

## How to Create Histograms with 95% Confidence Intervals in MS Excel

The 95% CI indicates that the true rate lies somewhere between these intervals. To represent these graphically, a number of steps must be undertaken prior to creating the chart.

1. Your data will look like this in an excel spreadsheet:

Risk Index	Number of SSI	Total Number of procedures	Rate	95% CI
0	11	485	2.3	1.1-4.0
1	43	832	5.2	3.8-6.9
2	32	456	7.0	4.8-9.8
3	21	207	10.1	6.4-15.1

(there may also be a NULL row in some instances).

2. Firstly, create two new columns which will indicate the difference between the rate and the highest range of the 95% CI and the lowest range of the 95% CI.

Risk Index	Number of SSI	Total Number of procedures	Rate	95% CI	Upper 95	Lower 95
0	11	485	2.3	1.1-4.0		
1	43	832	5.2	3.8-6.9		
2	32	456	7.0	4.8-9.8		
3	21	207	10.1	6.4-15.1		

For Risk Index 0, subtract the rate (2.3) from the upper 95%CI (4.0). This can be calculated using a formula in the cell or calculated manually i.e.  $4.0 - 2.3 = 1.7$ . Insert 1.7 into the Upper 95 column;

Risk Index	Number of SSI	Total Number of procedures	Rate	95% CI	Upper 95	Lower 95
0	11	485	2.3	1.1-4.0	1.7	
1	43	832	5.2	3.8-6.9		
2	32	456	7.0	4.8-9.8		
3	21	207	10.1	6.4-15.1		

To calculate the difference between the rate and the Lower 95%CI, subtract the Lower 95%CI from the rate i.e.  $2.3-1.1=1.2$ . Insert 1.2 into the Lower 95% CI column.

<b>Risk Index</b>	<b>Number of SSI</b>	<b>Total Number of procedures</b>	<b>Rate</b>	<b>95% CI</b>	<b>Upper 95</b>	<b>Lower 95</b>
0	11	485	2.3	1.1-4.0	1.7	1.2
1	43	832	5.2	3.8-6.9		
2	32	456	7.0	4.8-9.8		
3	21	207	10.1	6.4-15.1		

If the 95% CI is reported as n/a, put a 0 (zero) as the upper and lower 95.

3. Repeat these steps for the 95% CI for Risk Index 1, 2 and 3 rows.

<b>Risk Index</b>	<b>Number of SSI</b>	<b>Total Number of procedures</b>	<b>Rate</b>	<b>95% CI</b>	<b>Upper 95</b>	<b>Lower 95</b>
0	11	485	2.3	1.1-4.0	1.7	1.2
1	43	832	5.2	3.8-6.9	1.7	1.4
2	32	456	7.0	4.8-9.8	2.8	2.2
3	21	207	10.1	6.4-15.1	5.0	3.7

4. So that Excel can read the data correctly, insert 'RI' into the Risk Index column next to the numbers;

<b>Risk Index</b>	<b>Number of SSI</b>	<b>Total Number of procedures</b>	<b>Rate</b>	<b>95% CI</b>	<b>Upper 95</b>	<b>Lower 95</b>
RI 0	11	485	2.3	1.1-4.0	1.7	1.2
RI 1	43	832	5.2	3.8-6.9	1.7	1.4
RI 2	32	456	7.0	4.8-9.8	2.8	2.2
RI 3	21	207	10.1	6.4-15.1	5.0	3.7

(for NULL, insert "RI NULL")

You are now ready to start creating the chart.

5. Whilst holding down CTRL, select the Risk Index column, (Select by clicking in the cell and dragging over cells you wish to select)

The screenshot shows an Excel spreadsheet with the following data:

