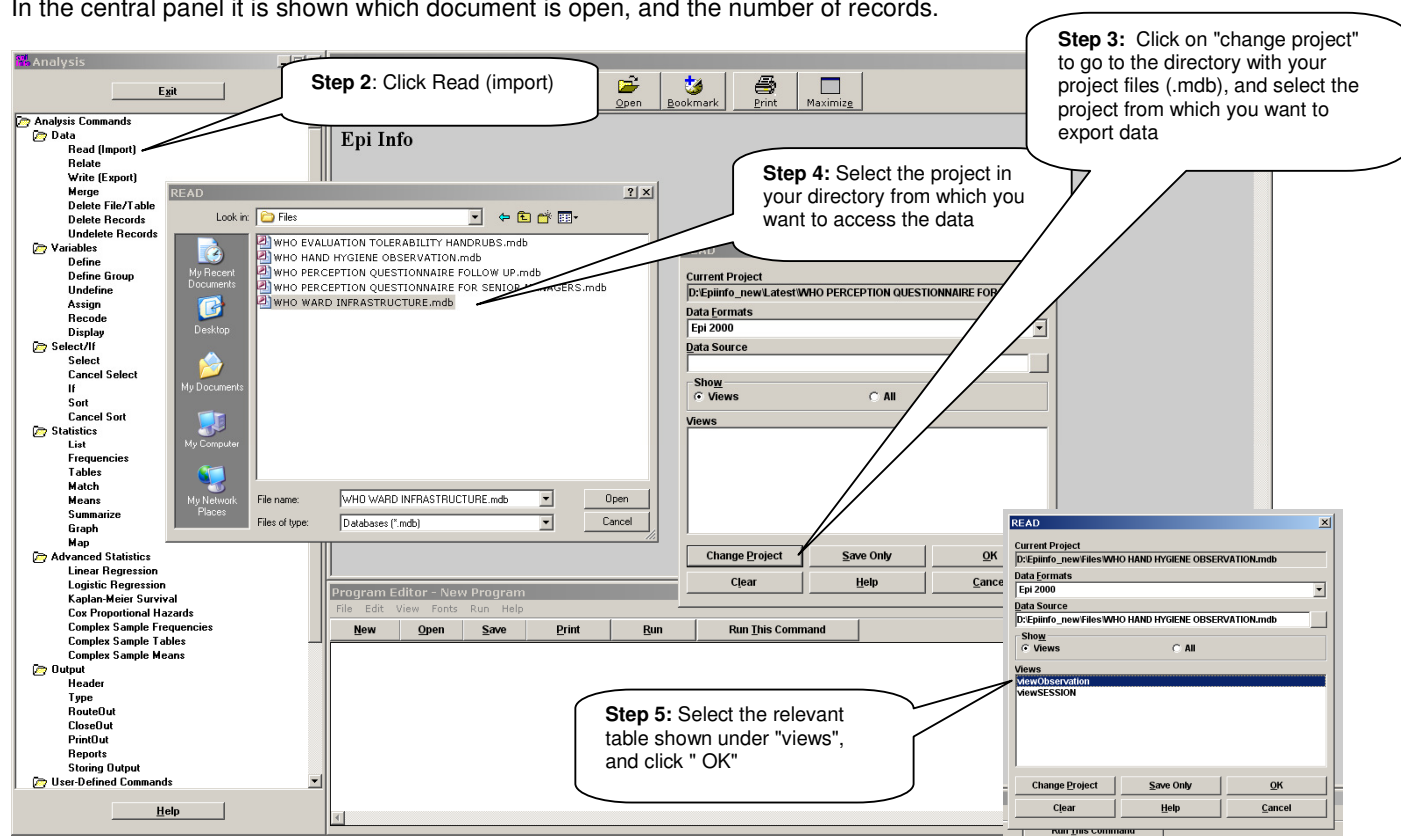


## 5. Export data or do analyses in Epi Info™

After entering the data you may want to do analyses with other software like Windows Excel or statistical packages. For this purpose you can export the data files that were entered in Epi Info™.

1. In the main page of Epi Info™, click "Analyze data";
2. Click on "Read (import)" in the panel at the left side of the screen, a new window appears (see picture below);
3. Go to the "change project" at click;
4. Go to your directory and select the project file from which you want the data to be exported and click "Open";
5. Select the table within the project file you want to open;
6. Click "OK".

In the central panel it is shown which document is open, and the number of records.



