EpiTour - an introduction to

EpiData

Dataentry and datadocumentation
Http://www.epidata.dk

Version of : August 3rd.2001

EpiData

EpiData is a windows 95/98/NT based program for:

- Defining data structures
- Simple dataentry
- Entering data and applying validating principles
- Editing / correcting data already entered
- Asserting that the data are consistent across variables
- Printing or listing data for documentation of error-checking and error-tracking
- Comparing data entered twice
- Exporting data for further use in statistical software programs

EpiData works on windows 95/98/NT/Professional/2000 and Machintosh with RealPc emulator.

Suggested citation of EpiData program:
Lauritsen JM, Bruus M, Myatt M. EpiData – An extended tool for validated dataentry and documentation of data. The EpiData Association, Odense Denmark. 2001. (Lookup Version in About box)

Suggested citation of EpiTour introduction:
Lauritsen JM, Bruus M, Myatt M. EpiTour - An introduction to validated dataentry and documentation of data by use of EpiData. The EpiData Association, Odense Denmark, 2001. Http://www.epidata.dk/downloads/epitour.pdf (See Version above)

This document is available as the EpiTour.hlp file installed together with EpiData and as a PDF format file EpiTour.pdf for printing an reading as a whole.

For further information and download of latest version: See http://www.epidata.dk

Introduction and Background

What is EpiData ?

EpiData is a program for DataEntry and documentation of data.

Use EpiData when you have collected data on paper and you want to do statistical analyses or tabulation of data. your data could be collected by questionnaires or any other kind of paperbased information. EpiData is **not** made for analyses, several available programs will do that.

With EpiData you can apply principles of "**controlled dataentry**". Controlled means that EpiData will only allow the user to enter data which meets certain criteria, e.g. specified legal values with attached text labels(1 = No 2= Yes), rangecheck (only ages 20-100 allowed), legal values (e.g. 1,2,3 and 9) or legal dates (e.g. 29febr1999 is not accepted).

EpiData is suitable for simple datasets like one questionnaire as well as datasets with many or branching dataforms. **EpiData** is freeware and available from Http://www.epidata.dk. A version and history list is available on the same www page.

The principle of EpiData is rooted in the simplicity of the dos program EpiInfo, which has many users around the world. The idea is that you write simple text lines and the program converts this to a dataentry form. Once the dataentry form is ready it is easy to define which data can be entered in the different data fields.

If you want to try EpiData during the coming pages make sure you have downloaded the program and installed it.

It is an essential principle of EpiData not to interfere with the setup of your computer. EpiData consists of one program file and a few help files. No other files are installed. (In technical terms this means that EpiData does not install or include any DLL files or system files - options are saved in registry.)

Registration
We encourage all users to registrate by using the form on www.epidata.dk . By registration you will receive information on updates and help us in decing how to proceed development - and to persuade others to add funding for the development. You can remove the registration again later by sending an e-mail to info@epidata.dk

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Work follows the PathDiagram which you can download and print from www.epidata.dk

Principle of entering data:

EpiData is focused on empirical data from a technical point of view. I.e. not looking at aspects of sampling bias, registry safety, study design etc. The complexity of datastructures in studies varies from a single questionnaire to a combination of several sources.

See: DataEntry Process – principle

Keywords in the process are: “reproducibility”, “writing down decisions”, “saving all files”, “One should be able to follow each value in each variable for each observation from final file back to when it was observed, measured or recorded in a questionnaire”.

Often there is an aspect of making data anonymous. Data are identified by an identity variable instead of name or personal registration number.. This variable is called "id". In particular countries this could be based on a "soundex" code which is a numerical "translate" based on words. Therefore part of the process will be to make a special file with identity information, which will be saved separately and used again for special purposes, e.g. follow up of a cohort of patients. Or repeated registry extract of outcome information. Another aspect is how to divide your data into topics, see DataEntry Process - in practice

Some useful internet pages on Biostatistics, Epidemiology, Public Health, EpiInfo etc.:

Data types and analysis:	http://www.sjsu.edu/faculty/gerstman/EpiInfo
EpiInfo home page:	http://www.cdc.gov/epo/epi/epiinfo.htm
Statistical routines:	http://www.oac.ucla.edu/training/stata/
Epidemiology Sources:	http://www.epibiostat.ucsf.edu/epidem/epidem.html
Epidemiology lectures:	http://www.pitt.edu/~super1/

Freeware for dataentry, calculations and diagrams:

