

AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Data Management Guide

Using Epi Info™ 7 for
Assessments of Chemical Exposure (ACE)

National Toxic Substance Incidents Program

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Introduction

This guide briefly introduces you to Epi Info™ 7 and shows how to use it for Assessment of Chemical Exposure (ACE) investigations. The guide also tells you where you find more Epi Info information and assistance. Note, however, that the material in this guide only highlights some of the major features of this software useful to you during your ACE investigation. CDC has many valuable Epi-Info forums, user guides, and tutorials. See **Resources** for more information.

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Introduction to Epi Info™ 7

Epi Info™ 7, which from now on we refer to as “Epi Info,” is a suite of free data management, analysis, and visualization tools designed specifically for the public health community. It is used extensively throughout CDC and at other health agencies and departments, both domestically and internationally. Key features include:

- Rapid electronic form creation and data entry
- Statistical analysis
- Mapping and visualization

Why Use Epi Info for ACE Assessments?

The Epi Info software has many advantages that make it a useful tool for managing data from ACE assessments. Advantages include:

- Free software download
- User friendly interface
- Flexibility
 - The software can manage a large database (ACE currently has over 255 data fields)
 - You can easily modify the data entry forms; this is critical during emergencies when you need to modify a survey quickly to collect the data you need
 - You can export data into Microsoft Excel or Access then import it into a variety of statistical packages for analysis
 - In addition to analyzing Epi Info data, the program can analyze data in MS Access, MS Excel, SQL Server, and ASCII files

Downloading Epi Info

Epi Info is a free download that you can install on your computer from the Web. You should check online frequently to make sure you stay current on the software updates. Having the most recent version is important—especially before you begin work on data management for an ACE investigation.

You can access Epi Info program files on the Web at <https://www.cdc.gov/epiinfo/index.html> .

You can download Epi Info two ways:

- Use the .zip file. You can download directly on to your desktop without requiring administrative privileges. This way is useful during emergencies or on laptops not connected to a network.
- Use the traditional setup mechanism. This way allows network administrators to manage the software. And it has the potential advantage of making program

components run faster. But during this installation, you will need administrative privileges for your computer.

System Requirements

Before downloading the software, your computer needs to meet the following requirements:

- Microsoft .NET Framework 4.0 or above
- Recommended - 1 GHz processor
- Recommended - 256 MB RAM
- Supported Operating Systems: Microsoft Windows XP or above

Data Entry

The ACE surveys are set up in a modular format to make them easy for you to adapt for your situation. You can delete any module or question that doesn't apply to your assessment. A module is also available with which you can add questions specific to the chemical incident in your jurisdiction. For example, if no explosion occurred during the chemical incident, you will not want the module that asks about an explosion. But you might want to ask the exposed community about a new communication mechanism local authorities or responders used during the incident.

ATSDR staff has already set up an ACE database. You can request the ACE database by email (atsdrace@cdc.gov) or by phone (404-567-3256).

Preparation

To begin entering data, all you have to do is edit the database to match the survey forms for your investigation. Epi Info allows you to make additions, deletions, and edits to the current database to match any changes you make to the survey forms.

Opening the ACE Survey Database

To prepare for the data entry process, you will first need to open the ACE database. Follow these steps:

- Save the .prj and .mdb ACE Database files in the same folder on your computer. A good location for these files is a folder in the Epi Info 7 Projects file on your C:\ drive.
- Double-click the Epi Info icon to open the program
- From the pop-up main menu, click "Create Forms" to open the form designer
- At the top of the page, select "Open Project"
- Open ACESurvey.prj file from the folder in which you saved it

Once you have loaded the ACE Survey database, you can select the forms you want to delete or edit. For those questions you added to the survey, you can add pages, data fields, or both within the form.

Figure 1 is the main Epi Info menu. From here, you can create forms, enter data, and analyze data.



Figure 1

The Project Explorer is where you can add and remove forms from your project; add, edit, and remove pages from individual forms; and work with templates. You will be working in this window of Epi Info when you are modifying the ACE surveys in preparation for data entry.

Figure 2 shows what the ACE database looks like once it has been loaded into the form designer. The pane on the left is the project explorer; the pane on the right is the canvas.