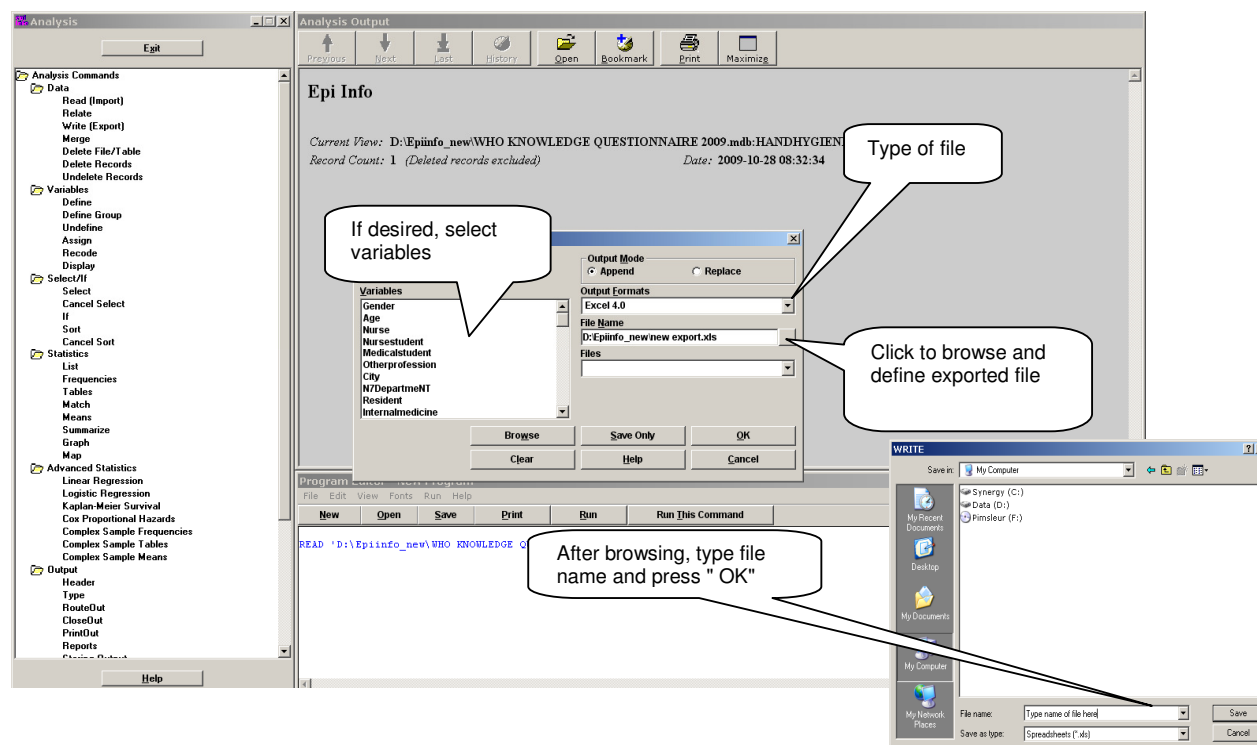
Subsequently, to do the export:

1. Click on "Write (export)" in the panel on the left (also check the screen displayed below);
2. Select the type of file (e.g. Excel 4.0) in *Output formats*;
3. Click on the browse button to go to your directory;
4. Type a name for the file you are exporting (e.g. observation.xls) in the field *File name*;
5. Do **not** change the setting to "Replace" in the "output mode" section of the window;
6. If you want to limit the variables to be exported, you can make a selection, if not, all variables are exported;
7. Click "OK".



The active data (opened data table) is now saved as a Windows Excel file. To access the exported Excel file, start the Excel programme and open the file.

You may now continue analyzing the active data in Epi Info™ or close (click "quit" to return to the main page Epi Info™).