EpiData (current program) for dataentry is available at www.epidata.dk

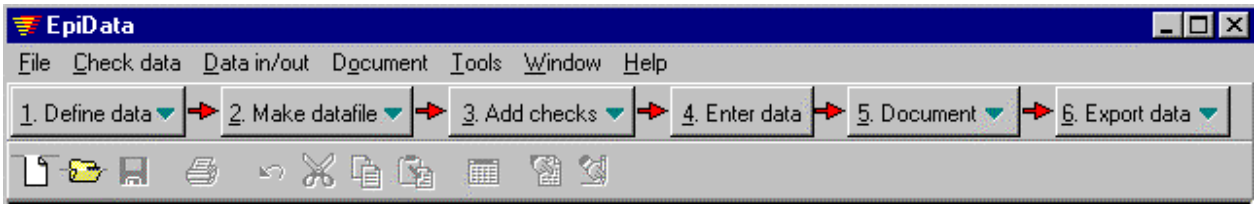
Epicalc 2000 Epidemiological oriented calculator. http://www.myatt.demon.co.uk/

EpiGram for drawing flowcharts and diagrams http://www.myatt.demon.co.uk/

you are now ready to start the How to work with EpiData

How to work with EpiData

The EpiData screen has a “standard” windows layout with one menu line and two toolbars (which you can switch off). Depending on the current task, the menu bar changes.



The "Work Process toolbar" guides you from "1. Define data" to “6. Export data” for analysis. The second toolbar helps in opening files, printing and certain other tasks to be explained later.

A. If you want you can switch off the toolbars in the Window Menu, but this EpiTour will follow the toolbar and guide you.

B. Start EpiData now.

C. Continue by doing things in EpiData and reading instructions in this EpiTour.

D. In the menu Help you can see how to register as a user of EpiData. Registered Users will receive information on updates.

E. Proceed to 1. Define and test DataEntry Form

1. Define and test Data Entry

1.. Point at "Define data" part and "new qes file" . An empty file called "untitled" is shown in the "Epi-Editor". A qes file defines variables in your study. "**Qes**" is an abbreviation of "qustionnaire", all types of information can be entered with EpiData. Questionnaire is just a common name for all of them.

2.. Save the empty file and give it the name **first.qes**.
you save files on the "file menu" or by pressing "Ctrl+S". Notice that in the Epi-Editor "untitled" changes to "first.qes".

Write now in the Epi-Editor the lines shown below.
Explanation: Each line has three elements:

A.. Name of variable (e.g. v1 or exposure).
B.. Text describing the variable. (e.g. sex or "day of birth")
C.. An input definition, e.g. ## for two digit numerical.

```
My first DataEntry Form
id        <idnum >
V1 sex           #
V2 Height (meter)      #.##
v3 Date of birth <dd/mm/yyyy>
s1 Country of Residence
_____________________________
s2 City (Current adress)         <a
>
```

The field types used in EpiData (which defines variables) are:

Type	Example
Text	_____
ID-number	<IDNUM>
Numeric	### ###.##
Upper-case	<A> <A >
Soundex	<S >
Boolean	<Y>
Date	<dd/mm/yyyy>
	<mm/dd/yyyy>
Today's date	<today-dmy>
	<today-mdy>
Tabulator	@<a> @##

The tabulator field type is only used to align the other fields. Useful if you use proportionally spaced fonts.

3.. Save the file again as done in point 2. Simplest by pressing Ctrl+s

4.. Now preview the dataform.

 Press the toolbar box 2 from left and choose "Preview Dataform" or press Ctrl+T.

On the screen is shown a preview or test DataForm for your **first.qes**. Try moving around with arrows. Notice how the variable types are shown on the status bar. On the preview dataform you cannot save any data, it is designed for testing the number of variables .

If you want other variables switch to the Epi-Editor and add them now.

 Press this on the second toolbar for help in formatting fields by pasting them onto the form or Ctrl+Q. you can hide it again by pressing “Esc”.

 A different tool can be activated by Ctrl+W or the icon shown. This will "autocomplete" certain parts. E.g. if you add one #,_ , <d, etc and see what happens. Try " and indicate 1.1 or 8.

In date fields **EpiData** will help in completing the date: If you enter ”040599” in a date-dmy field, EpiData will format it as "04/05/1999". If 2-digit years are entered the century will be 1900 for years between 50 and 99 and 2000 for years between 00 and 49. If you enter ”0405”, current year will be used, i.e. in year 2001 saved as ”04/05/2001”. "040503" is saved as "04/03/2003" After entry, all dates are checked. E.g. 29021999 will not be accepted.

Use the tabulator mark @ in front of fields to left align the input field.

When you are satisfied with the DataForm, **close** the form as well as the Epi-Editor (See menu File).

Proceed to next section. Create Datafile

2. Create DataFile

Press **2** (Alt+2) and accept the ”**first.qes**” and ”**first.rec**” names for "make datafile". This will create a physical file on the disk. Preview Dataform only exist in the memory of your computer.