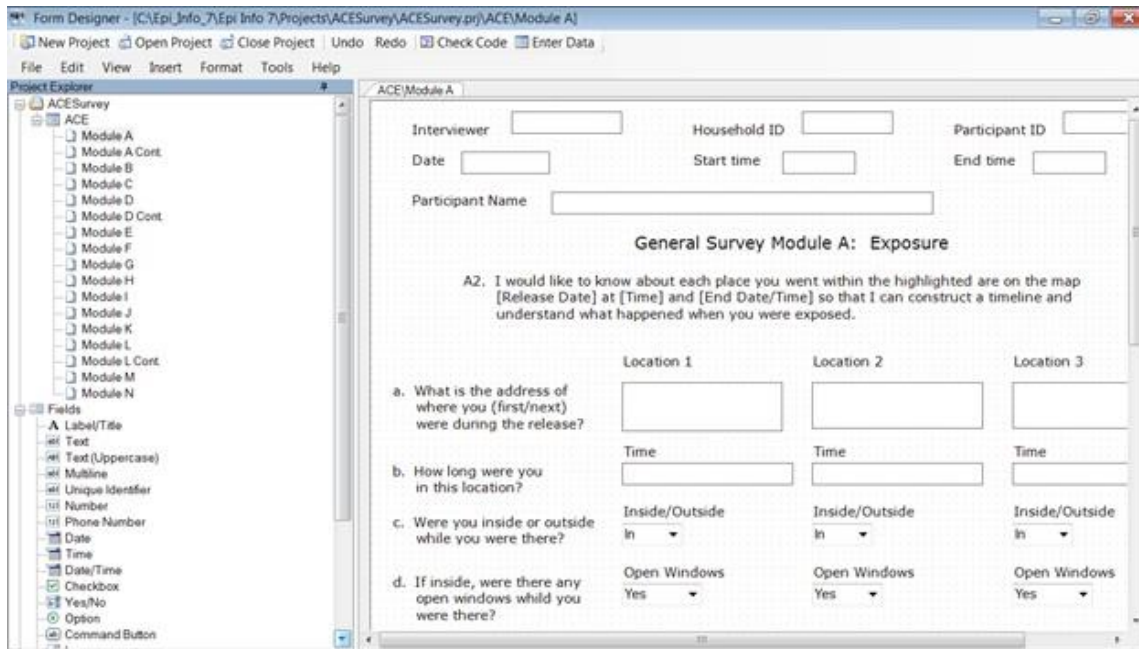


Figure 2

Deleting Pages

If you didn't use a particular module during your assessment, it is important that you delete the page. That way you will avoid having a series of database fields without any data. By right-clicking on the page in the form designer's project explorer (left pane) of the form designer, you will see an option to delete a page.

For example, if no fire or explosion occurred during your chemical incident, you would want to delete Module C, which collects symptom data resulting from a fire or explosion. Just right-click Module C in the project explorer and select "Delete Page" from the pop-up menu. See Figure 3.

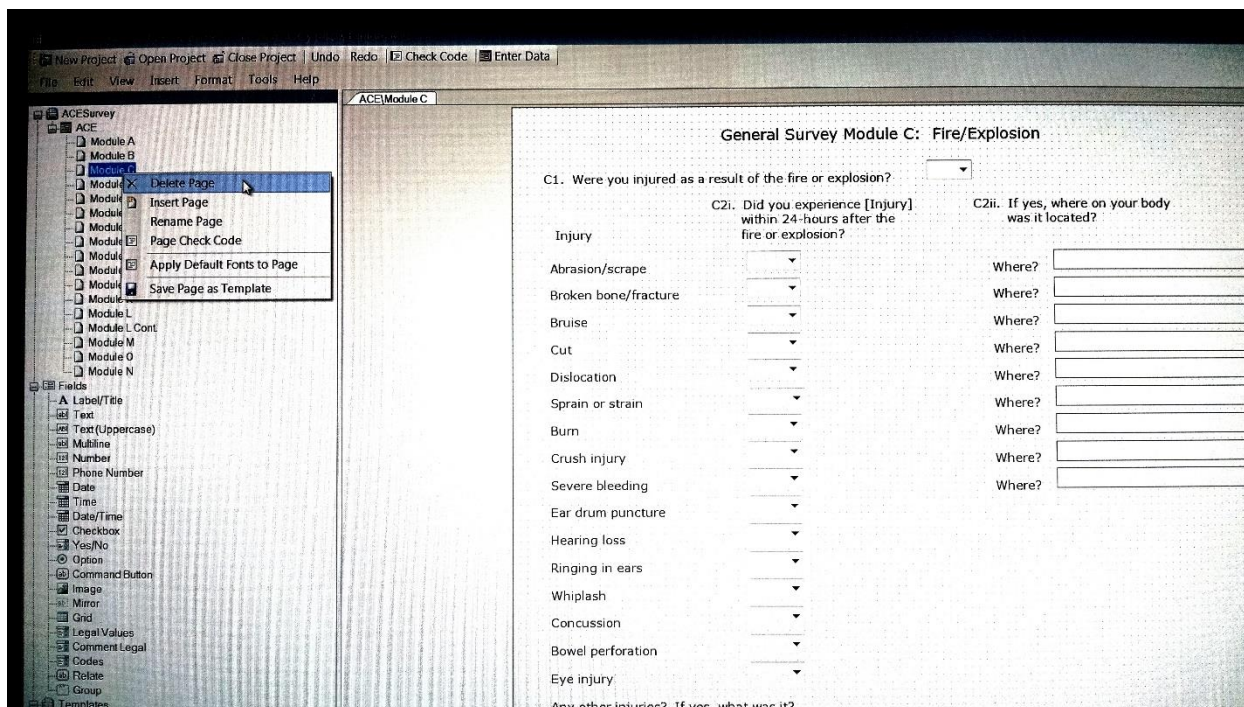


Figure 3

Adding Pages

If you want to add incident-specific questions to the ACE database, you might want to insert a new page then add fields that you need for the additional questions. To add a new page, make sure you are in the form designer, right-click on the ACE survey form, and select “Insert Page.” Refer to Figure 3.

