HINTS FOR PRACTICAL ACTIVITIES

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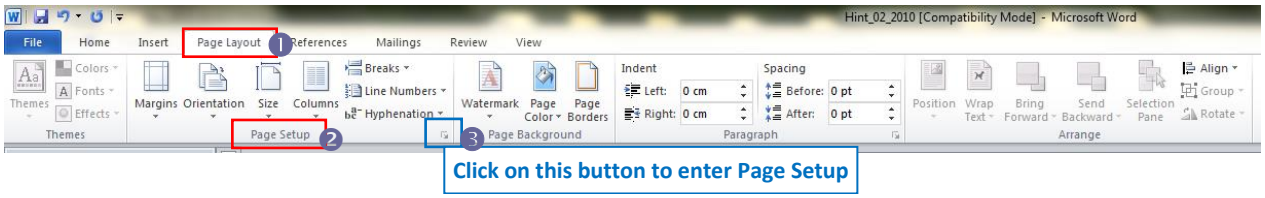
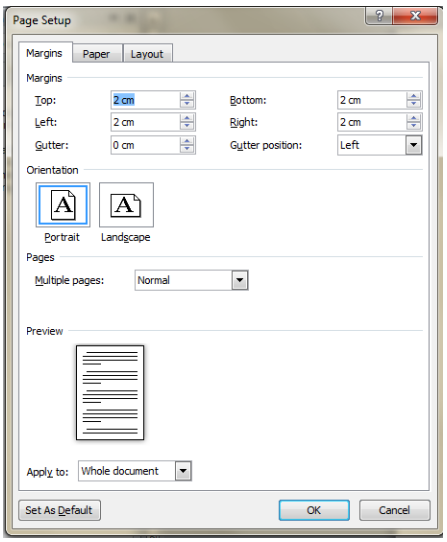
Contents

MICROSOFT WORD

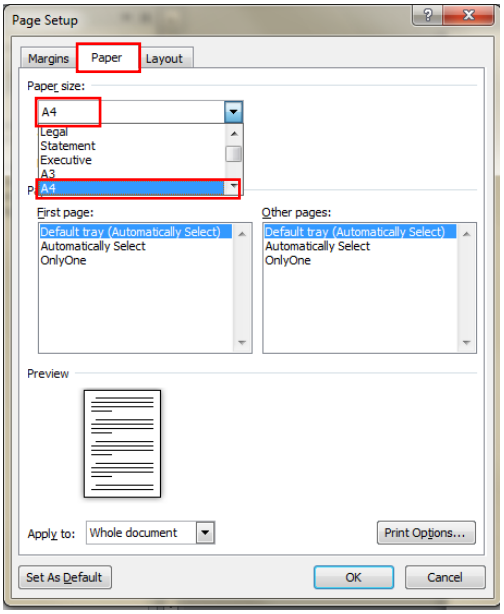
PAPER FORMAT

- Page Layout:

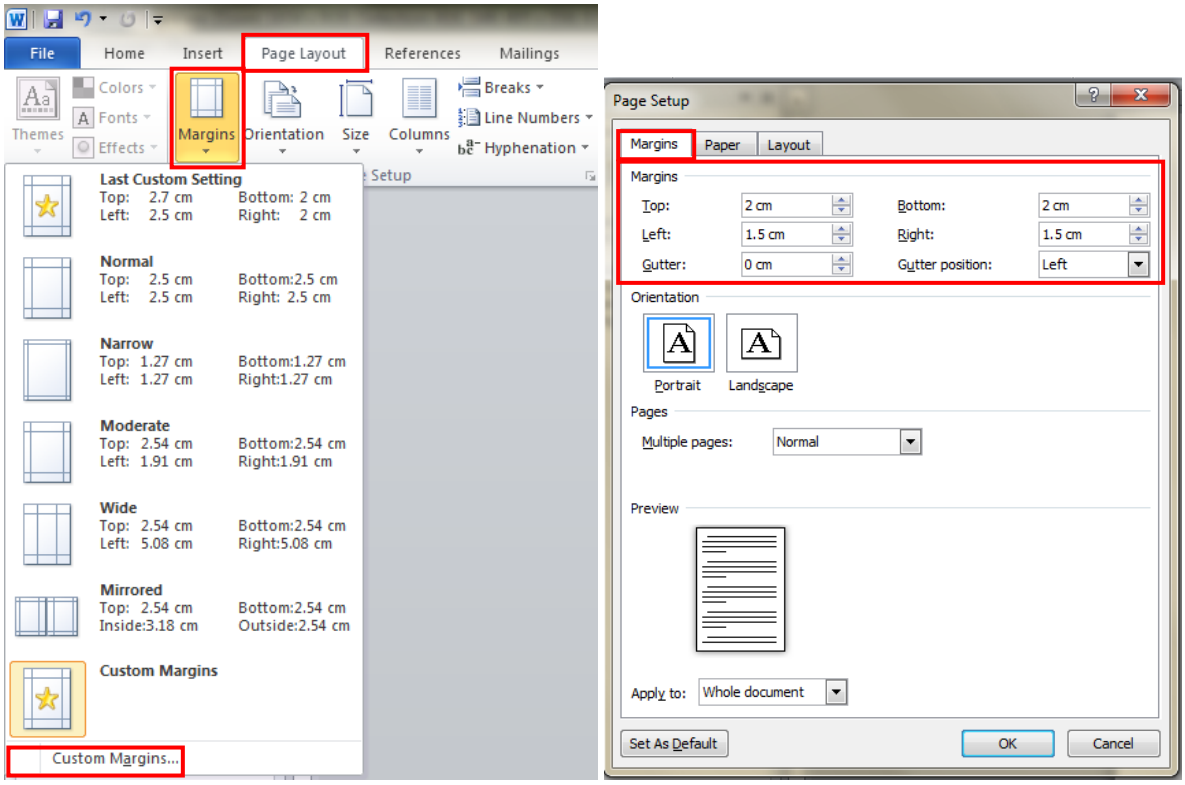




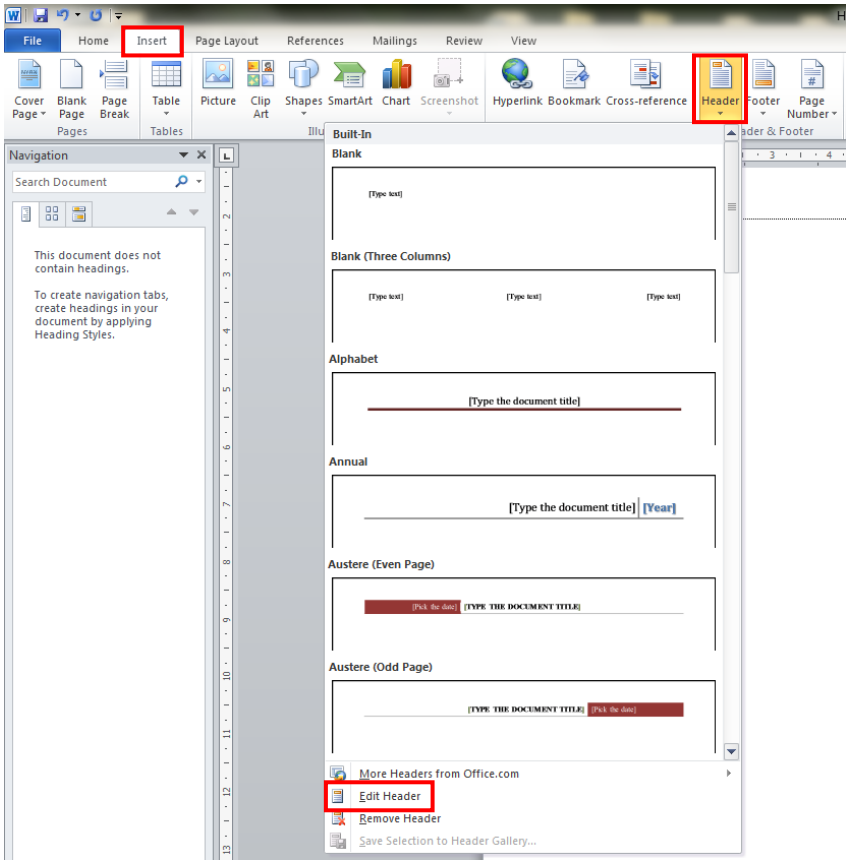
- Paper:



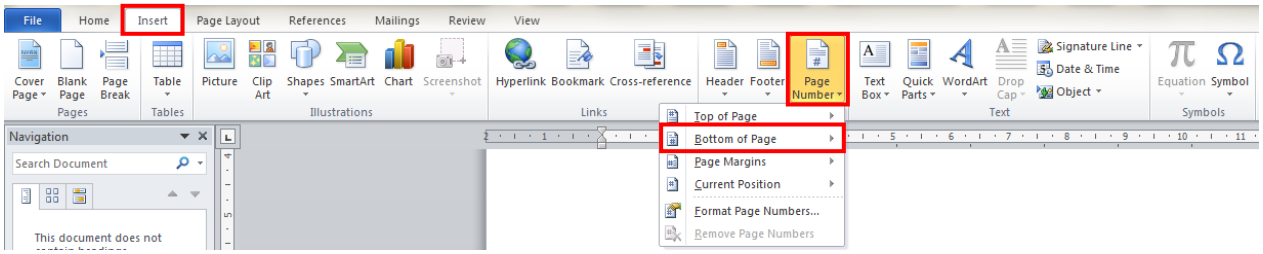
- Custom Margins: **[Page Layout – Page Setup … - Margins]**



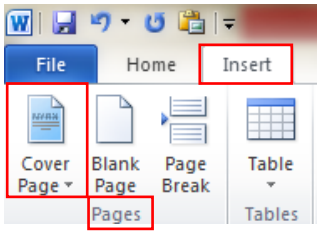
- Headers and Footers: **[Insert - Headers]**



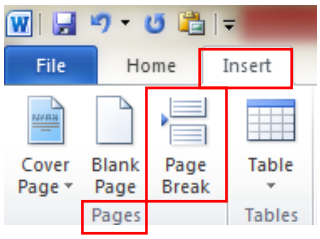
- Page Number: **[Insert - Page Numbers]**



- Cover page: **[Insert – Pages – Cover Page]**

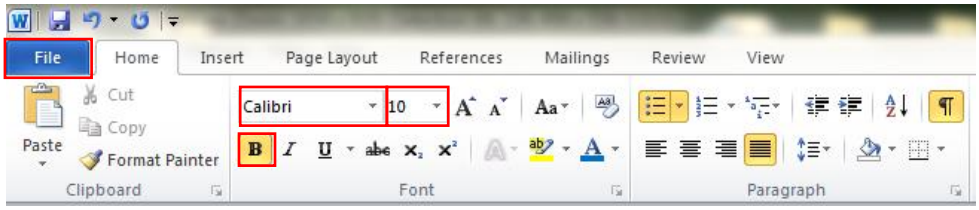


- Insert page break: **[Insert – Pages – Page Break]**

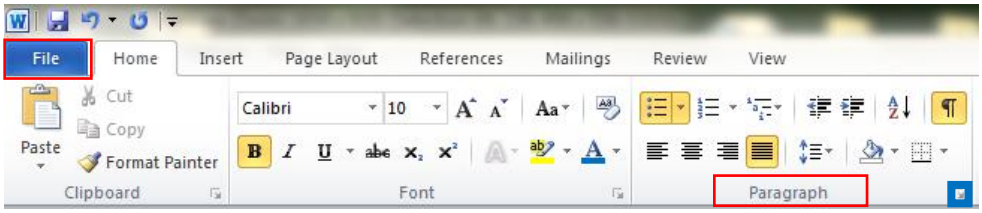


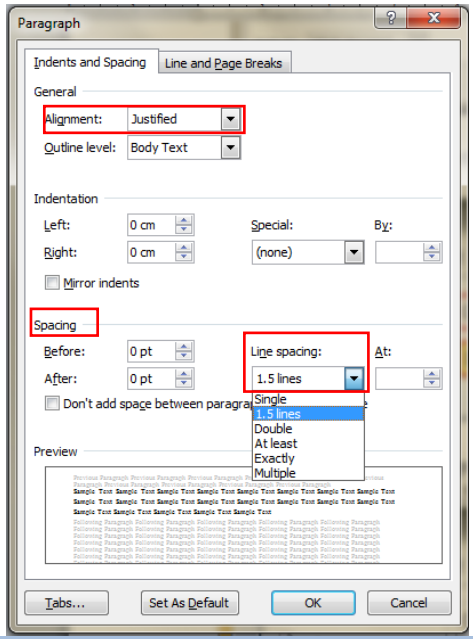
TEXT

- Formatting text: select the text and then **[Home** - **Font** (e.g. ***ARIAL*** ①); **Font Style** (e.g. ***Bold*** - ②); **Size** (***18*** - ③)**]**.



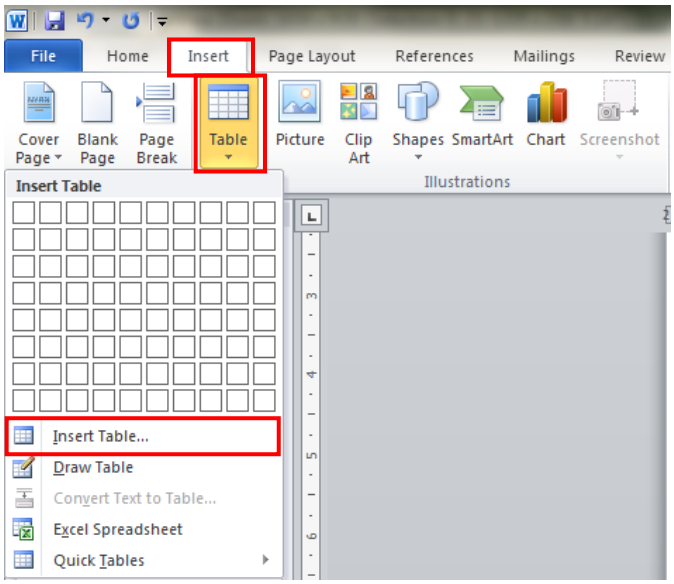
- Text Spacing and Alignment: **[Home** - **Paragraph** - **Indentation and Spacing**: General-Alignment: Justified; Spacing-Line Spacing: 1.5 lines**]**.

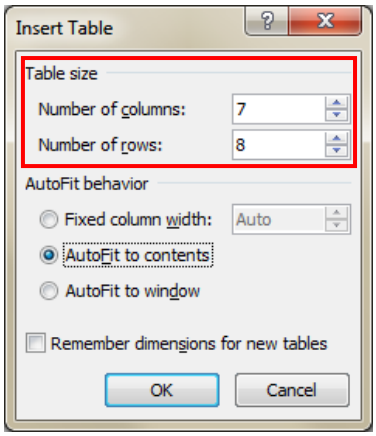




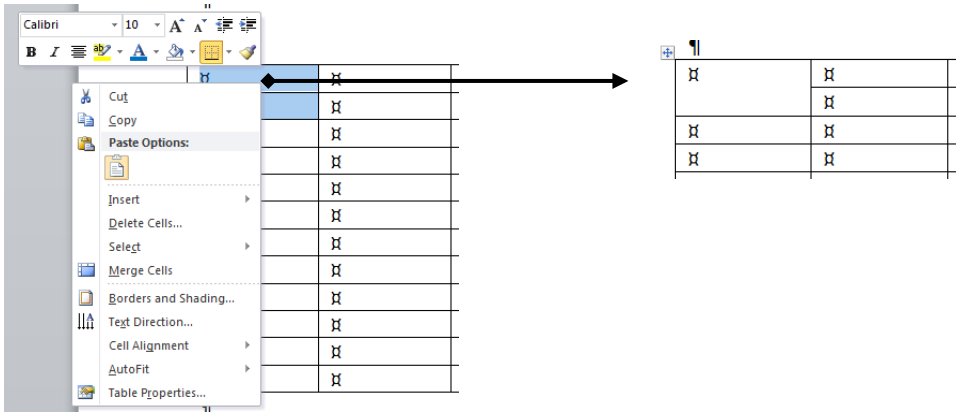
TABLE

- Insert a table for example with 7 columns and 8 rows: **[Insert – Table – Insert Table…]**.