Press **OK** and you have created a datafile based on the definition made earlier:
you have now defined:

A A dataform definition file saved as a file with the name **first.qes**
B An actual datafile which will contain the data, saved as **first.rec**.
Rec is an abbreviation for ”record” or observation.

(If you look at the files in windows explorer you might only see two files with the name first, but not the "qes" and "rec" extension. If this is so setup your explorer to show extensions for all files, you do that in preferences)

Proceed to next section. Add Checks

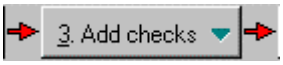
Color selection and options

On the menu file one point is "options". If you activate this a number of options can be set. Among others the way the color of the screen dataentry fields are shown. Some options are easy to understand others are for more experienced users. You cannot destroy data by changing options.

Variable names

Variable names can take two forms: e.g. v1sex (8 first characters in sentence-default) or v1 (first word of sentence). If you prefer to use names like v1 v2 v3 .... t1, then you should pick the "Use first word as fieldname" option in "create datafile" (see menu file - "options"). Close all files before changing options.

3 Add checks of DataEntry



When you ”add checks” **you specify rules** for dataentry. **Adding checks is optional**. Move directly to Enter Data if you are not concerned with checks at this point.

Add checks has five basic aspects and one "advanced":

1.. **label:** Add descriptive text to numerical values (Value label)

2.. Restrict dataentry to certain values **(range, legal) (**and **label)**

3..Specify sequence of dataentry E.g. fill out certain questions for males only, **(jumps)**

4..**Mustenter** you must enter a value

5.. **Repeat** – copy value from previous record. E.g. if you are typing in data from several schools. The class will be the same for several children.

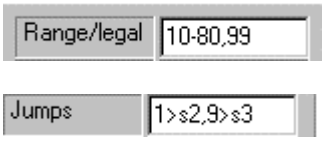
Advanced: Help messages and other extended definitions of computations, if .. then ...endif structures etc.. This is added with the "Edit" button next to the Exit button. This aspect is NOT covered in this EpiTour, see help file.

A rule of thumb:
Make simple rules
Use range/legal when you have continous data (e.g. from 1 to 100 or 4.2 to 13.1)
Use labels when you have categorial data or a few values (e.g. 1,2 or 1,2,3,4,5,9)

Examples:

range 10-80 plus single value 99

Jumps: On value 1 goto s2: 1>s2 . On value 9 goto s3: 3>s3



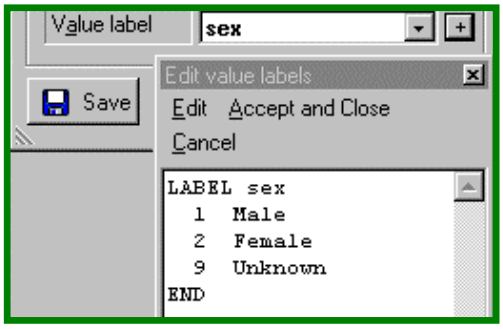
Now add value labels to a variable.

Make sure you have NOT specified any range/legal to that field.

The idea of the label is that it associates an input number with a text description for a numerical field. Or for a short string field it gives a longer description. It makes statistics output more readable and makes sure, that the value entered is interpreted correctly.

EpiData exports information on value labels if you export data to Stata format, and to SPSS and SAS by creation of command files and raw datafiles. Commercially available programs (e.g. StatTransfer) can convert these files further to other statistics programmes

Each label has a name. If a label name is shown in the small window to the right of "Value label" and you press the "+" further to the right, then the values are shown. E.g. sex as seen in the figure.



You can define new labels, e.g. one with the name "size" with contents 1small 2 normal 3 large. To define a new label press the "+" next to the field value label. A small window pops up. After definition of a label it can be attached to as many variables as you like.

You have now added checks to the dataentry in **first.rec** based on the structure you defined in **first.qes.** The definitions of these checks are saved in a file called **first.chk**.

Continue with Enter Data

Special and further notes.

a.

you can press Ctrl+C and save the current definitions in a buffer. If you then move to a different field on the Dataform and press Ctrl+V the definitions copied will be applied in a single keystroke.

b.

Fieldnames can be added to the jumps automatically. First write the value in the jumps section, (e.g. 1) then add the sign (>) and then click with your mouse on the desired field (Change screen position with PageUp/Page Down keys). The fieldname will be added automatically to the jumps definition.

c

The Edit button gives access to all currently defined checks for the field. Here more complicated structures can be added (e.g. if.. then ...endif) structures, see help file.