Adding Fields

To add fields, right click on the canvas (the dotted white space in the right pane) and select the new field type that you need. Figure 4 shows the list of all the available field types. To help you select the appropriate field for the question you’re asking, check the online tutorials. Using the appropriate fields is critical for preventing data entry errors and for increasing the ease of data analysis.

For many fields, the ACE database uses drop-down boxes (i.e. text with legal values). We avoided check boxes except for fields such as race, where multiple races can be selected. Check boxes have a default value of “no,” which means you are unable to distinguish between “no” and “not answered.” In addition, each checkbox becomes its own field, so there are multiple fields representing race in the database.

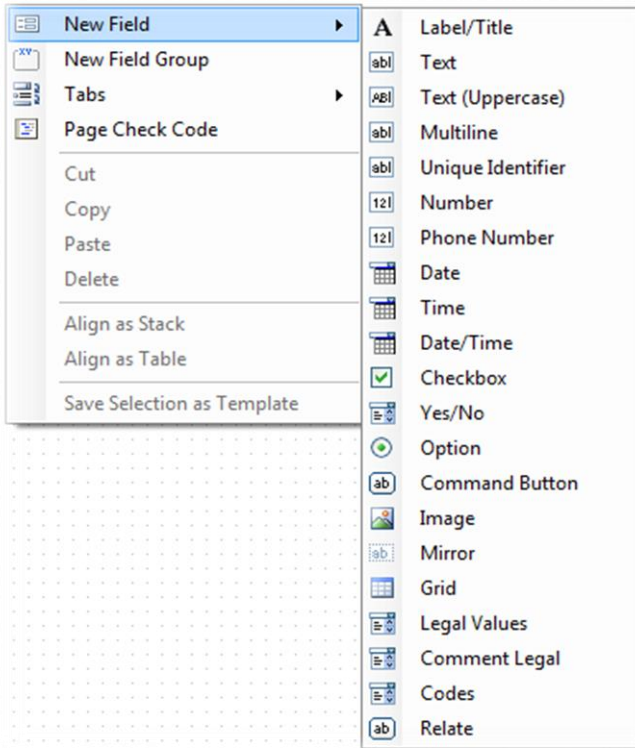


Figure 4

The only “required” field in the ACE database is the participant ID number. A “required” field means one that has to have data entered into it before any subsequent fields can be populated. Keep this in mind during your editing if you decide to create a “required” field.

Each page contains multi-line note boxes so there are already places to enter additional information collected by the interviewer into the database.

Entering Data into the ACE Survey Database

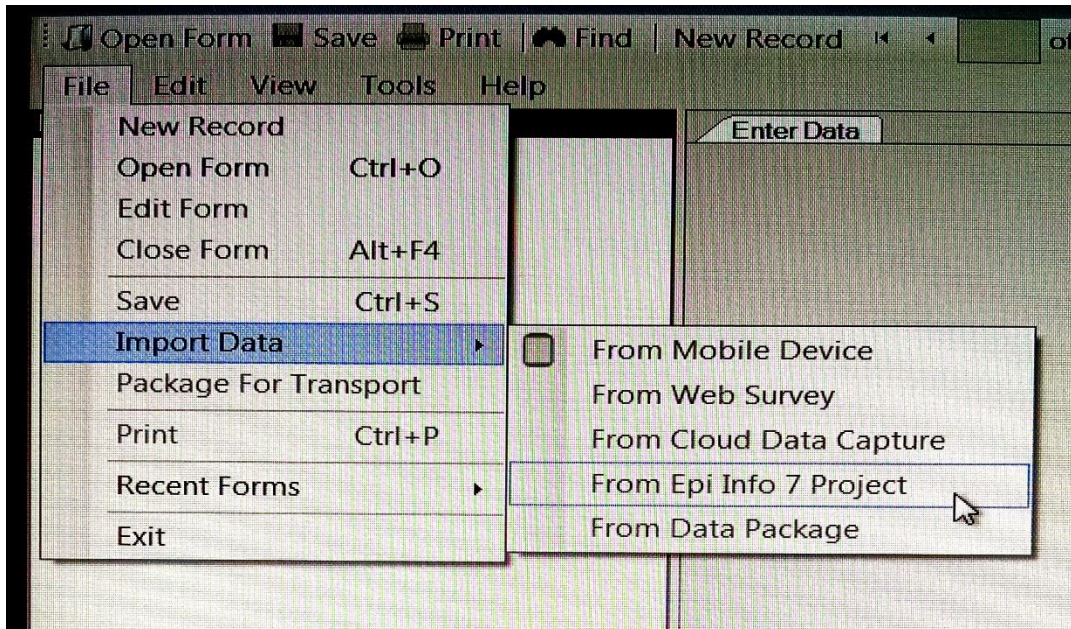
Data entry in Epi Info is straightforward. To enter data in the ACE Survey database:

- Double-click the Epi Info icon to open the program
- From the pop-up main menu, click “Enter Data”
- On the top toolbar on the “Enter Data” page, select “Open Form”
- Open ACESurvey.prj file from the folder in which you saved it
- Click New Record
- Enter your data using the TAB key to move through the fields or your mouse to select the fields. Epi Info saves your data as you work through the form
- When you have finished with one record, click New Record to enter data from the next completed questionnaire

Merging Databases

Several people might use different computers to enter data from your ACE surveys into your incident's database. If so, Epi Info allows you to merge the databases into a single database you can analyze. Note that if you plan on entering data into multiple databases, everyone must use the same ACE database .prj and .mdb files. To merge the databases, follow these steps:

- Save the files that need to be merged on your computer
- Select "Enter Data" from the Epi Info main menu
- Click File Menu
- Select Import Data, From Epi Info 7 Project—See Figure 5
- Select the .prj file that contains the data form you want to import and merge—In the top box shown in Figure 6
- Select the data form containing the data you want to import and merge—In the second box shown in Figure 6
- Select Update and Append records—See Figure 6
- Select Import—See Figure 6
- Click on toolbar to show a line list and review it to make sure your data merged properly—See Figure 7



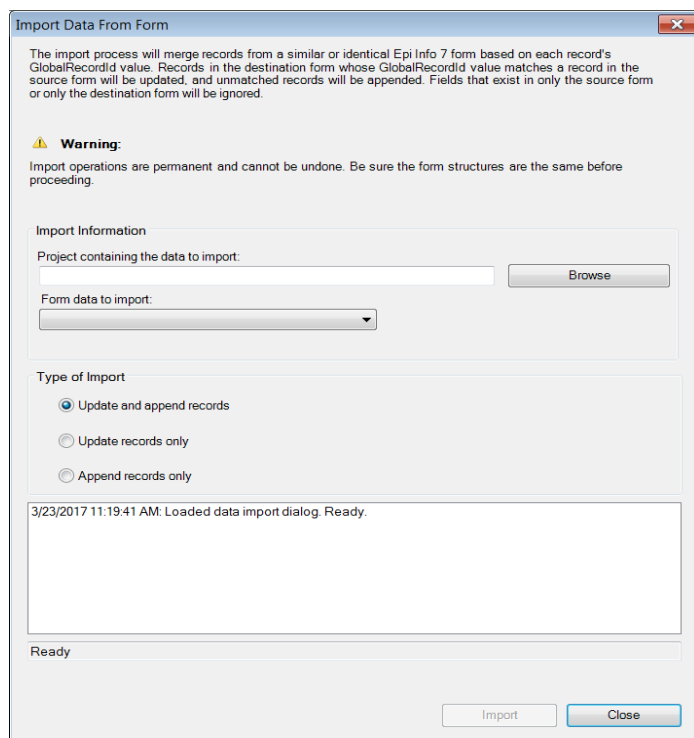


Figure 6

Sending the Databases via Email

If data is being entered on multiple computers and you need to share those data via email, you will need to send both the .prj file and the .mdb file. Note that some email programs, including Microsoft Outlook, will strip .mdb files—those files will not reach your intended recipient.

There are two ways to make sure your .mdb file reaches its destination:

- Change the .mdb extension to .abc; the recipient changes the file extension back to .mdb when saving the file
- Zip the .mdb file and attach it to the email.

Exporting the Data to MS Excel

Once you have finished entering data, you might want to export those data to Microsoft Excel. The easiest way to do this is when you are still in the “Enter Data” window. First, open the database you want to export. On the toolbar along the top on the “Enter Data” screen, click the “Line Listing” down arrow and select “MS Excel” from the menu (see Figure 7). When the database opens in Excel, save the file.

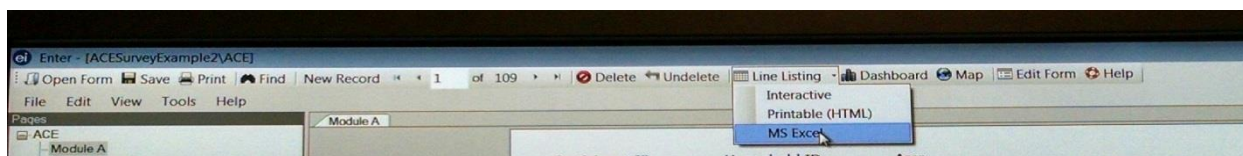


Figure 7

You can also export your data into Excel or Access in the Analysis window, but that requires more steps.

Always check to make sure that your Excel file has all of your fields. ACE databases often have more than 255 data fields, and in older versions of Excel that might exceed the field limit.