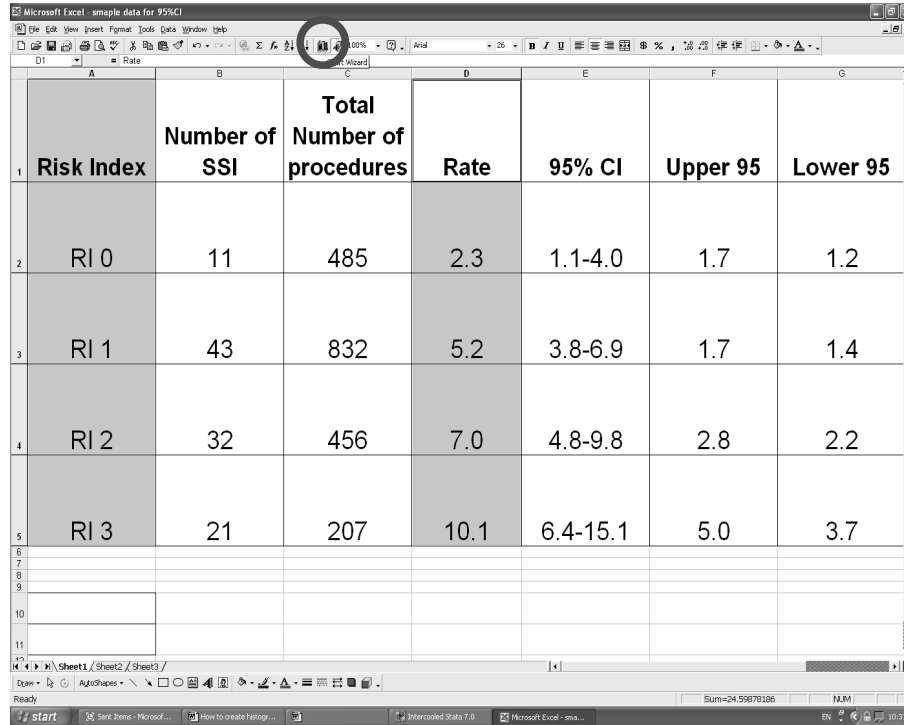
	A	B	C	D	E	F	G
1	<b>Risk Index</b>	<b>Number of SSI</b>	<b>Total Number of procedures</b>	<b>Rate</b>	<b>95% CI</b>	<b>Upper 95</b>	<b>Lower 95</b>
2	RI 0	11	485	2.3	1.1-4.0	1.7	1.2
3	RI 1	43	832	5.2	3.8-6.9	1.7	1.4
4	RI 2	32	456	7.0	4.8-9.8	2.8	2.2
5	RI 3	21	207	10.1	6.4-15.1	5.0	3.7
6							
7							
8							
9							
10							
11							

6. Continue to hold down CTRL, and select the Rate column;

The screenshot shows the same Excel spreadsheet as above, but now the Rate column (D) is also selected. The data remains the same:

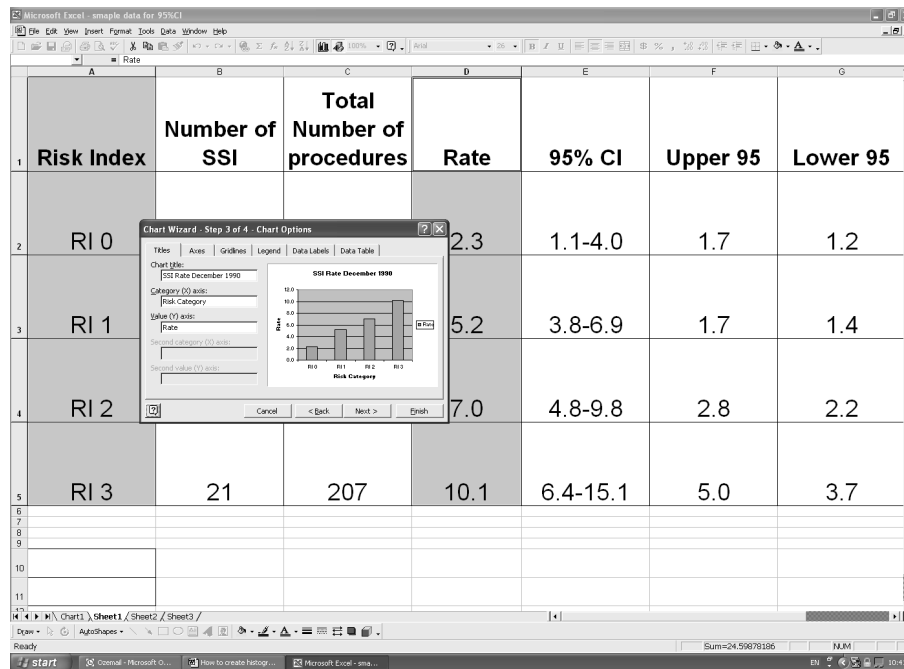
	A	B	C	D	E	F	G
1	<b>Risk Index</b>	<b>Number of SSI</b>	<b>Total Number of procedures</b>	<b>Rate</b>	<b>95% CI</b>	<b>Upper 95</b>	<b>Lower 95</b>
2	RI 0	11	485	2.3	1.1-4.0	1.7	1.2
3	RI 1	43	832	5.2	3.8-6.9	1.7	1.4
4	RI 2	32	456	7.0	4.8-9.8	2.8	2.2
5	RI 3	21	207	10.1	6.4-15.1	5.0	3.7
6							
7							
8							
9							
10							
11							