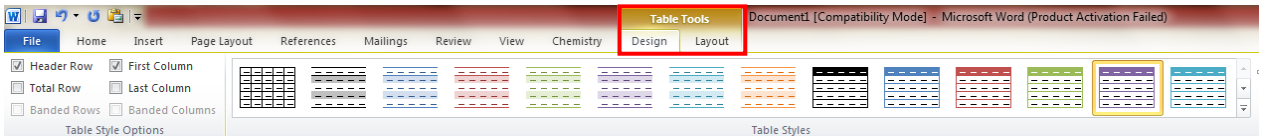




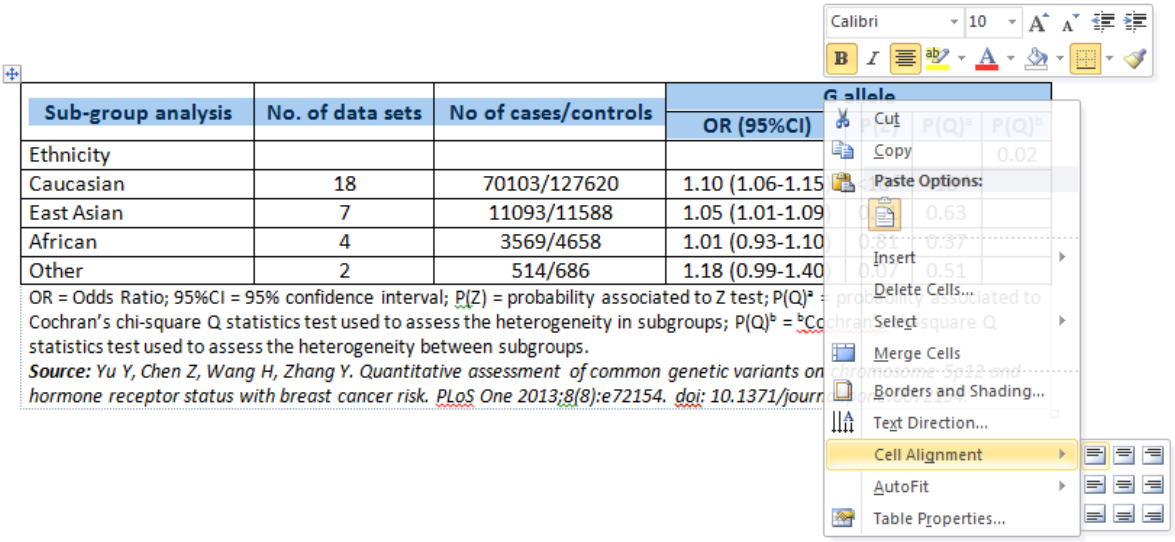
- To link two or more cells (even if the cells are on rows or on columns) select the cell that you want to merge and right click – Merge Cells



- To apply a style, select first the whole table and **[Table Tools – Design – Table Styles]**



- To align text in a table: select the row or column and right click **[Cell Alignment]**



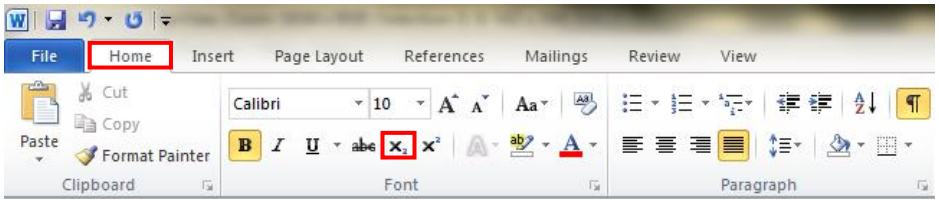
Sub-group analysis	No. of data sets	No of cases/controls	OR (95%CI)
Ethnicity			
Caucasian	18	70103/127620	1.10 (1.06-1.15
East Asian	7	11093/11588	1.05 (1.01-1.09
African	4	3569/4658	1.01 (0.93-1.10
Other	2	514/686	1.18 (0.99-1.40

OR = Odds Ratio; 95%CI = 95% confidence interval; P(Z) = probability associated to Z test; P(Q)[a] = Cochran's chi-square Q statistics test used to assess the heterogeneity in subgroups; P(Q)[b] = [b]Co statistics test used to assess the heterogeneity between subgroups.

Source: *Yu Y, Chen Z, Wang H, Zhang Y. Quantitative assessment of common genetic variants on hormone receptor status with breast cancer risk. PLoS One 2013;8(8):e72154. doi: 10.1371/journ*

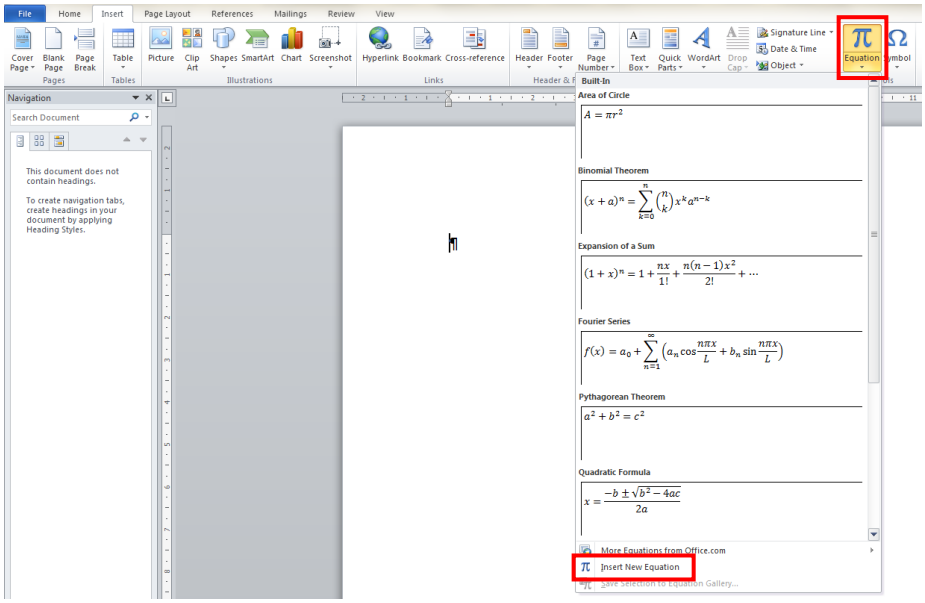
- To apply single paragraph: select the whole table and **[Home – Paragraph – Spacing – Line spacing = Single]**

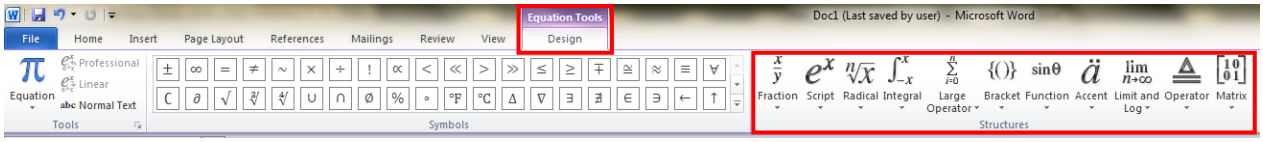
- To put text to superscript: select the text and **[Home** - **Font – Superscript]**



FORMULAS

- To insert a formula: **[Insert – Symbols - Equation – Insert New Equation]**:



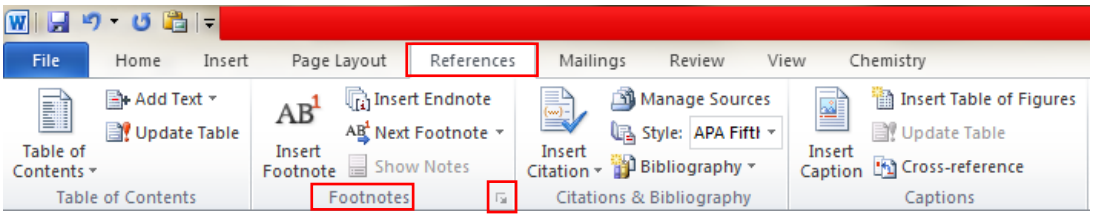


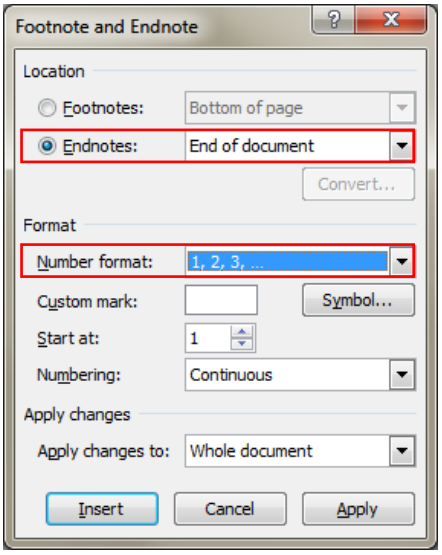
PREDEFINED STYLES & FORMATTING

- Using predefined Styles and Formatting: **[Home – Styles – Heading 1]**

INSERTING REFERENCES TO THE END OF DOCUMENT

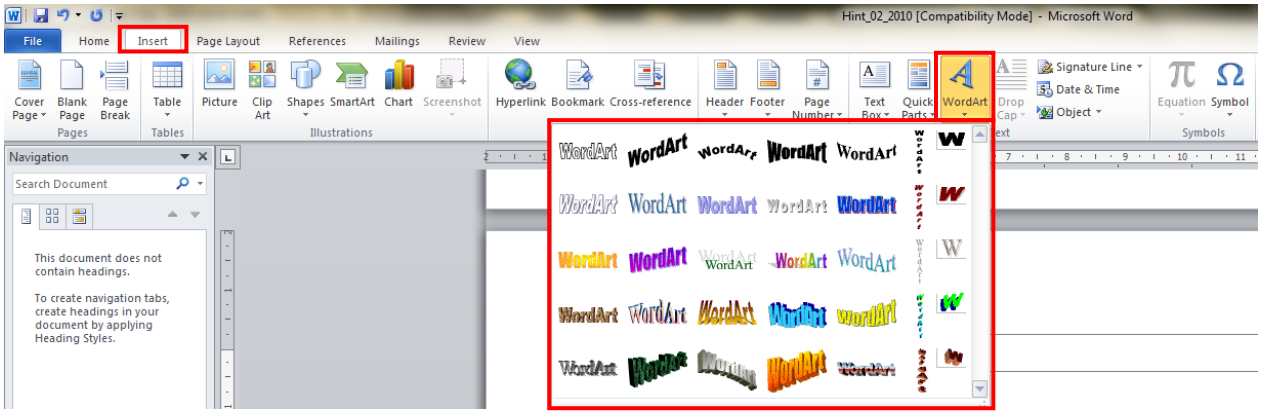
- Insert reference at the end of the document: **[References – Footnotes – Footnotes and Endnotes – Location = Endnotes & End of document – Format = Number format = 1, 2, 3, … - Insert]**



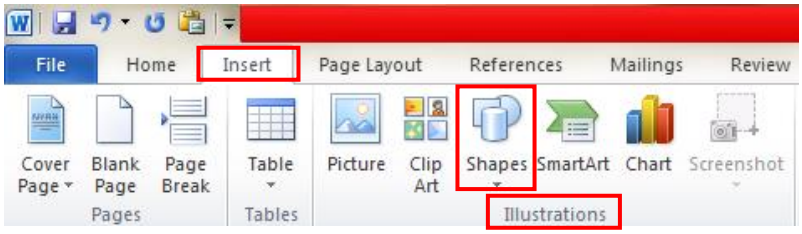


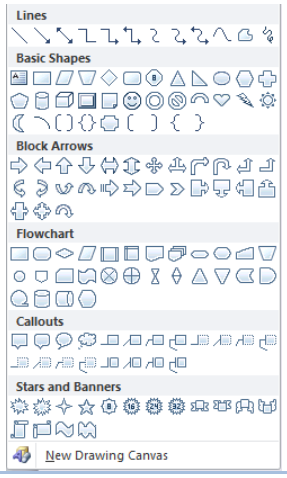
WORDART & DRAWING

- WordArt: activate Drawing toolbar: **[View – Toolbars – Drawing]** and **Insert WordArt**



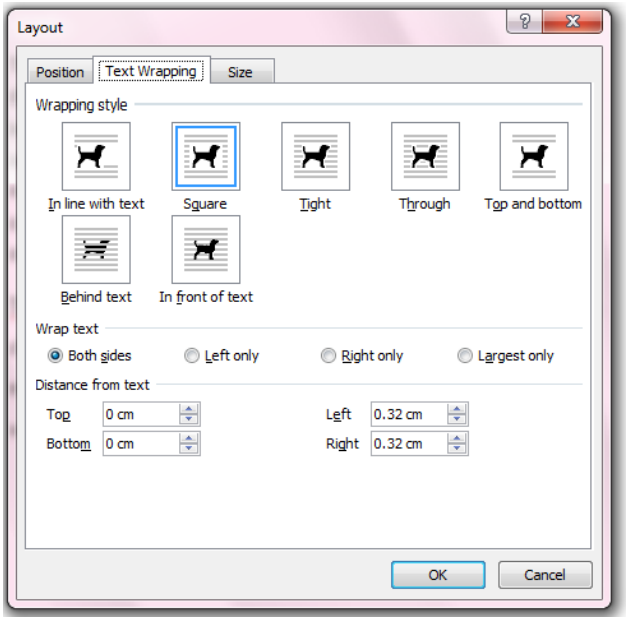
- Shapes: **[Insert – Illustrations - Shapes]**





PICTURES

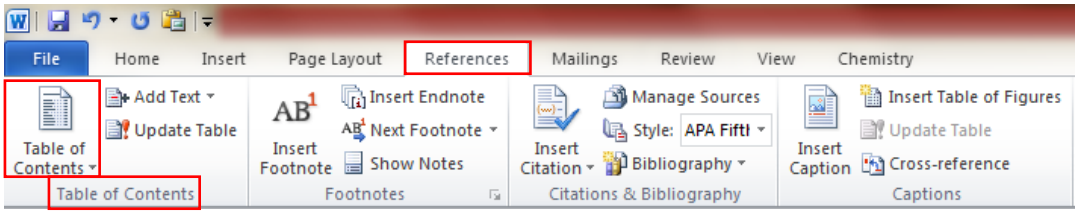
- **[Insert – Illustration - Picture]** and choose the picture that you want to insert in the document.
- To align the image, right click on the Image and **[Size and Position… - Text Wrapping & Square]**:



- Set the dimensions of the picture for the Exercise 3 as follows: Height = 6.75 cm & Weight 6.75 cm.

TABLE OF CONTENTS

- Preliminary request: format your title and subtitles using **[Home – Styles – Heading(s)]**
- Create the content of the document: place the mouse where you want to have the contents and **[References – Table of Contents – Table of Contents – Insert Tables of Contents… - Ok]**


File
Home
Insert
Page Layout
References
Mailings
Review
View
Chemistry
Table of Contents
Add Text
Update Table
Table of Contents
Insert Footnote
Insert Endnote
Next Footnote
Show Notes
Footnotes
Insert Citation
Manage Sources
Style: APA Fifth
Bibliography
Citations & Bibliography
Insert Caption
Insert Table of Figures
Update Table
Cross-reference
Captions

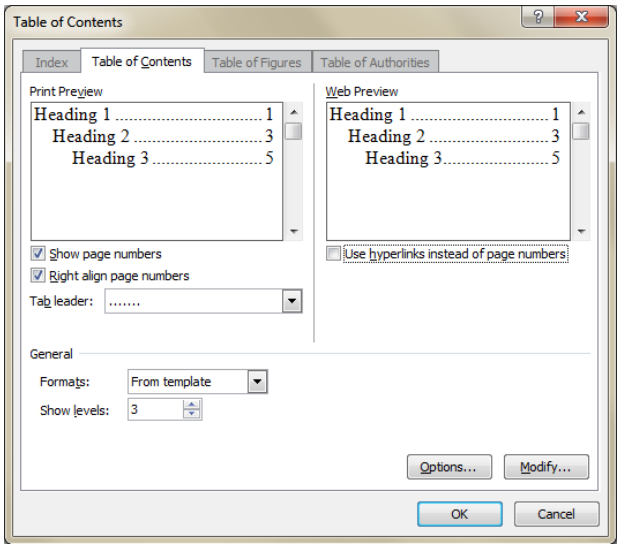
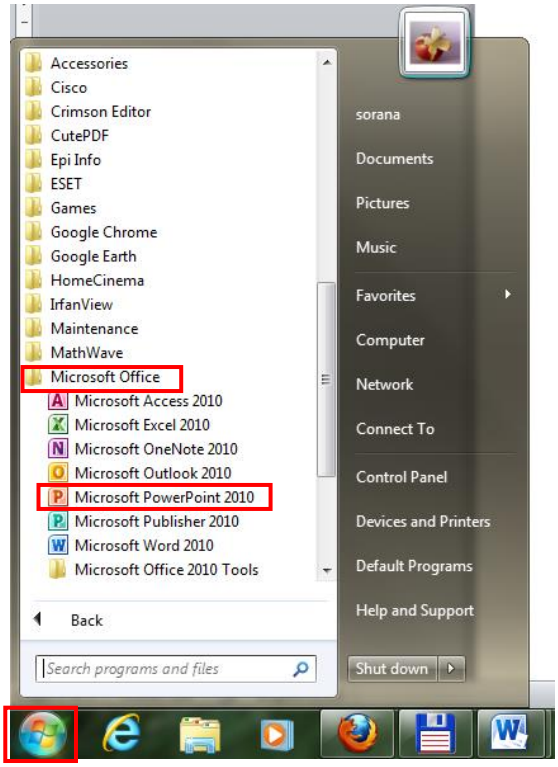