Before analyzing your data, open the Excel database and see if when data were exported the word “Missing” was entered for fields with no data some field types (such as Yes/No). If so, you might want to use the Find and Replace function to change those fields from “Missing” to a blank space. Otherwise, when you try to run 2 X 2 tables, you will end up with 3 X 2 or 3 X 3 tables for those fields.

Data Analysis

Epi Info has two methods for analyzing data: Classic Analysis and Visual Dashboard. Analysis on the Visual Dashboard uses gadgets. For those unfamiliar with Epi Info, gadgets might be the most straightforward approach to analysis. We’ll describe it here.

When you first open the Visual Dashboard, you will be asked to set the data source you will use for your analysis. When prompted, select the .prj file that has your incident data and click “OK.” See Figure 8.

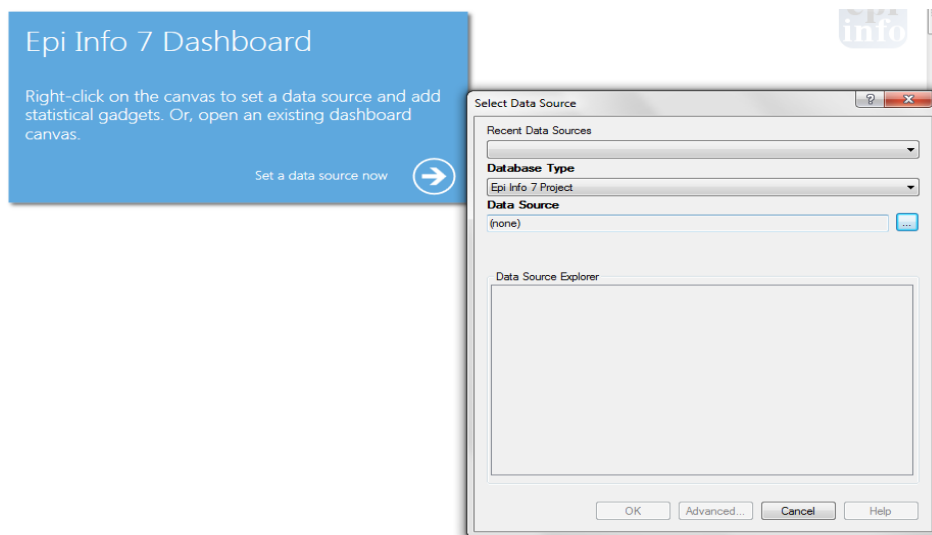


Figure 8

After you have set your data source, two tabs always appear on the Visual Dashboard: defined variables and data filters. You can add gadgets to the analysis canvas, but those tabs will always remain. The most often-used gadgets with the ACE Survey data are frequencies, means, charts (for epi curves), and 2x2 tables. By right-clicking on the Visual Dashboard canvas, you are given an option to add gadgets to the canvas from a dropdown menu (See Figure 9). This is where you can select the gadgets you want to use.

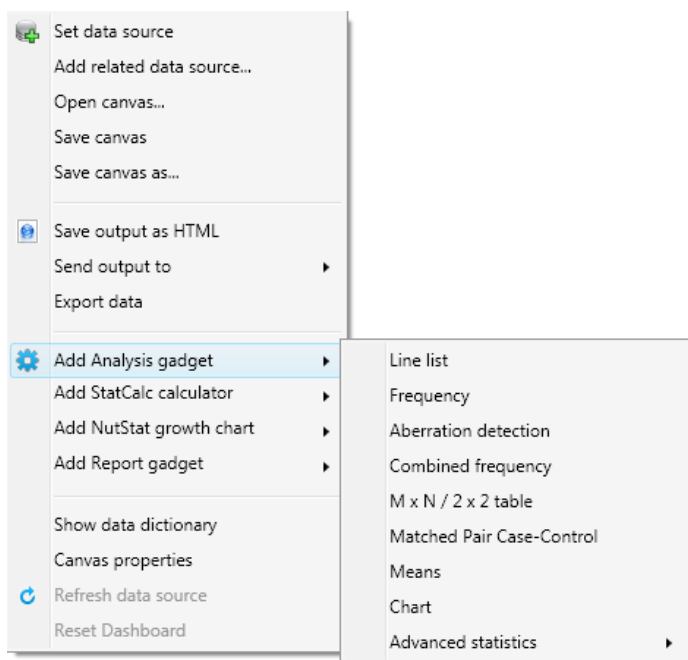


Figure 9

Frequencies

You can analyze frequencies to help understand your exposed population more thoroughly. For example, you can determine what proportion of your population is male and female, thus allowing you to determine which sex was more frequently exposed to the chemical(s). By analyzing the transport variable, you can determine how people were transported to the hospital for medical care.

First, select “Frequency” from the Add Analysis gadget from the drop down menu (refer to Figure 9) and select the field you want to analyze (e.g., Transport) and click “Ok” (see Figure 10). The gadget will then show the results you requested (see Figure 11). If desired, you can right-click in the results table and either copy your data to a clipboard or send it to Microsoft Excel.