## Using the Analyze data module

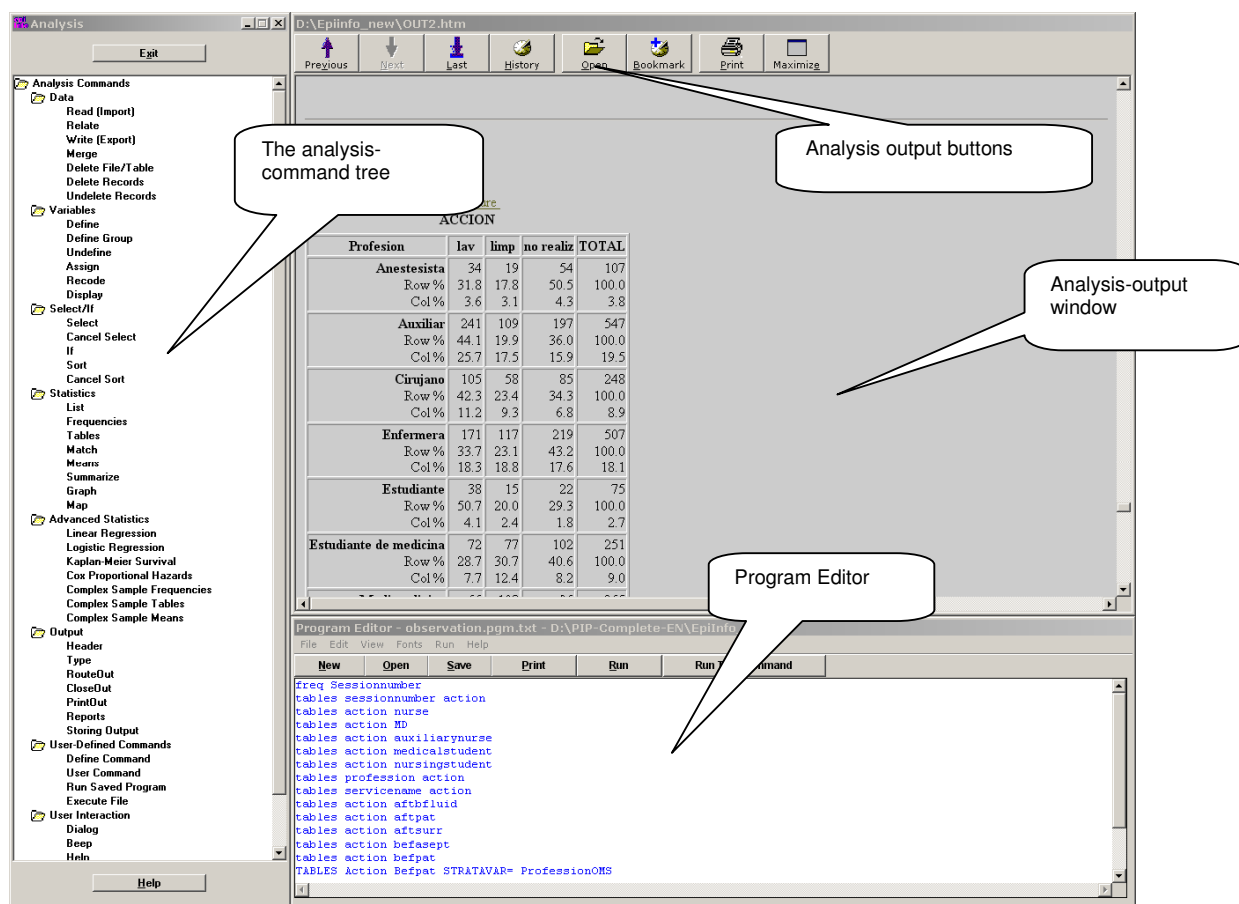
You may wish to do analyses using the exported files in other software, or you may choose to do analyses in Epi Info™.

The Analysis screen in Epi Info™ is divided into three different areas (see image below): the *Analysis Command Tree*, on the left side of the screen containing a list of commands such as *Frequencies*, *Tables*, *Means* or *Graph*; the *Analysis Output Window* on the top right side of the screen, which acts like a browser and displays the results of analyses; and *The Program Editor* on the bottom right side of the screen where you can run and create programmes.

The Command tree contains commands used to analyze data. Here are some of the most useful commands:

- **DISPLAY:** This command, found in the "Variables" folder, shows information about the variables in the project;
- **SELECT:** This command specifies a condition that must be true for a record to be processed. This is useful if you want to do an analysis of part of the data, for example only for respondents under 25 years of age.
- **LIST:** This command allows you to display a listing of the current data table;
- **FREQUENCY:** This is one of the most useful commands in analysis. The use of this command produces a frequency table showing the number of selected events, characteristics or occurrences (for example: frequency of variable "gender" gives the number and percentage of females and males);
- **TABLES:** This command enables you to compare proportions by making 2 by 2 or n x n tables. Relative risks, odds ratio (both with 95% Confidence Interval) as well as Chi-square and Fischer exact tests are computed;
- **MEANS:** This command enables you to calculate average values and to compare continuous variables such as age.





To analyze the data you need to: 1) open a data table, and 2) open or create commands/programme for the analysis.