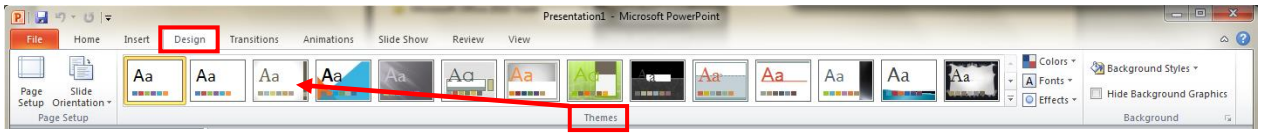
Table of Contents
Index
Table of Contents
Table of Figures
Table of Authorities
Print Preview
Heading 1 1
Heading 2 3
Heading 3 5
Web Preview
Heading 1 1
Heading 2 3
Heading 3 5
Show page numbers
Right align page numbers
Tab leader:
Use hyperlinks instead of page numbers
General
Formats:
From template
Show levels:
3
Options...
Modify...
OK
Cancel

POWERPOINT

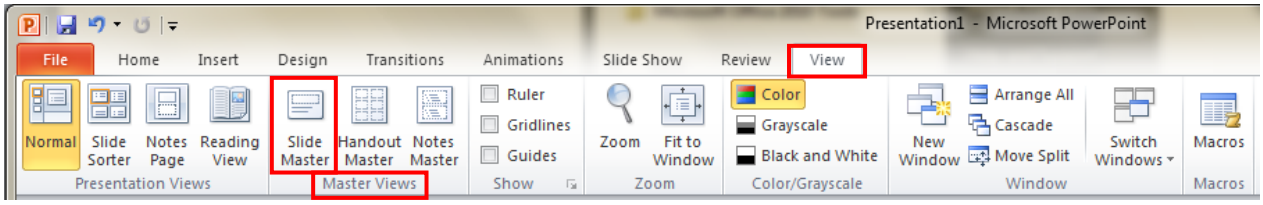
- To create a new PowerPoint presentation: **[Start – Microsoft Office – Microsoft PowerPoint]**



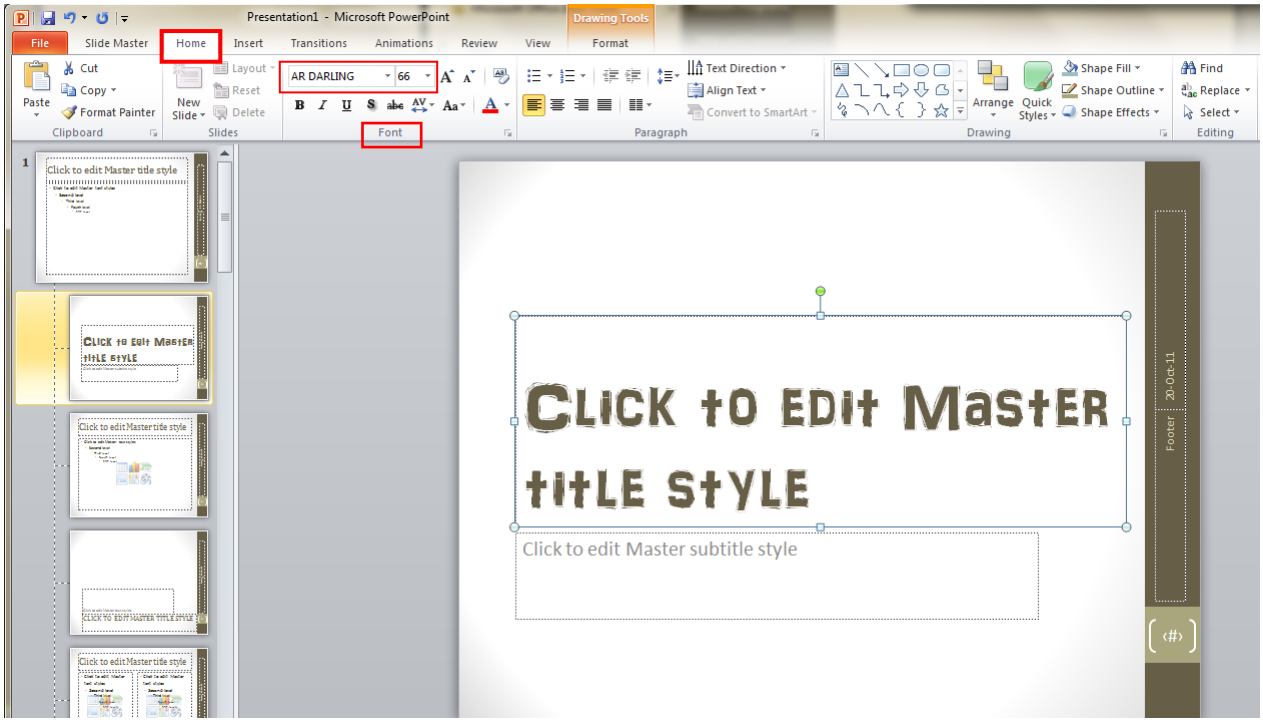
- Choose a design: **[Design - Themes]**



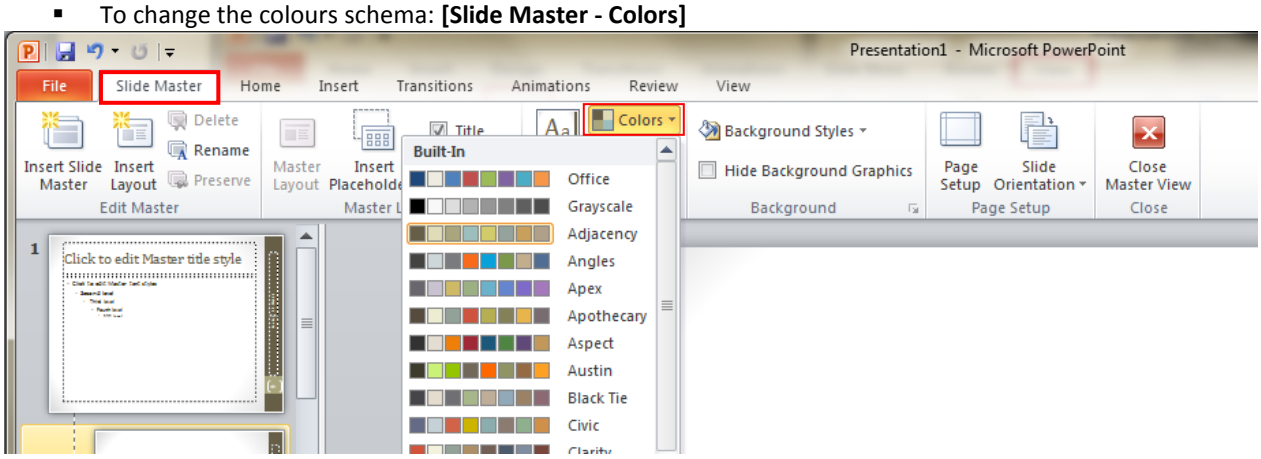
  - To modify Slide Master: **[View – Master Views - Slide Master]**



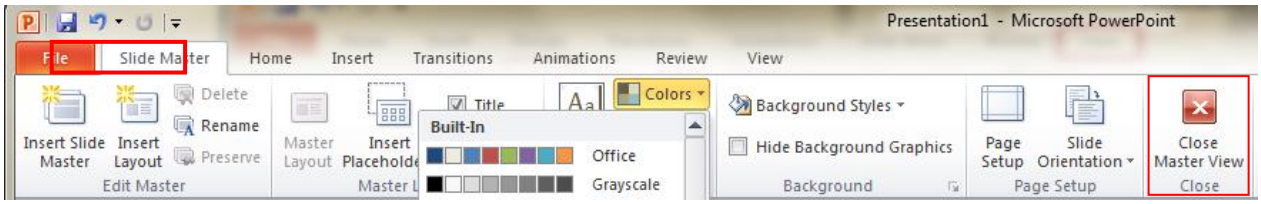
    - To change the Fond Style: select the text box on which you want to apply the new style and **[Home – Font]**. It is possible to change all predefined formatting.