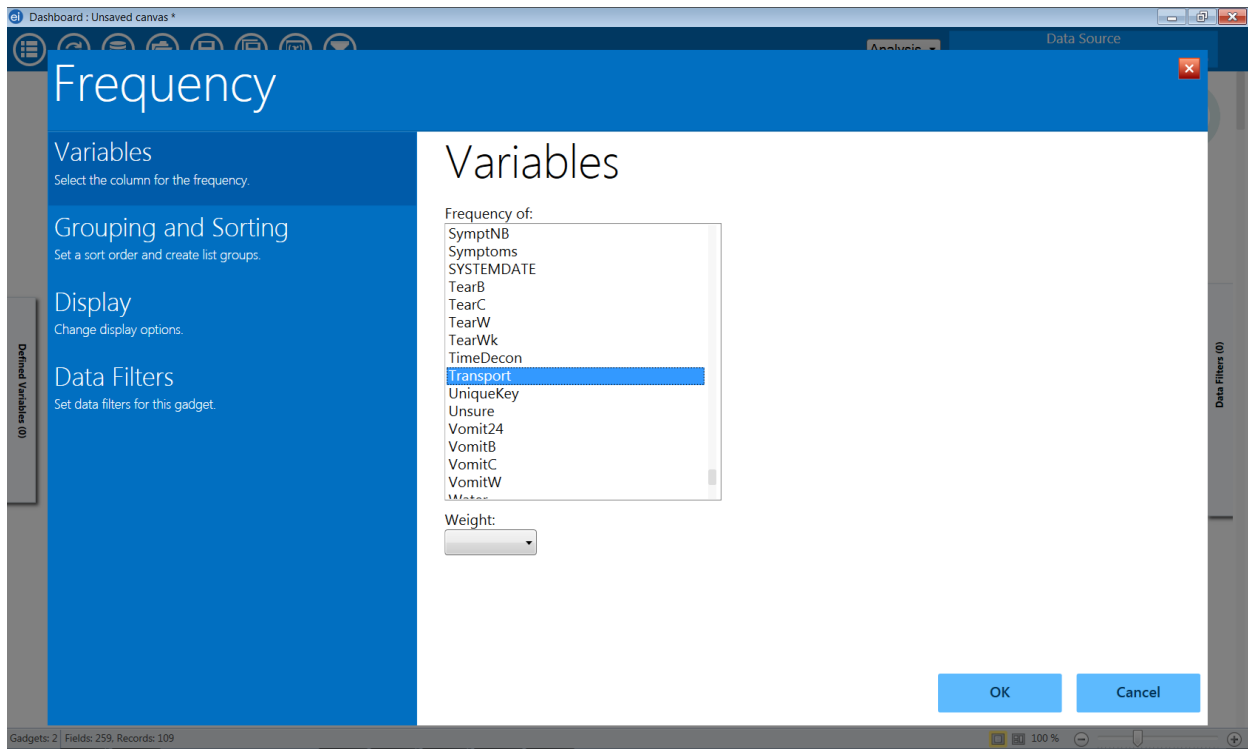


Figure 10

D8. How did you get to the hospital?	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
Driven by relative, friend, or acquaintance	2	50.00 %	50.00 %	6.76 %	93.24 %
Drove self	2	50.00 %	100.00 %	6.76 %	93.24 %
TOTAL	4	100.00 %	100.00 %		

Figure 11

Means

The “Means” gadget allows you to generate summary statistics for the numeric data in your database. This includes calculating the mean, median, maximum, minimum, and mode. You could analyze the age of the exposed population you interviewed and even use the advanced option to then cross-tabulate age by sex so you could further understand your exposed population.

First, select “Means” from the Add Analysis gadget dropdown menu, then select the field you want to analyze (e.g., Age). The gadget will update, showing the results you requested. As with the “Frequency” gadget, you can right-click and send your results to Microsoft Excel or to a

clipboard. See Figure 12 for a view of the gadget with the advanced options expanded, and Figure 13 for a sample of the generated results.

While Figure 13 does not include a cross-tabulation, you can add a cross-tabulation in the means properties panel by clicking the down-arrow and selecting the advanced options text. In the cross-tabulation drop down list, select the field you want (e.g., sex). The gadget will then display the results.