7. Once selected, click on the “Chart Wizard” icon from the menu;



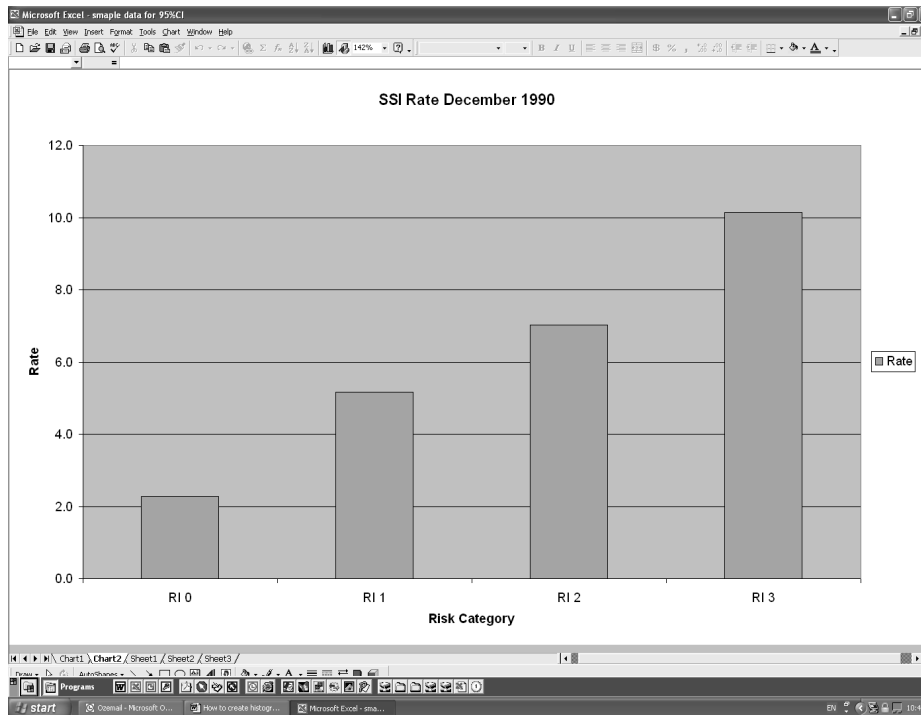
	A	B	C	D	E	F	G
1	<b>Risk Index</b>	<b>Number of SSI</b>	<b>Total Number of procedures</b>	<b>Rate</b>	<b>95% CI</b>	<b>Upper 95</b>	<b>Lower 95</b>
2	RI 0	11	485	2.3	1.1-4.0	1.7	1.2
3	RI 1	43	832	5.2	3.8-6.9	1.7	1.4
4	RI 2	32	456	7.0	4.8-9.8	2.8	2.2
5	RI 3	21	207	10.1	6.4-15.1	5.0	3.7
6							
7							
8							
9							
10							
11							