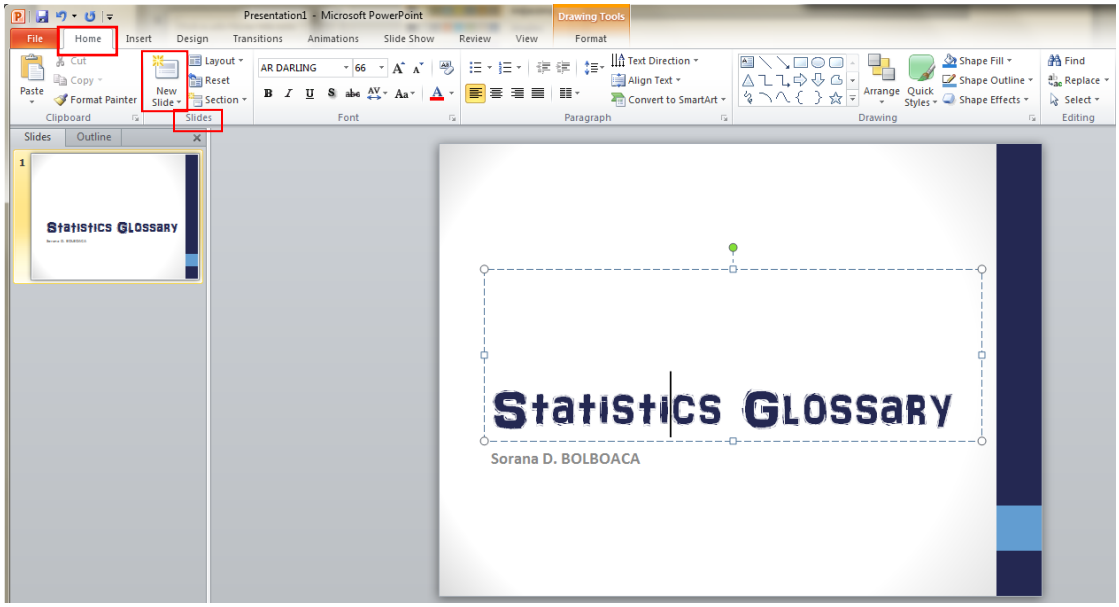
- To change the colours schema: **[Slide Master - Colors]**



- To validate the changes: **[Slide Master – Close Master View]**

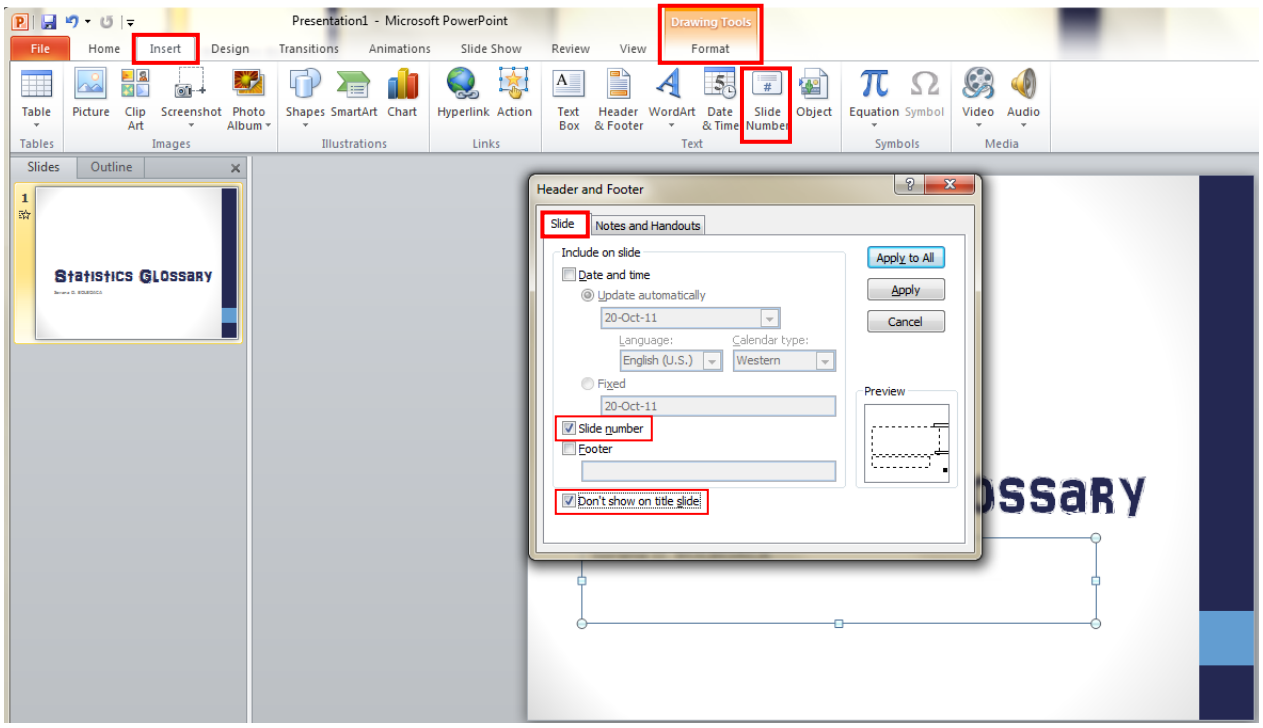


- To insert a new slide: **[Home – Slides – New Slide]**

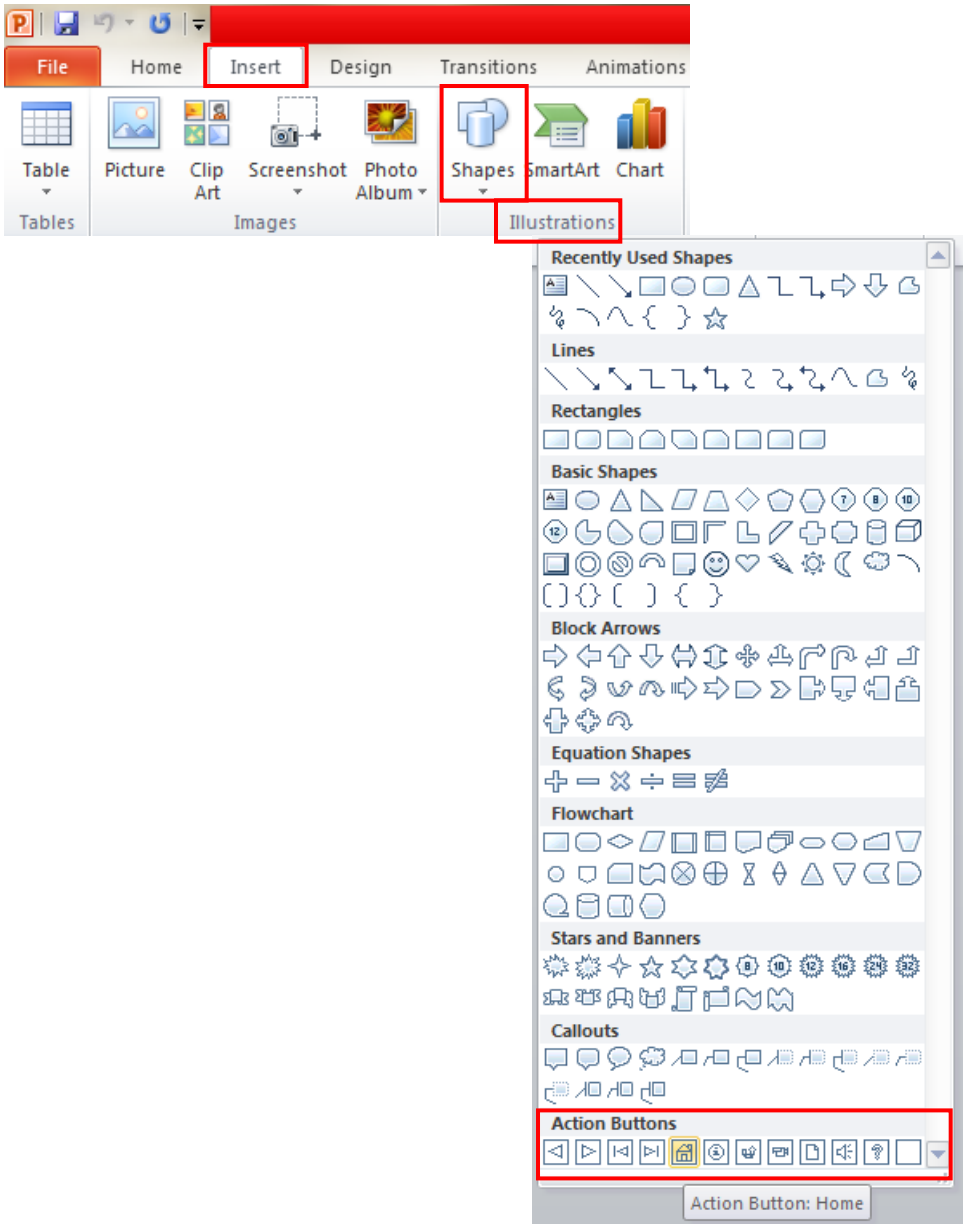


- To apply a transition to a presentation: **[Transitions – Choose a Transition Type – Apply to All]**