Help messages can be defined and shown during dataentry, e.g.:

help "text to show to person inputting data"

d.
For EpiInfo users: Most aspects of the EpiInfo version 6 check language has been implemented in EpiData.

Proceed to next section. Enter Data

4. Enter Data

Simply activate the **Enter data** on the toolbar and accept **first.rec** for dataentry.

Enter 5-10 records. A record is one observation, one unit in the data.

As seen on the **menu** (Goto) you can jump between records, move to first and last variable, search for values etc. These options can be used if you need to revise data.

The Shift+Del buttons mark a single record as deleted. If something was entered incorrectly and/or messed up, you can mark it for deletion and leave it out while rewriting the file for export. In coming versions an option to permanently delete these records will be implemented.

Sometimes it is useful to enter comments while entering data. While first.rec is open for dataentry, press F8. This will open a small document editor and add the date and time. You can then add some comments. The small file gets the name **first.not** and should be backed up along with the **first.rec**, **first.chk** and **first.qes** files. EpiData can do this for you, see later.

Proceed to next section. Document Data

5 Document Data

In this part you can write out information about the structure, date, labels and contents of files and variables. Here you can see an example for the file first.rec, created during the previous parts of this short **EpiTour**.

```
DATAFILE:  C:\data\first.rec
Filelabel: My first datafile is an example

Filesize:          612 bytes
Last revision:     28. okt 2000 22:14
Number of fields:  7
Number of records: 0
Checks applied:    Yes (Last revision 28. okt 2000 22:32)


Fields in datafile:

No. Name Variable label   Fieldtype       Width  Checks            Value labels
-------------------------------------------------------------------------------
  1 id                    ID-number       6

  2 v1   sex              Integer         1                        sex
                                                                   1: Male
                                                                   2: Female
                                                                   9: Unknown

  3 v2   Height (meter)   Fixed number    4:2    Legal: 0.0-2.30,9

  4 v3   Date of birth    Date (dmy)      10

  5 s1   Country          Text            28

  6 s2   City (Current    Upper-case text 12                       string
         adress)                                                   blt: Baltimore
                                                                   cph: Copenhagen Denm
                                                                   rey: Reykjavik Icela
                                                                   sid: Sidney
                                                                   ndh: New Delhi
                                                                   mom: Mombassa
                                                                   bue: Buenos Aires

  7 t1   Todays Date      Today date-dmy  10

-------------------------------------------------------------------------------
```

Lists of values can be shown like this:

```
Observation 1

      id              1          v1           Male          v2           1.92
      v3     12/12/1945          s1        denmark          s2     Copenhagen
      t1     28/10/2000
```

With codebook you can write out condensed frequency tables:

Example of this:

```
v1 ------------------------------------------------------------------------- Age
                  type:  Integer
            range/legal:  0-100

                missing:  0/25
                  range:  [4,82]
          unique values:  22

v2 ------------------------------------------------------------------------- Sex
                  type:  Integer
           value labels:  sex
            range/legal:  1-2,2

                missing:  0/25
                  range:  [1,2]
          unique values:  2

             tabulation:   Freq.    Pct.   Value  Label
                              11    44.0       1  Male
                              14    56.0       2  Female

v3 ------------------------------------------------------------------------ Temp
                  type:  Floating point
            range/legal:  36.00-40.00

                missing:  0/25
                  range:  [36.00,37.50]
          unique values:  12

                   mean:  36,84
              std. dev:  0,37
```

and with "Dataentry notes" you can further edit the file activated by F8 at dataentry.

Proceed to next section. Export Data

6 Export, Analysis and options.

The simplest export is a backup of your data. In case of fire, waterpipe failure, theft or breakdown of computers you MUST have a copy in a different location.

Therefore each day's work ends with making a "**backup copy**". Activate "Export data" and try it out.

If you wish to analyse the data with the EpiInfo program analysis.exe, you are ready to do so. The files written by EpiData can be analysed in EpiInfo as is, except for certain special field types, such as soundex fields and the <today-dmy> fields.

If you are using a different program for analysis you can export data to one of the types:

Simple export (data and variable names)
1..simple (comma separated) ascii file
2..dbaseIII
3..Excel

Complete export (data and variable names, labels)
4..Stata, SPSS and SAS

Import (data and for Stata also variable names, labels)
1..simple (comma separated) ascii file
2..dbaseIII
3..Stata

For use in other statistical programs commercial software for conversion is available, such as Stat/Transfer (http://www.circlesys.com/) or DBMS/Copy.

This was your first dataset with EpiData. Proceed to Support and About EpiData

Steps in the DataEntry Process - principle

1 Aim and purpose of investigation is settled

- Hypothesis described, Size of investigation, time scale, Power calculation ...
- Funding ensured, Ethical commitee ....etc.