Opening a project file is equal to the procedure described and illustrated in the paragraph above:

1. In the main page of Epi Info™, click "Analyze data";
2. Click on "Read (import)" in the panel at the left side of the screen, a new window appears (see picture below);
3. Go to the "change project" at click;
4. Go to your directory and select the project file from which you want the data to be exported and click "Open";
5. Select the table within the project file you want to open;
6. Click "OK".

The name of the data table appears in the Output Window as well as the number of records in the view. The *Analysis Output* buttons allows navigation through the programmes, printing the results and maximizing the screen.

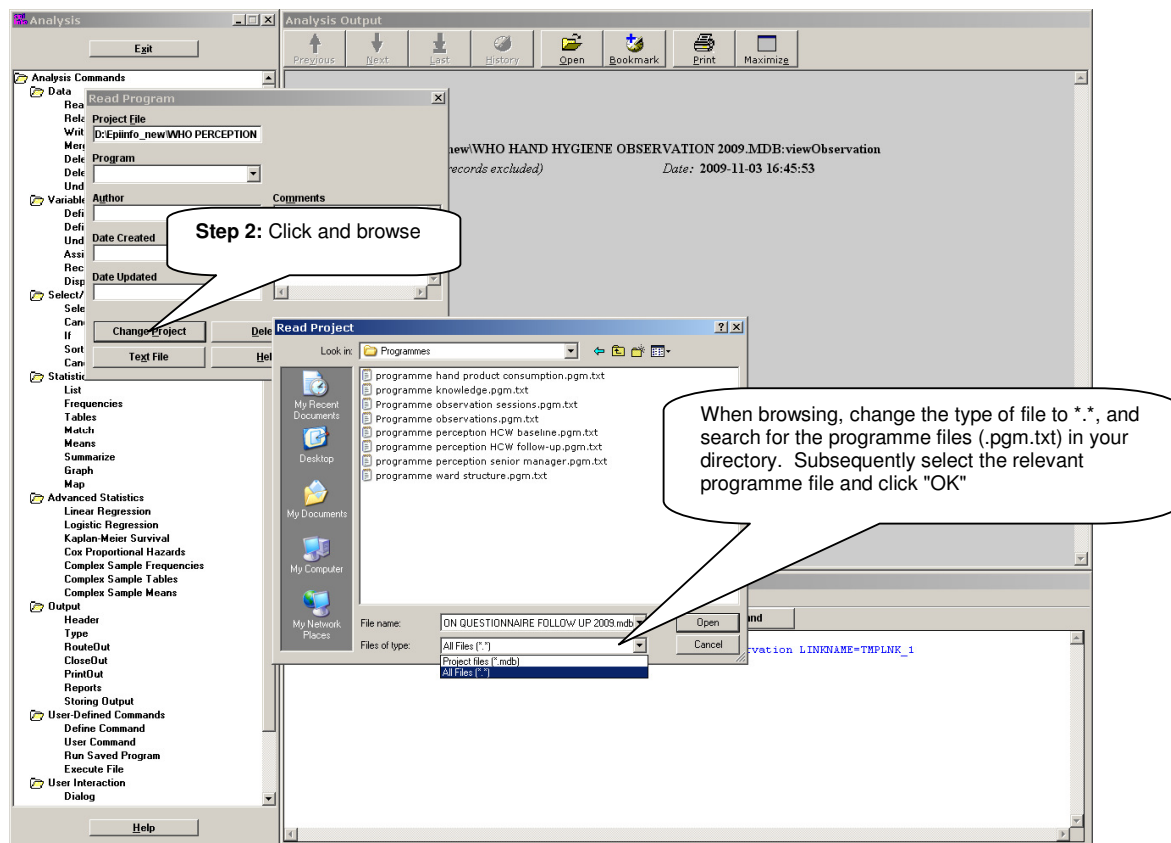
With the active dataset, i.e. the file currently open, you can now start the analysis by selecting a command from the left panel and selecting the variable(s) and other conditions as requested by the programme after selection of the command. The "Help" option in the programme and documents on the Epi Info™ website can help you to do the analyses.

To help you to analyze the data, if you are not familiar with Epi Info™, we have developed simple analysis programmes. These programmes have the .pgm extension and are text files. These files are provided on the website as previously mentioned.



To use these .pgm programmes:

1. Click "Open" in the *Program Editor* (see screen displayed above)
2. Click "Change Project" to go to your directory;
3. Change the type of file from .mbd to \*.\* (see illustration below) and select the programme file (.pgm.txt) you want to work with (which matches the active data set);
4. Click "OK" and the programme will appear in the window of the "Program Editor"
5. Press "Run" in the Program Editor to run the analysis



Running the programme produces output in the Analysis-Output Window (see example in screen displayed below). In general the analysis aims for two types of information:

- General descriptive information;
- Changes over time.