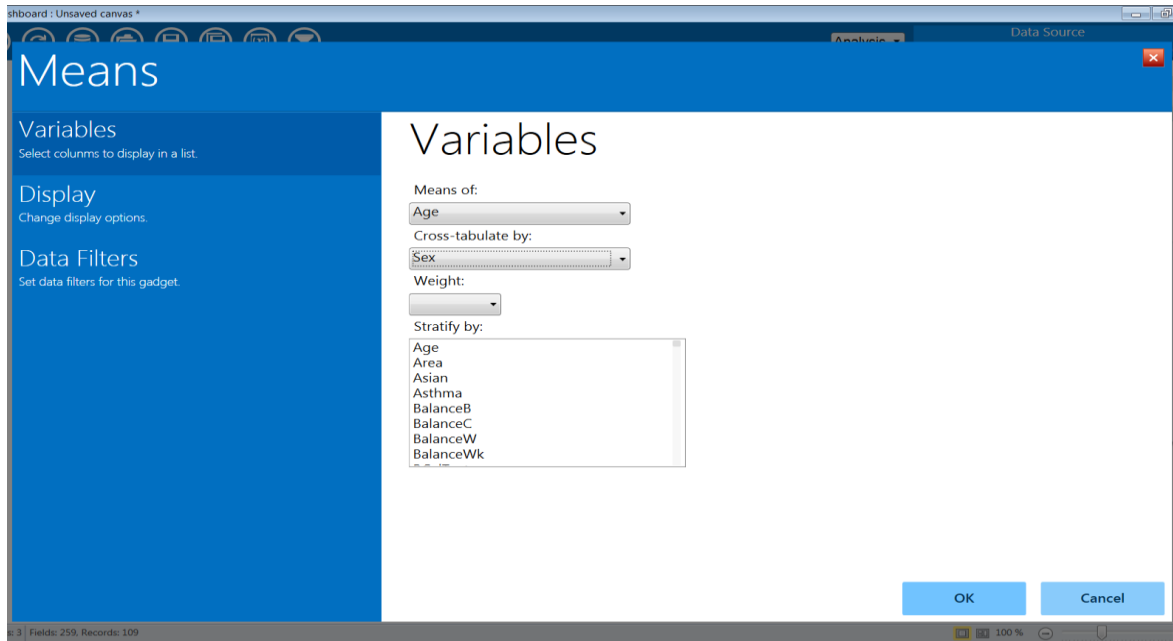


Figure 12

Means											
	Obs	Total	Mean	Var	Std Dev	Min	25%	Median	75%	Max	Mode
Age	104	4513	43.3942	533.1149	23.0893	3.0000	22.5000	46.0000	60.0000	94.0000	22.0000

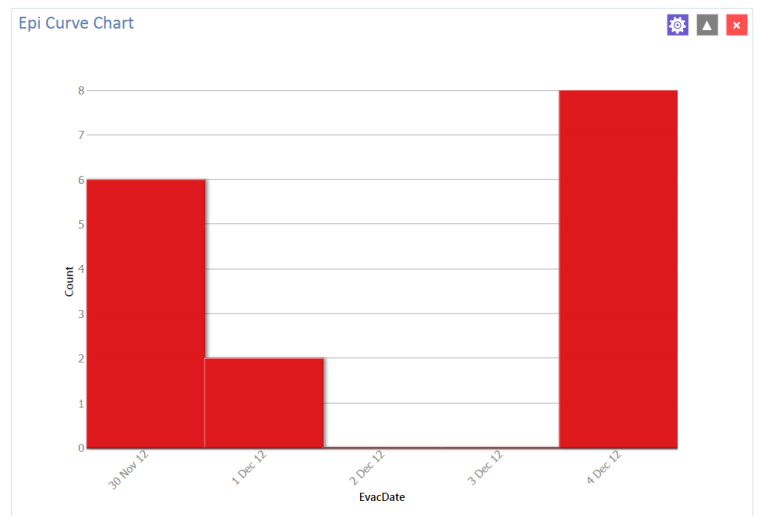
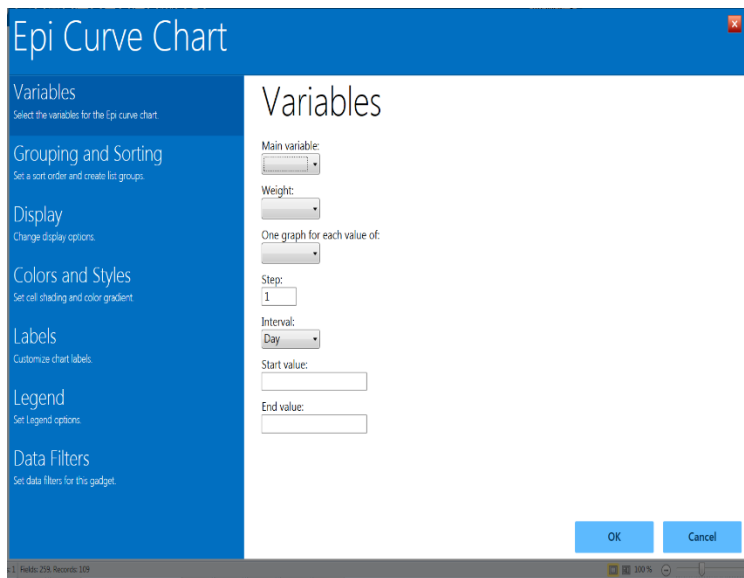
Figure 13

Epidemic (Epi) Curve

In ACE investigations, we most often use an epidemic curve (commonly referred to as an epi curve) to show the number of patients receiving medical care at hospitals each day. The horizontal axis is the time of onset, representing when the exposed person arrived at the hospital. The vertical axis is the number of exposed persons who arrived at the hospital during that time. It can also be used for other dates, such as when people evacuated an area during an ongoing release.