2 Ensuring Technical dataquality at entry of data

Collect data and ensure quality of data from a pure technical point of view. Document the process in files and error lists.

- done by applying legal values, range checks etc
- entering all or parts of data twice to track typing errors.
- finding the errors and correcting them

3 Consistent data and logical assertion.

The researcher cross examines the data. Trying to see if data are to be relied upon:

- Sound from a content point of view (no grandmothers below age of xx, say 35)
- Amount of missing data. Some variables might have to be dropped or part of the analysis should question influence on estimates in relation to missing.
- Decisions on number of respondents (N).

Describe the decisions in a document together with descriptions of the dataset, variable composition etc.

4 Data Clean Up, derived variables and conversion to analysis ready dataset.

In most studies further clean-up and computation of derived variables is needed. E.g. in a follow-up study where periods of exposure should be established , merging of interview and register based information, computation of scales etc. Along this clean up decisions on particular variables, observations in relation to missing data are made. These decisions should all be documented.

5 Archive copy of data in a data archive or safety deposit. Include copies of all project plans, forms, questionnaires, error lists, other documentation. The aim is to be able to follow each value in each variable from final dataset to original observation.Archive original questionnaires and other paper materials as proof of existence in accordance with "Good Clinical Practice Guidelines", "Research Ethical Commitees" etc (e.g. for 10 years)

6 Actual analysis and estimation is done. All analysis is made in a reproducible way in principle. Sufficient documentation of this will be kept as research documentation.

Data documentation process

Aim and purpose of investigation is settled

- Hypothesis described, Size of investigation, time scale, Power calculation ...
- Funding ensured, Ethical commitee ....etc.

Ensuring Technical dataquality at entry of data

Collect data and ensure dataquality of data from a pure technical point of view

- done by applying legal values, range checks etc
- entering all or parts of data twice to track typing errors.
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Documenting the process in files or error lists.

Consistent data and logical assertion.

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Research Documentation

Actual analysis and estimation is done.

All analysis is made in a reproducible way in principle. Sufficient documentation of this will be kept as research documentation

DataEntry Process - in practice.

Depending on the particular study the details of the process outlined above will look different. The demands for a documentation based data-entry and clean-up process varies therefore. Let us look at the process in more detail.

a. Which sources for data Based on approved study plans. Decide which sources of data will make up the whole dataset. E.g. a questionnaire, an interview form and some blood samples. Sample/identify your respondents (patients). Generate an anonymous ID variable.

b. Save an ID-KEY file with two variables: **id** and **Social security number**, **Civil registration number** or other appropriate identification of respondents

c. Collect your Data:

questionnaire (common id variable): Enter data with control on variable level of:

- legal values, range, filter questions (jumps), etc.

interview form (common id variable): Enter data with control on variable level of:

- legal values, range, filter questions (jumps), etc.

blood samples (common id variable):

- Acquire data as automatic sampled or enter answers your self, applying appropriate control.