8. The “Chart Wizard” will then appear. Follow the instructions in the Wizard, labeling and formatting as desired.

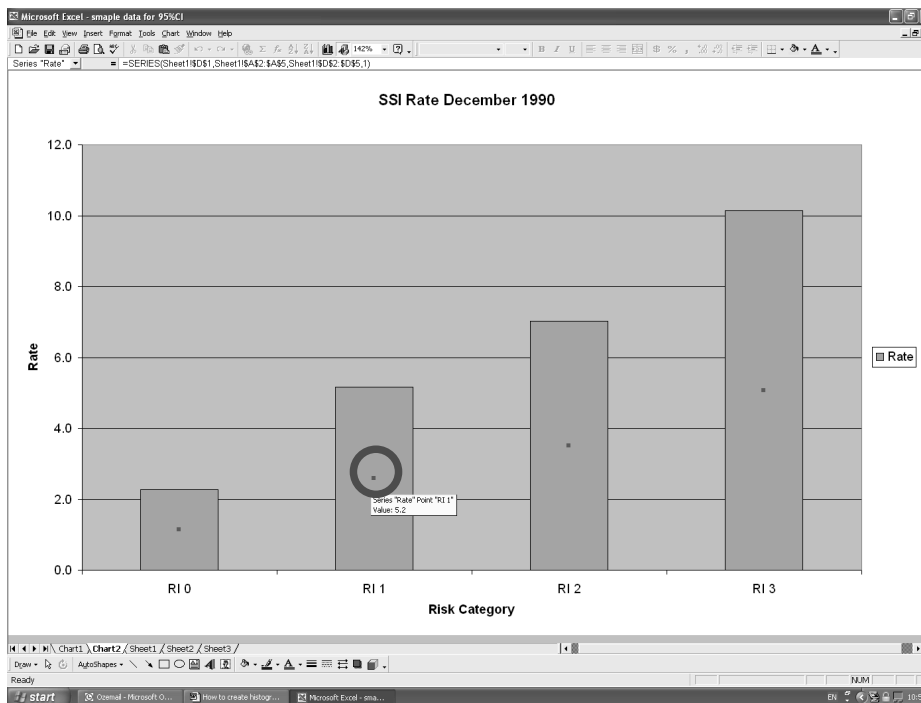


	A	B	C	D	E	F	G
1	<b>Risk Index</b>	<b>Number of SSI</b>	<b>Total Number of procedures</b>	<b>Rate</b>	<b>95% CI</b>	<b>Upper 95</b>	<b>Lower 95</b>
2	RI 0			2.3	1.1-4.0	1.7	1.2
3	RI 1			5.2	3.8-6.9	1.7	1.4
4	RI 2			7.0	4.8-9.8	2.8	2.2
5	RI 3	21	207	10.1	6.4-15.1	5.0	3.7
6							
7							
8							
9							
10							
11							

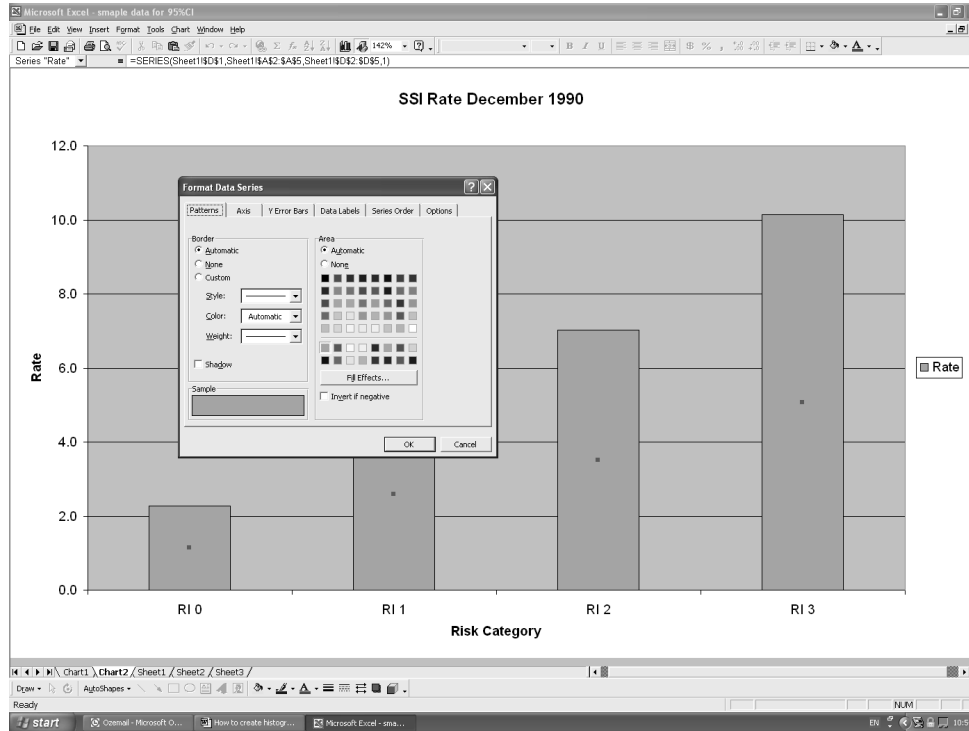
9. Once completed, your chart should look like this;