To create an epi curve (see Figure 14):

- Right-click on the dashboard. A pop-up context menu should appear.
- Select Add Analysis Gadget > Chart. A chart gadget should appear on the dashboard canvas.
- From the chart type drop-down list, select Epi Curve (See Figure 14).
- Select the relevant variables to be displayed (See Figure 14).
- Click the Generate Chart button (see Figure 15 for a sample of generated results).



2x2 Tables

The 2x2 table is useful for calculating odds ratios and for analyzing results of yes/no or checkbox-response questions. For example, if you are interested in seeing how many evacuated persons developed symptoms, select the MxN/2x2 table option (using the same process as you did for frequencies and means). You then select your exposure field (e.g., whether the person evacuated) and the outcome field (e.g., did he or she experience symptoms). Figure 16 is a screenshot of the 2x2 table gadget and Figure 17 shows an example of results.

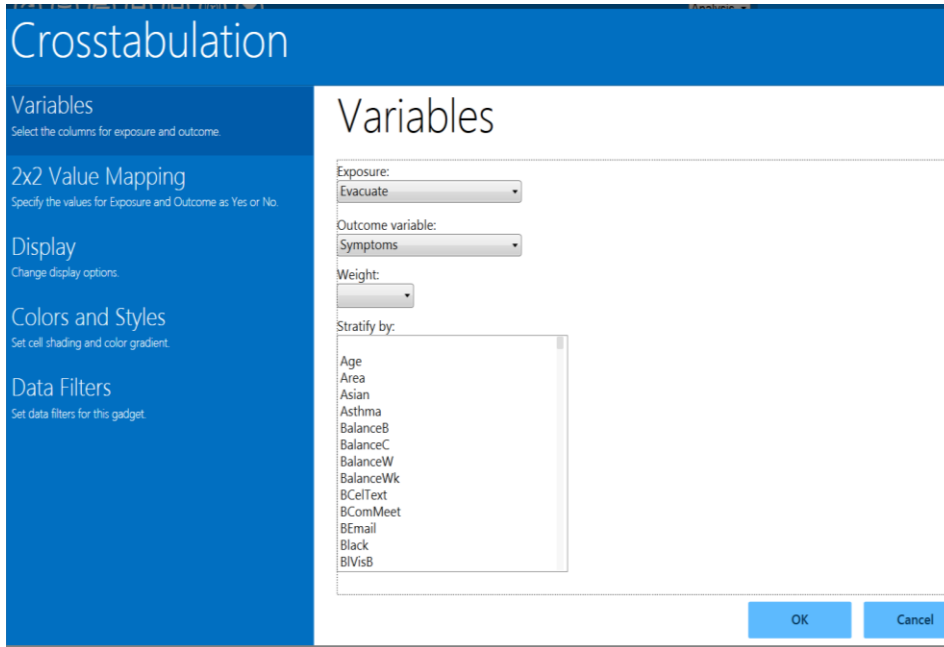


Figure 16



Conclusion

This data management guide is not meant to be a complete guide to Epi Info. Rather, it's a tool you can use to get started managing and analyzing your ACE assessment data. This guide provides general instructions for how to download Epi Info, load the ACE database, tailor the ACE database to fit the survey you used to collect your data, enter your data, and get started with basic analysis functions. For the many other resources available to assist you with Epi Info, see the **Resources** section.

Resources

We have provided links to several Websites, forums, and tutorials where you can learn more about how Epi Info can work for you.

- Go online on CDC's Web page for the latest Epi Info program at:
<http://www.cdc.gov/epiinfo>
 - Additional training resources and tutorials are available online at:
<http://wwwn.cdc.gov/epiInfo/html/tutorials.htm>
 - User guide with links: <http://wwwn.cdc.gov/epiinfo/user-guide/index.htm>
 - Helpline: epiinfo@cdc.gov or call 404.498.6190
 - Send your comments and suggestions to: epiinfo@cdc.gov
- Join Epi Info Community of Users in phConnect:
<http://www.phconnect.org/group/epiinfo>
 - Download slide presentations from the Epi Info Community of Users in phConnect: <http://www.phconnect.org/group/epiinfo/forum/topics/epi-info-7-training-module-1>
 - The forum also has ongoing Epi Info discussion:
<http://www.phconnect.org/group/epiinfo/forum>
 - A quick start guide has been posted to get you started on some of the basics discussed here: <http://www.phconnect.org/group/epiinfo/forum/topics/epi-info-7-quick-start-guide>
- Check out YouTube for additional demonstrations: http://www.youtube.com/watch?v=-uTHI9E6NK8&feature=player_embedded

The findings and conclusions in this guide have not been formally disseminated by the Agency for Toxic Substances and Disease Registry and should not be construed to represent any agency determination or policy.