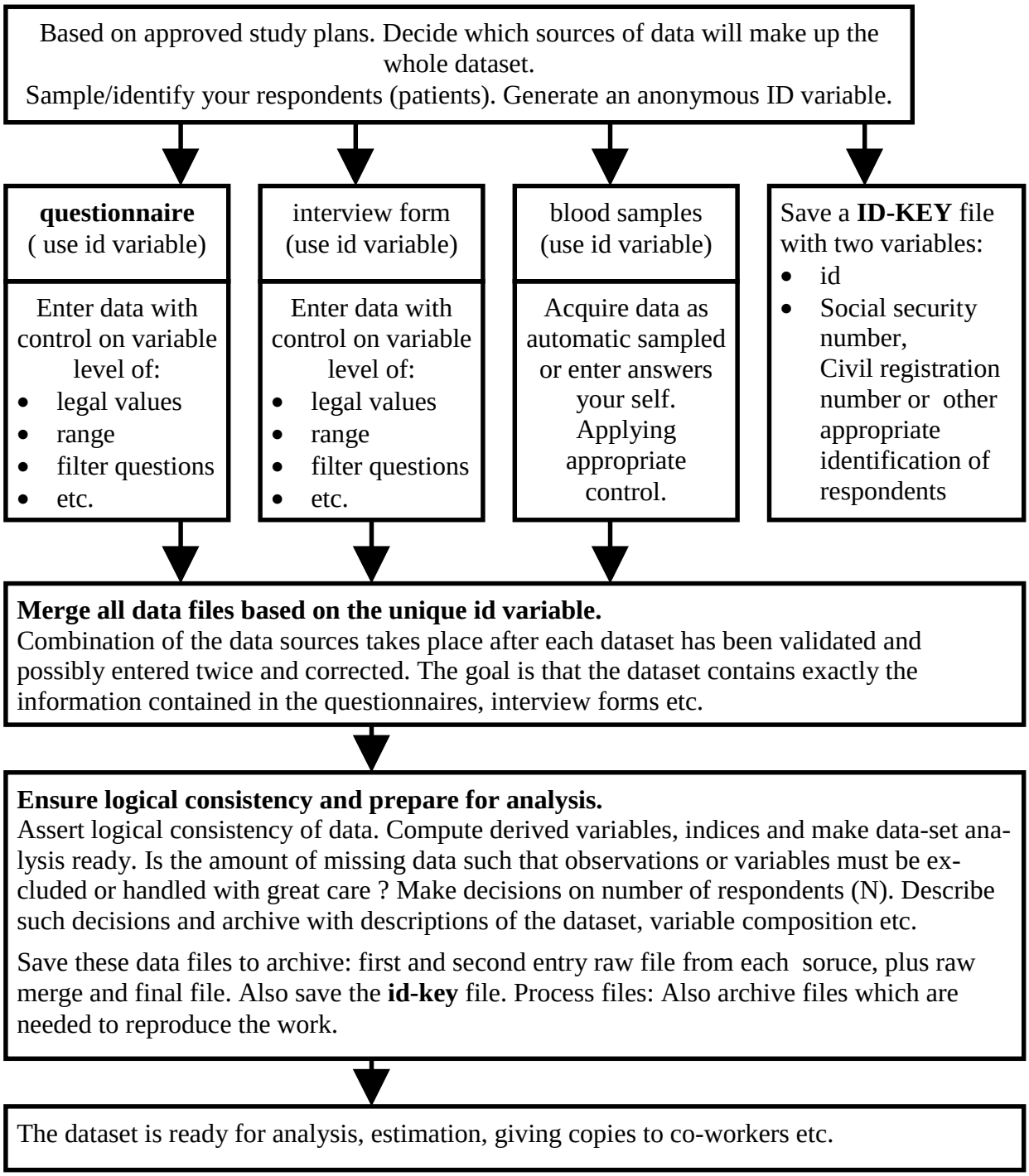
d. Merge all data files based on the unique id variable.

Combination of the data sources takes place after each dataset has been validated and possibly entered twice and corrected. The goal is that the dataset contains an exact replica of the information contained in the questionnaires, interview forms etc.

e. Ensure logical consistency and prepare for analysis.

Assert logical consistency of data. Compute derived variables, indices and make data-set analysis ready. Is the amount of missing data such that observations or variables must be excluded or handled with great care ? Make decisions on number of respondents (N). Describe such decisions and archive with descriptions of the dataset, variable composition etc.

Save these data files to archive: first and second entry raw file from each soruce, plus raw merge and final file. Also save the **id-key** file. Process files: Also archive files which are needed to reproduce the work..