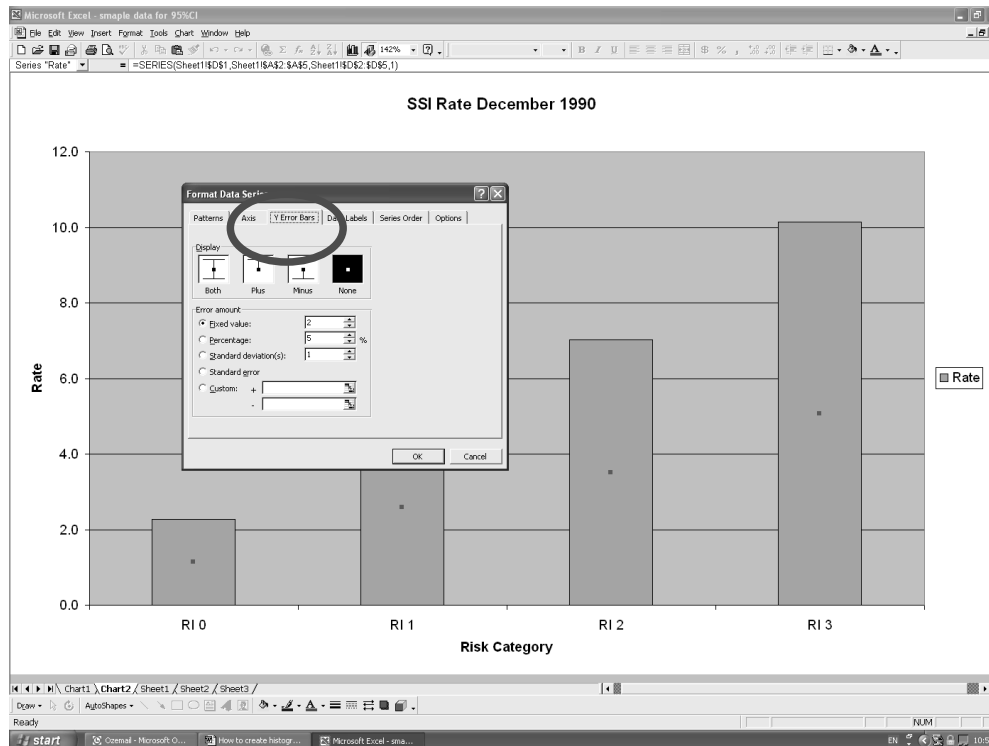
10. To create the 95% CI bars, double click in the middle of any of the histogram bars;



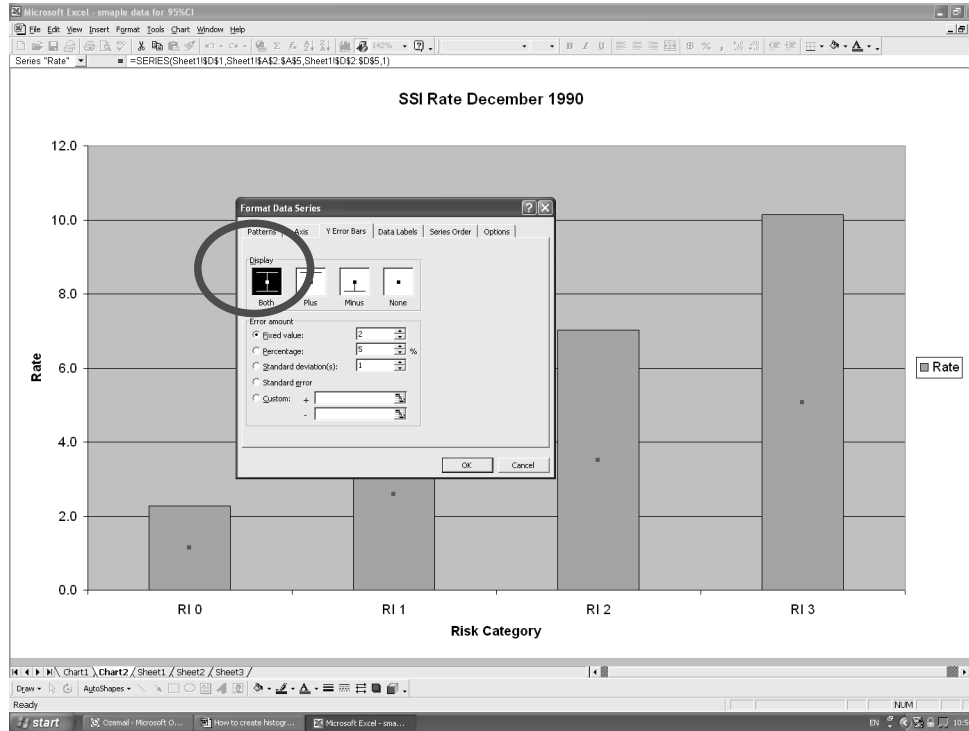
## 11. The “Format Data Series” window will appear;