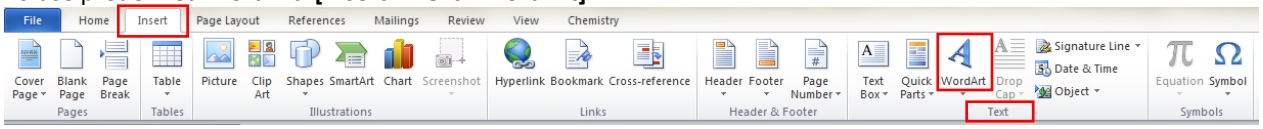
- To insert the slide number: **[Insert – Slide Number – Slide – Slide number & Don't show on title slide]**



- To insert an action button: **[Insert – Illustrations - Shapes – Action Buttons]**



- To use predefined WordArt: **[Insert – Text - WordArt]**

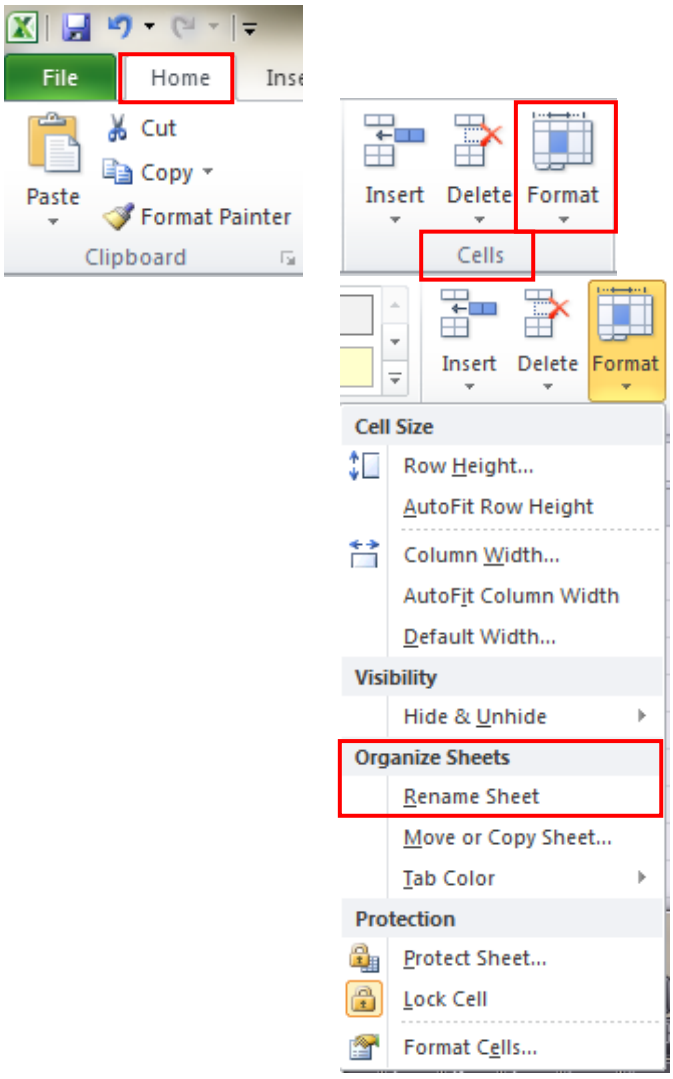


MICROSOFT EXCEL

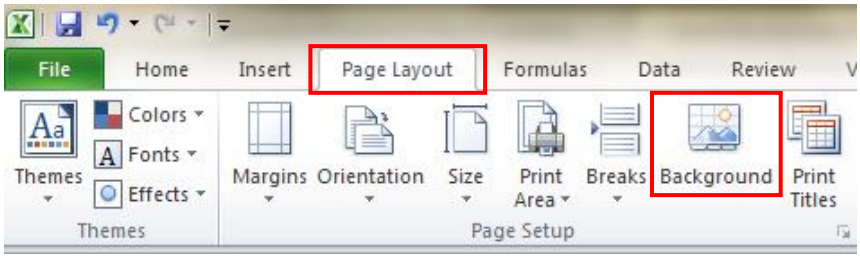
BASIC FORMATTING

- To create a new workbook: **[Start – All Programs – Microsoft Office - Microsoft Excel 2010]**
- To rename a sheet(1):
  - Select the sheet whose tab you want to rename (the selected worksheet is active and the current sheet name appears in bold letters).
  - Double-click the sheet tab. (You also can right-click the sheet tab and select **Rename** on its shortcut menu. The current name on the sheet tab appears selected.)
  - Replace the current name on the sheet tab by typing a new sheet name. (When you begin typing a new name, the previous name disappears.)
  - Press Enter.

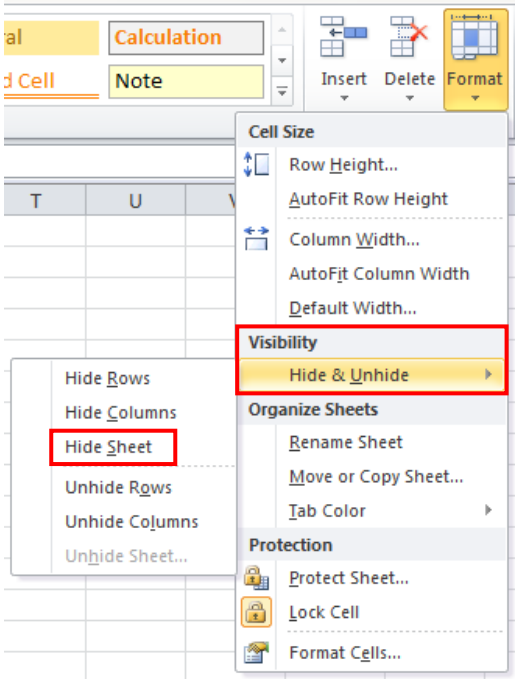
- Other option used to rename a sheet (2): **[Home – Cells – Format – Organize Sheets – Rename Sheet]**



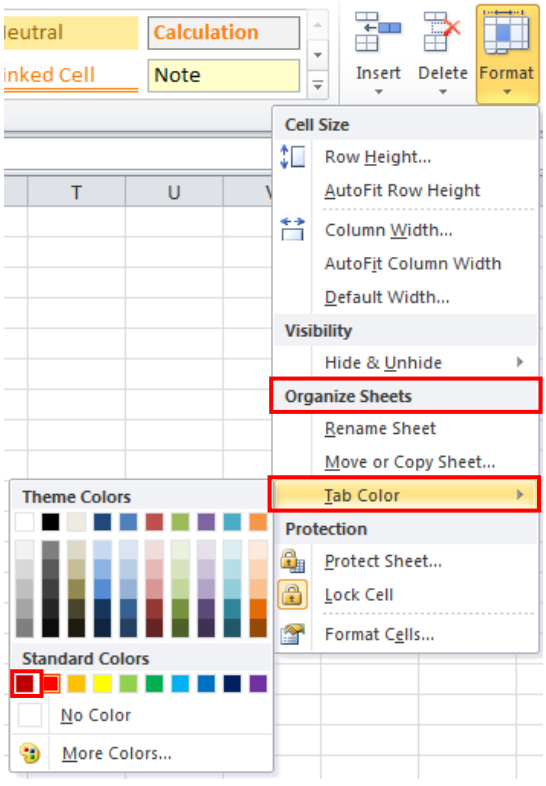
- To insert a background: select the sheet and **[Page Layout – Background]**