To achieve this, many variables can be examined in relation to the *period number*. This then produces a table in which information on a certain variable is calculated for each period number, providing the opportunity to analyze changes over time (see screen below for example).

Please note the following:

- To help you correlate the name of the variable with the question, the number of the question has been put at the end of the variable name;
- It is essential to avoid missing the entry of data, as well missing the collection of data in the first instance. Both these may hinder the full interpretation of the results;
- For the *knowledge questionnaire* the " \* " character has been added to the variable name for the correct answer.



- The *hand hygiene observation* file includes two tables with the information "SESSION" and "Observation". Each session has multiple observations. The unique linking is through the variable "FKey" in the Observation table, which matches the variable "UniqueKey" in the Session table. These linking variables have been assigned by the programme, and are essential to link the information of the session to the observation. This can be used for further analysis.
- The results will be sent by default as a HTML file into the Epi Info™ directory on the C-drive of your computer. If you want to send the results to a specific directory, write the following command with the name of the directory: ROUTEOUT 'C:\Documents and Settings\name of the directory\name of the file.htm' (or do this by selecting the "RouteOut" command in the Output directory in the Command Tree of Analysis).
- The output HTML files can be edited in MS-Word.
- In the programme (the .pgm file) for Hand Hygiene Observation, messages are included to better understand the results. The message is starting and ending with "\*\*\*".
- The provided analyses are simple descriptive analyses only.

**EFFECTIVE18**

| Periodnumber | False | True* | TOTAL |
|--------------|-------|-------|-------|
| 2            | 0     | 2     | 2     |
| Row %        | 0.0   | 100.0 | 100.0 |
| Col %        | 0.0   | 100.0 | 66.7  |
| 3            | 1     | 0     | 1     |
| Row %        | 100.0 | 0.0   | 100.0 |
| Col %        | 100.0 | 0.0   | 33.3  |
| TOTAL        | 1     | 2     | 3     |
| Row %        | 33.3  | 66.7  | 100.0 |
| Col %        | 100.0 | 100.0 | 100.0 |

**Single Table Analysis**

|                                                         | Point Estimate | 95% Confidence Interval Lower | 95% Confidence Interval Upper |
|---------------------------------------------------------|----------------|-------------------------------|-------------------------------|
| PARAMETERS: Odds-based                                  |                |                               |                               |
| Odds Ratio (cross product)                              | 0.0000         | Undefined                     | Undefined (T)                 |
| Odds Ratio (MLE)                                        | 0.0000         | 0.0000                        | 9.5000 (M)                    |
|                                                         |                | 0.0000                        | 19.5000 (F)                   |
| PARAMETERS: Risk-based                                  |                |                               |                               |
| Risk Ratio (RR)                                         | 0.0000         | Undefined                     | Undefined (T)                 |
| Risk Difference (RD%)                                   | -100.0000      | -100.0000                     | -100.0000 (T)                 |
| (T=Taylor series; C=Cornfield; M=Mid-P; F=Fisher Exact) |                |                               |                               |
| STATISTICAL TESTS                                       |                |                               |                               |
|                                                         | Chi-square     | 1-tailed p                    | 2-tailed p                    |

**Program Editor - programme knowledge.pgm.txt - D:\EpiInfo\_new\Programmes\**

```

New Open Save Print Run Run This Command
TABLES Periodnumber Abdomen201
TABLES Periodnumber Injection201
TABLES Periodnumber Bedpan211
TABLES Periodnumber Gloves201
TABLES Periodnumber Makingbed201
TABLES Periodnumber Blood201
TABLES Periodnumber Jewellery21
TABLES Periodnumber Damagedskin21
TABLES Periodnumber Fingernails21
TABLES Periodnumber Handcream21
ROUTEOUT 'results knowledge questionnaire'
  
```

The results of the analysis should be used to support the implementation process of the WHO Multimodal Hand Hygiene Improvement Strategy. It provides information about hand hygiene progress in your facility. The results can be fed back to the staff in your facility. You can present information from Epi Info™ or Excel files or use this to inform an MS Word document report aimed at highlighting compliance rates, knowledge, perceptions and structural issues to a range of health-care and administrative/management staff. The provided Data Summary Report Framework slides, for presenting results, can be used to structure the information. These can be found at [http://www.who.int/gpsc/5may/tools/evaluation\\_feedback/en/index.html](http://www.who.int/gpsc/5may/tools/evaluation_feedback/en/index.html)