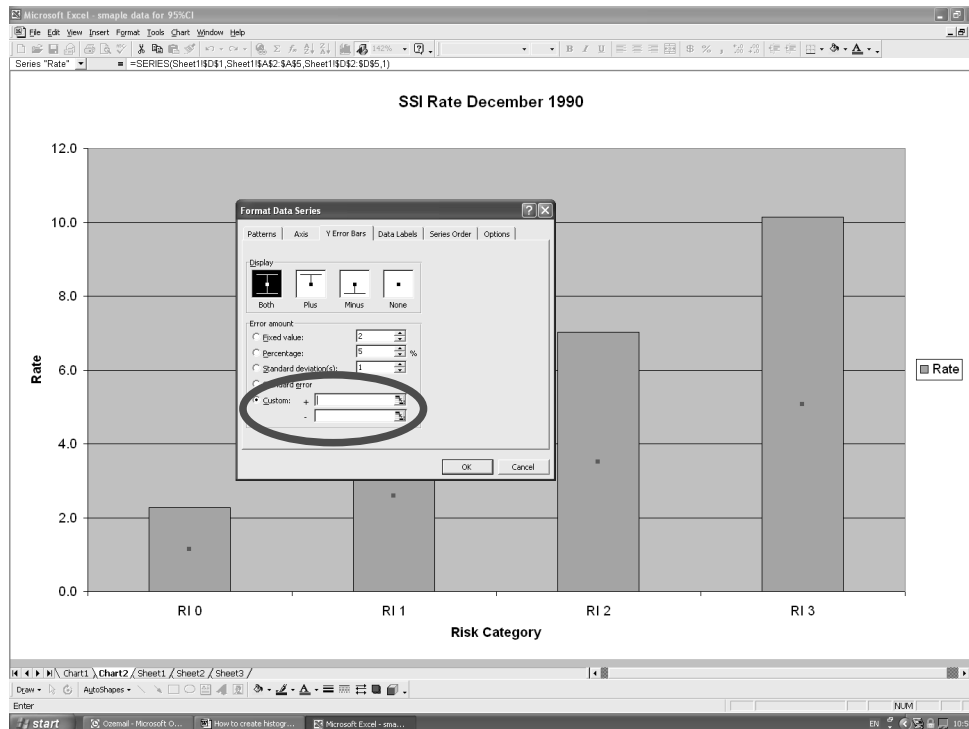
## 12. Select the “Y Error Bars” tab



## 13. Click 'Both' in Display box:



## 14. Select the Custom button, and click in the "+" bar;



15. With the cursor flashing in the "+" bar, click on the spreadsheet tab where the data is stored;

	Risk Index	Number of SSI	Total Number of procedures	Rate	95% CI	Upper 95	Lower 95
1							
2	RI 0	1			1.1-4.0	1.7	1.2
3	RI 1	4			3.8-6.9	1.7	1.4
4	RI 2	3			4.8-9.8	2.8	2.2
5	RI 3	21	207	10.1	6.4-15.1	5.0	3.7

16. Now select the data in the Upper 95 column;

	Risk Index	Number of SSI	Total Number of procedures	Rate	95% CI	Upper 95	Lower 95
1							
2	RI 0	1			1.1-4.0	1.7	1.2
3	RI 1	4			3.8-6.9	1.7	1.4
4	RI 2	3			4.8-9.8	2.8	2.2
5	RI 3	21	207	10.1	6.4-15.1	5.0	3.7

