

**WHAT'S NEW IN EMERGENCY PRE-HOSPITAL CARE RESEARCH?
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**STATISTICAL PROCESS CONTROL (SPC) WORKSHOP
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Hints and Tips

Setting your macro security level

The funnel plot and SPC tools use various macros. To allow the tools to run correctly your computer macro settings in Excel need to be set to medium.

To do this:

1. Open an Excel workbook
2. Click the 'tools' menu on the bar at the top of the screen
3. Click on 'macro' which will be on the drop down list that appears
4. select 'macro security' on the next list that appears
5. Select the 'medium' option and press OK

For Excel 2007 users:

1. Click the Office Button 
2. Select Excel Options
3. Select Trust Centre
4. Select Trust Centre Settings
5. Select Macro Security and set to medium

Every time you open the audit sheets the computer will ask you if you want to enable macros. Click 'enable' and the macros should work.

Using the Charting Tools

Using the Funnel Plot Tool (SPC Builder v 2.2)

Terms used in SPC tool:

Population – the total number of records, items, patients etc in the samples audited by each team

Prevalence – the number or percentage of cases which meet the set criteria for the audit

(Note: if using percentages, and pasting data from an excel sheet, the format should be number format not percentage format ie data should look like 45.45 not 45.45% when appearing on the SPC tool)

Tip: Data can be typed straight onto the tool or pasted in from an excel sheet. It is generally advisable to use data from an excel sheet as data has to be cleared and re-entered if errors are spotted or data is added after the chart has been created.

Creating the Chart

1. Open an Excel workbook and type in the data for the funnel plot from the data sheet.
2. Open SPC Builder and enable the macros.
3. Click the - '1 extraction/Start' button on the left of the screen.
4. Enter the number of data sources you will be entering (ie how many 'Teams' are you comparing). For our data this will be 11.
5. Click OK on the box which appears.
6. Go to your Excel workbook and click 'Edit' – 'Office clipboard'.
7. Highlight and copy the data from the team names, population and prevalence columns (NB Do not copy the column headings if you have put them in) – **Tip** if you copy the data in reverse order it will appear in the correct order on the clipboard for pasting into the SPC builder.
8. Return to the SPC builder and click on the cell which shows 'ID 1'. On the office clipboard click on the team identifiers and these will be pasted in.
9. Click in the top cell under the heading 'x axis' and on the office clipboard click on the Population data.
10. Click in the top cell under the heading 'y axis' and on the office clipboard click on the prevalence data.
11. Once you are happy the data has pasted in correctly press the '1 extraction/create SPC' button.
12. Watch all the pretty flashing lights until the chart appears!
13. Press OK on the box which appears

Formatting the Chart

Add your team identifiers to the chart:

1. Select 'Tools' from the menu bar.
2. Select 'XY chart labels', 'Add Chart Labels' from the drop down lists.
3. Click in the 'select a label range' box.
4. Click on the tab for the 'Calculate' worksheet towards the bottom left of the screen.
5. Highlight the team names and press OK. The team names will then appear on your chart.
6. To reposition the team names, select the chart labeller from the Tools menu then 'Move Labels'. Use the arrows to reposition the labels.

7. Labels can be repositioned individually if their difficult to read due to their position on the chart. To do this, click on the team name you want to move. Pause slightly then click the name again. You can now click and drag the name to where you want it.

Add chart titles and name axis

1. Click on 'chart title here' so that the text box appears.
2. Highlight the phrase 'chart title here' and type in your chart title
3. Repeat for the axis labels

Copying the chart into another document

1. Click in the white area around the chart so that 8 square dots appear around the frame of the chart.
2. Copy the chart then paste it into your document.

Creating another chart and closing the SPC Builder

To create a new chart:

1. Select the 'Calculate' worksheet
2. Click the 'clear all data' button
3. Repeat the 'Creating the Chart' instructions above from Step 3

When closing down do not save changes. If you do wish to save the data and chart use the 'Save as' function from the File menu and rename the file.