Based on approved study plans. Decide which sources of data will make up the whole dataset.
Sample/identify your respondents (patients). Generate an anonymous ID variable.
questionnaire (use id variable)
Enter data with control on variable level of:
legal values
range
filter questions
etc.
interview form (use id variable)
Enter data with control on variable level of:
legal values
range
filter questions
etc.
blood samples (use id variable)
Acquire data as automatic sampled or enter answers your self. Applying appropriate control.
Save a ID-KEY file with two variables:
id
Social security number, Civil registration number or other appropriate identification of respondents
Merge all data files based on the unique id variable.
Combination of the data sources takes place after each dataset has been validated and possibly entered twice and corrected. The goal is that the dataset contains exactly the information contained in the questionnaires, interview forms etc.
Ensure logical consistency and prepare for analysis.
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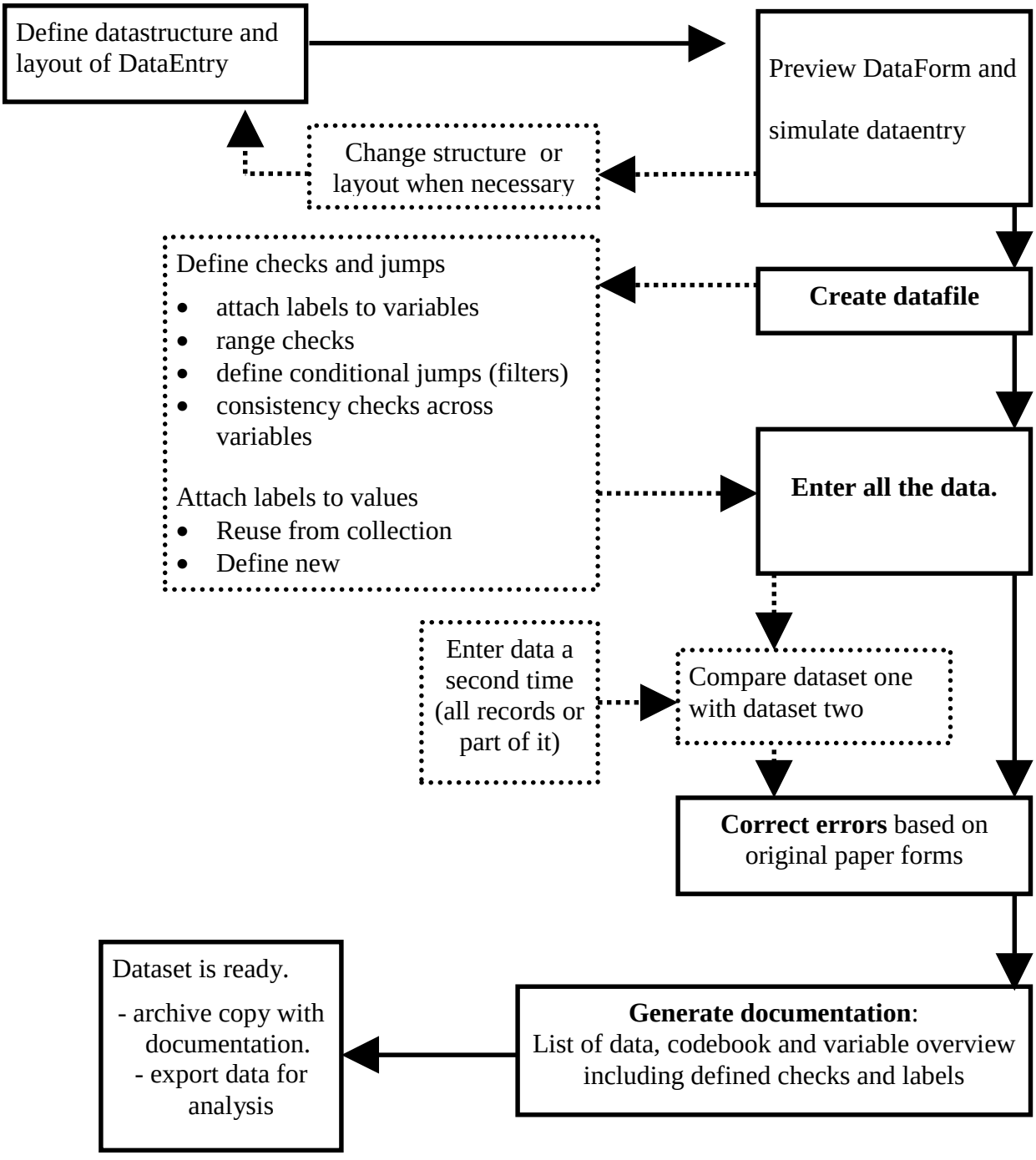
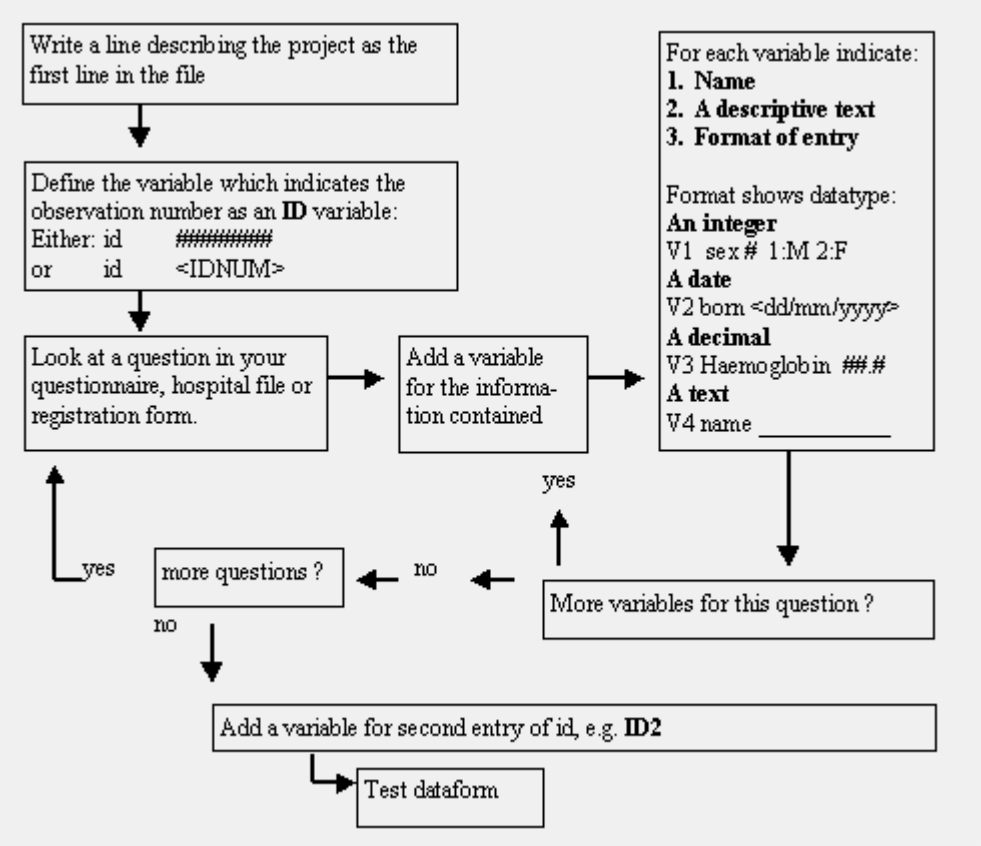
Save these data files to archive: first and second entry raw file from each soruce, plus raw merge and final file. Also save the id-key file. Process files: Also archive files which are needed to reproduce the work.
The dataset is ready for analysis, estimation, giving copies to co-workers etc.