17. The cell range will now be displayed in the "+" bar of the "Format Data Series" window;

	Risk Index	Number of SSI	Total Number of procedures	Rate	95% CI	Upper 95	Lower 95
1							
2	RI 0	1			1.1-4.0	1.7	1.2
3	RI 1	4			3.8-6.9	1.7	1.4
4	RI 2	3			4.8-9.8	2.8	2.2
5	RI 3	21	207	10.1	6.4-15.1	5.0	3.7

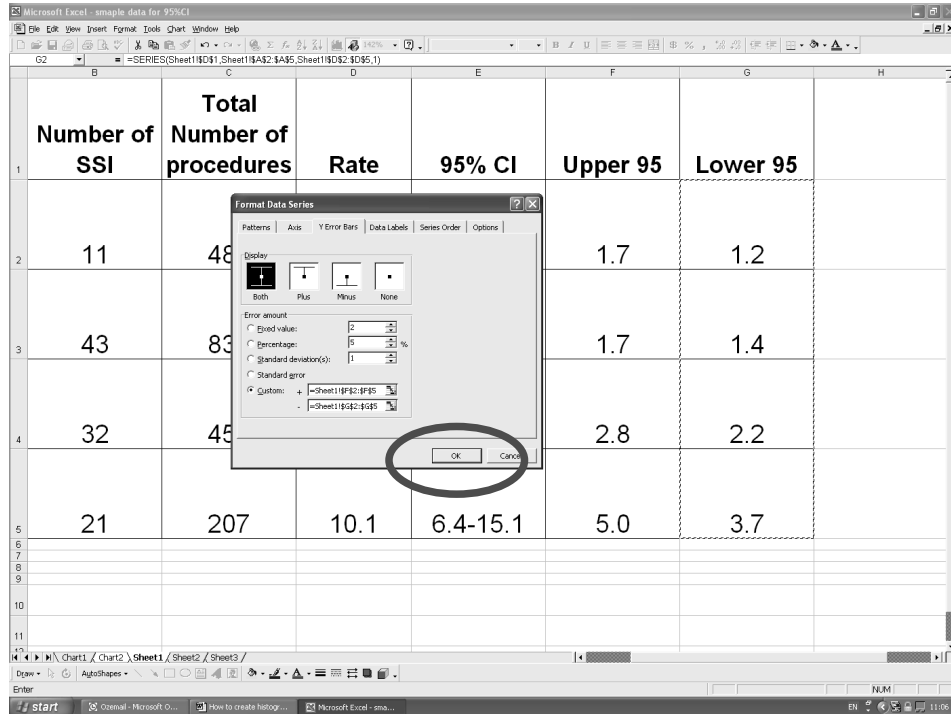
The 'Format Data Series' dialog box is open, showing the 'Error Bars' tab. The 'Custom' option is selected, and the cell range reference is set to '=Sheet1!\$F\$2:\$F\$5'. The '+' sign in the 'Display' section is highlighted.

18. Repeat this for the – bar. Click in the "-" bar and select the data in the Lower 95 column, and the cell range will appear in the "-" bar;