Using the SPC I Chart Tool (BCPChart400)

Creating the Chart

1. Open an Excel workbook and type in the data for the 'statistical process control I chart' from the data sheet.
 - a. All column headings should appear in row 13 with the first one starting in cell B13.
 - b. Data should start in row 14.
 - c. The first column (B) should hold the date or time period for the data entered
 - d. Subsequent columns should contain the data to be plotted. Each column can hold data for different criteria
2. Save and close the database (remembering where you have saved it!)
3. Open the BCP Chart tool and enable macros.
4. A message will appear asking if you want to open the tool as 'read only'; always select 'yes'.
5. From the 'File' menu select 'load database (from prior save only)' and select the data file you saved in step 2.
6. Select the 'I chart' worksheet tab (bottom left of screen, second tab in). After a couple of seconds your data will appear on the chart.

Formatting the Chart

The chart and axis titles can be changed in the same way as described in the Funnel plot instructions, above.

'Right clicking' on any of the chart elements (eg axis, data points etc) will open formatting menus allowing you to change scales, and appearance. Click on the white area outside of the chart to return the chart to normal.

The Chart shows the first 25 data points by default. If you have more than 25 data points or only wish to show a particular range of data you can change the number of data points displayed by clicking on the 'X Range' button, selecting 'Use first, last rows shown' and using the up and down arrows to define the data range.

To alter the range of the Y axis, click on the 'options' button and select the 'Y Range' button.

Highlighting a 'step change'

Eight or more data points falling on and above the green centre line in sequence (ie no data point falling below the centreline) suggest that there has been a sustained improvement in the system being used. These can be shown more clearly by inserting a 'step change'. To do this:

1. Click the 'Options' button
2. Click the 'step change' radio button which is at the bottom of the list under 'type of trend'
3. Click on the 'Set Up Step Change' button which appears on the right hand side
4. In our data the sequence of data falling above the centre line begins at Jan 08. Click the down arrow at the end of the step 2 box. Scroll down and select Jan 08.
5. Click the 'copy to current history' button on the right hand side and then the 'Done' button at the top right.
6. Click OK in the Control Chart Options box.
7. A new centreline and upper and lower control lines have been plotted.

If you have more than one column of data in your database, the next and previous buttons will move between the charts for each set of data, or you can use the 'select' button to go straight to the chart you want.

Using the charts in other documents

There are two ways of copying charts for use in other documents. The first way is to click in the area around the chart to select it and use the normal copy and paste functions.

The second way is to create a Layout.

1. Click the 'layout button
2. In the top left hand corner select the number of charts you want to appear on the layout
3. In the 'Data in each Chart' section use the down arrows to select the charts you want to appear (we only have one so this automatically appears on the list)
4. Press the 'Create Layout' button then exit.
5. Select the Layout tab along the bottom of the worksheet and you chart/charts will be shown.
6. To save the layout, select 'Special' from the toolbar
7. Select 'copy charts to file' from the drop down menu
8. Select the items you want to save by clicking on the relevant radio buttons
9. Click OK
10. Your charts etc appear in a new workbook. Use the 'File', 'Save as' function in the normal way to save the workbook.

Data for use in the Workshop

Data for the SPC Funnel Plot

Team	Population (Number of records audited by each team)	Prevalence (% of total population meeting set criteria)
1	11	45.45
2	118	30.51
3	235	22.98
4	130	33.85
5	54	25.93
6	186	24.19
7	300	14.33
8	74	63.51
9	129	57.36
10	102	39.22
11	61	75.41

Note:

The SPC tool will only work with data entered in 'number format'. When using percentages, and pasting in data from an excel sheet, ensure that the data is in number format (to convert percentage format into number format in excel, change the cell format to number with 2 decimal places, then multiply the cell by 100).

Data for Statistical Process Control (SPC) I chart

Date (enter in cell B13 on excel work sheet)	Number Meeting Criterion (Enter in cell C13 on excel worksheet)
Jan-07	45
Feb-07	44
Mar-07	50
Apr-07	62
May-07	48
Jun-07	45
Jul-07	48
Aug-07	52
Sep-07	43
Oct-07	47
Nov-07	46
Dec-07	49
Jan-08	54
Feb-08	55
Mar-08	57
Apr-08	58
May-08	58
Jun-08	57
Jul-08	57
Aug-08	57
Sep-08	55
Oct-08	56
Nov-08	57

Note:

The SPC Tool will take data in number or percentage format.