Path Diagram - How to work with EpiData



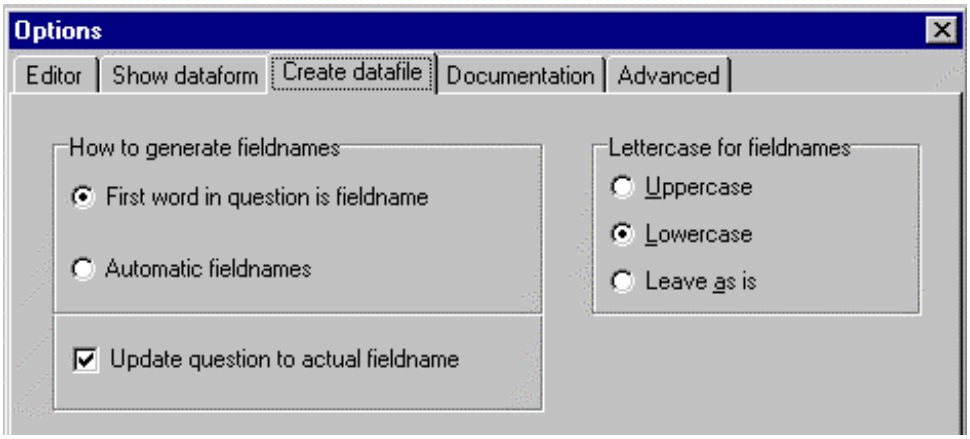
Path Diagram - Building a datadefinition ("qes" file)



If you add the descriptive text before the field defining character (e.g. #) then the text will be part of the variable label. If you place it <u>after</u> it will not.
Depending on settings in options, you can get variable names v1, v2 ....v8 or v1age v2sex ...

```
id <idnum>
V1      Age     ##
V2      Sex     #
V3      Temp    ##.##
V3a     Temp    ##.##
V4      WBC     ##
V5      AB      #
V6      Cult    #
V7      Serv    #
V8      Dur     ##
```

v8Dur in this example:



If you select "first word" as shown in the options (file menu) you get v1, v2.....v8 in the example above.

Support

If you find errors or bugs when using the program or have suggestions for improval please use the form found on www.epidata.dk

Sources for support:
1..Read the help file to epidata.
2..Read this epitour document
3..Download from http://www.epidata.dk the epidata help file
and the epitour help file in the format of "pdf", which is easy to print.
4. Basic aspects of epidata follows the epiinfo version 6 manuals. This is available from the epiinfo site: http://www.cdc.gov/epiinfo/

Unfortunately we do not have resources for support of dataentry questions in general.
We suggest that you refer these to the EpiInfo internet discussion list. See
http://www.cdc.gov/epo/epi/epiinfo.htm

About EpiData

EpiData is a Windows 95/98/NT/2000 based program (32 bit) for DataEntry.

Program design by
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Released by:
The EpiData Association, Odense, Denmark.

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Acknowledgements and other

Please see the main help file for EpiData for further information on funding, acknowledgements etc.

Disclaimer

The EpiData software program was developed and tested to ensure fail-safe entering and documentation of data. We made every possible effort in producing a fail-safe program, but cannot in any circumstance be held responsible for errors, loss of data, work time or other losses incurred by or in relation to the program.