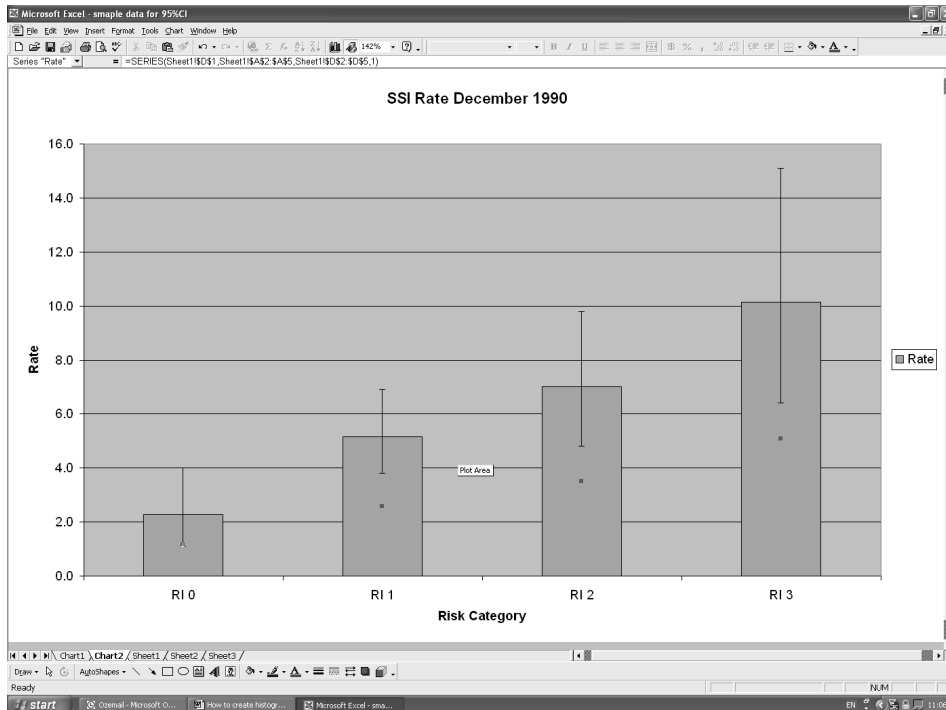
	Risk Index	Number of SSI	Total Number of procedures	Rate	95% CI	Upper 95	Lower 95
1							
2	RI 0	1			1.1-4.0	1.7	1.2
3	RI 1	4			3.8-6.9	1.7	1.4
4	RI 2	3			4.8-9.8	2.8	2.2
5	RI 3	21	207	10.1	6.4-15.1	5.0	3.7

The 'Format Data Series' dialog box is open, showing the 'Error Bars' tab. The '-' bar is selected, and the cell range reference is set to '=Sheet1!\$G\$2:\$G\$5'. The '-' sign in the 'Display' section is highlighted.

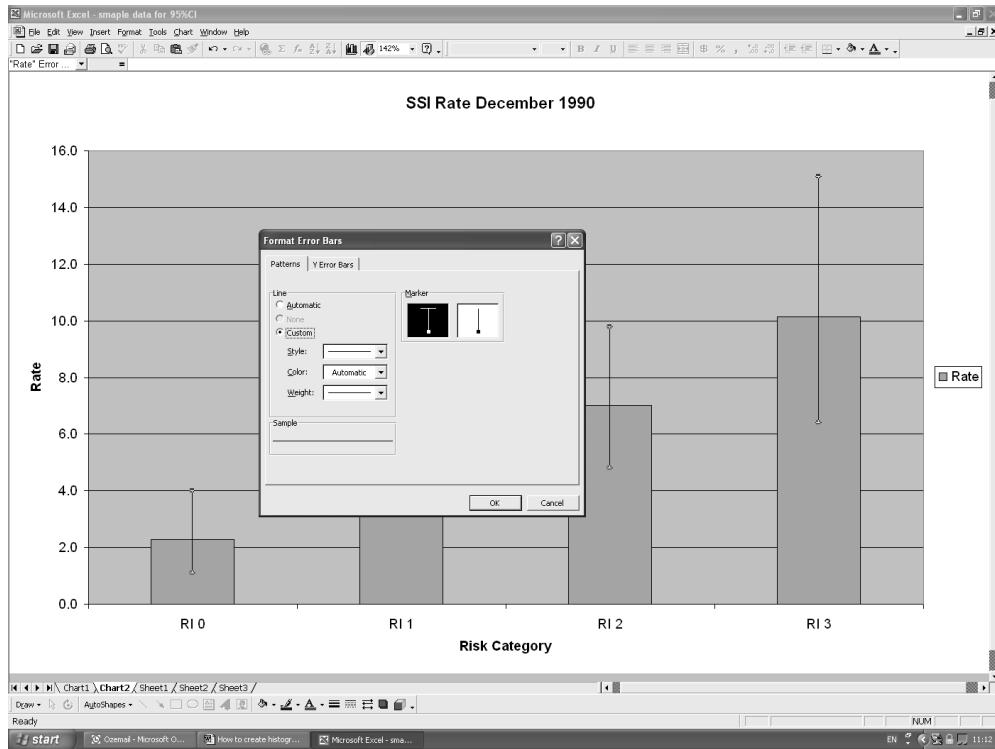
19. Now click "OK";



20. The histogram will now appear with the 95% CI bars evident.



21. To format these bars, double click on any one of them as alter appearance as desired.



22. Done!!!