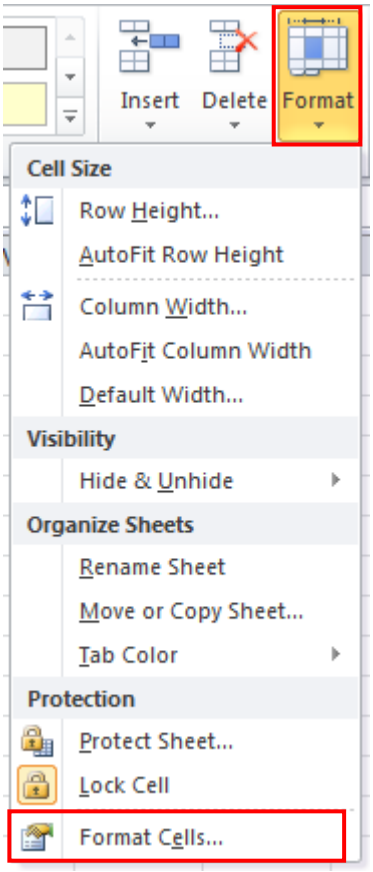
- To hide a sheet: select the sheet and **[Home – Cells – Format – Visibility – Hide&Unhide – Hide Sheet]**

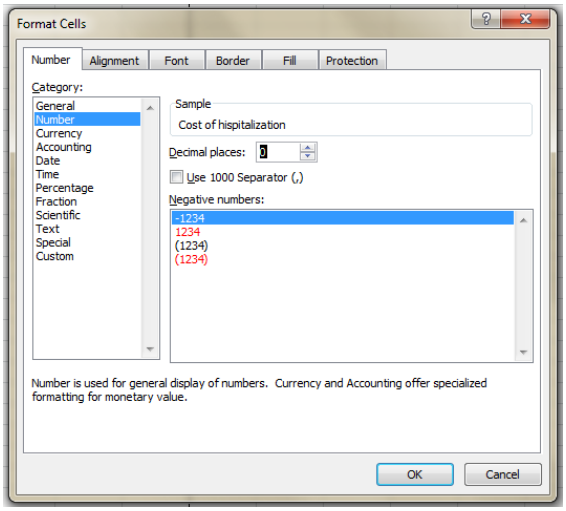


- To insert the tab to a sheet: select the sheet named Data and **[Home – Cells – Format – Organize Sheets – Tab color]** and choose the red color.



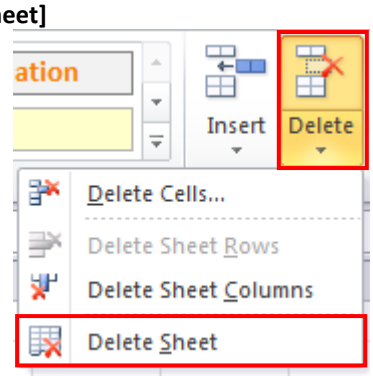
- To formatting a cell/column/row: **[Home – Cells – Format – Format Cells…]**





Category	Example	What to do?
Number	256	Write the number in the cell **[Format Cells …Number - Number]** N.B. Aligned implicit to the right of the cell.
Date	12-Oct-06	**[Format Cells … Number - Date]** Press CTRL+; (semicolon) to enter today's date.
Time	12:00 PM	**[Format Cells … Number - Time]** To enter a time based on the 12-hour clock, type the time + a space + "a"/"p" (a = AM – ante meridian – before midday; p = PM – after midday) ; To enter the current time, press CTRL+SHIFT+: (colon).
Text	Your name	Put some text hear (e.g. your first name) **[Format Cells – Number - Text].** N.B. The text is aligned implicit to the left of the cell.
Scientific	0.00000058	Enter a number less than 1 **[Format Cells … - Number - Scientific]**

- To delete a sheet:
  - Right click on the sheet named and choose Delete option
  - **[Home – Cells – Delete – Delete Sheet]**



BUILDING GRAPHS

- Basic steps for creating graph in Microsoft Excel:
  1. Input your data in an Excel file.
  2. Choose a type of graph to create.
  3. Switch axes if necessary.
  4. Adjust your labels and legends, if desired.
  5. Change the axis measurement option, if desired.
  6. Reorder data, if needed.

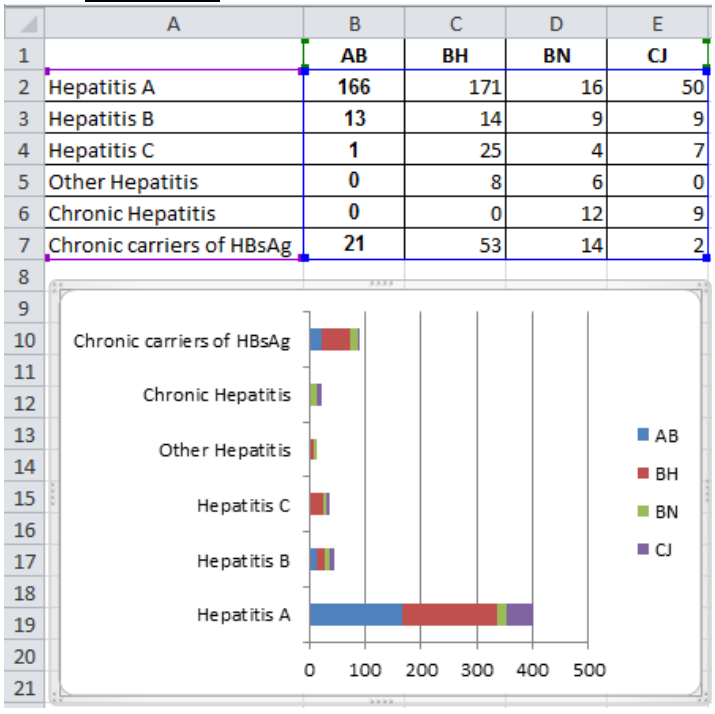
1. Input your data in an Excel file.
   - Copy data from another file and Paste them in Excel file.
   - Introduce data in Excel file.

   In the example below, in Column A, we have a list of type of hepatitis while in columns B, C, D, and E we have the number of cases according to the county (where AB = Alba Iulia, BH = Bihor, BN = Bistriţa Năsăud, CJ = Cluj-Napoca). For example, Column B, Row 2 (cell B2) illustrates that in Alba Iulia County were 166 subjects with Hepatitis A.

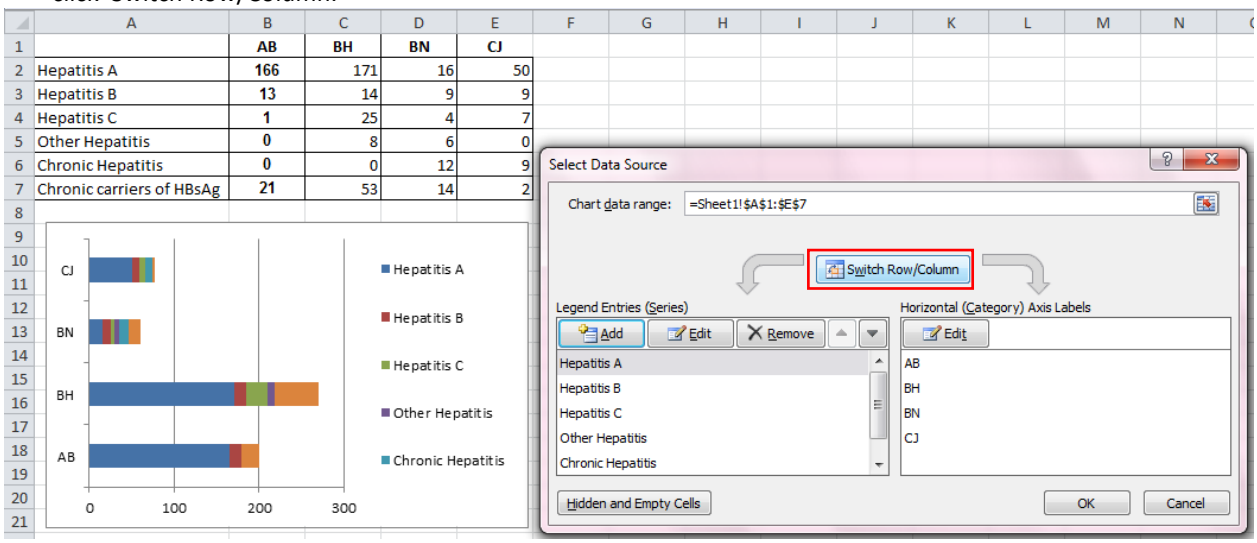
	A	B	C	D	E
1		**AB**	**BH**	**BN**	**CJ**
2	Hepatitis A	**166**	171	16	50
3	Hepatitis B	**13**	14	9	9
4	Hepatitis C	**1**	25	4	7
5	Other Hepatitis	**0**	8	6	0
6	Chronic Hepatitis	**0**	0	12	9
7	Chronic carriers of HBsAg	**21**	53	14	2

2. Choose a type of graph to create.

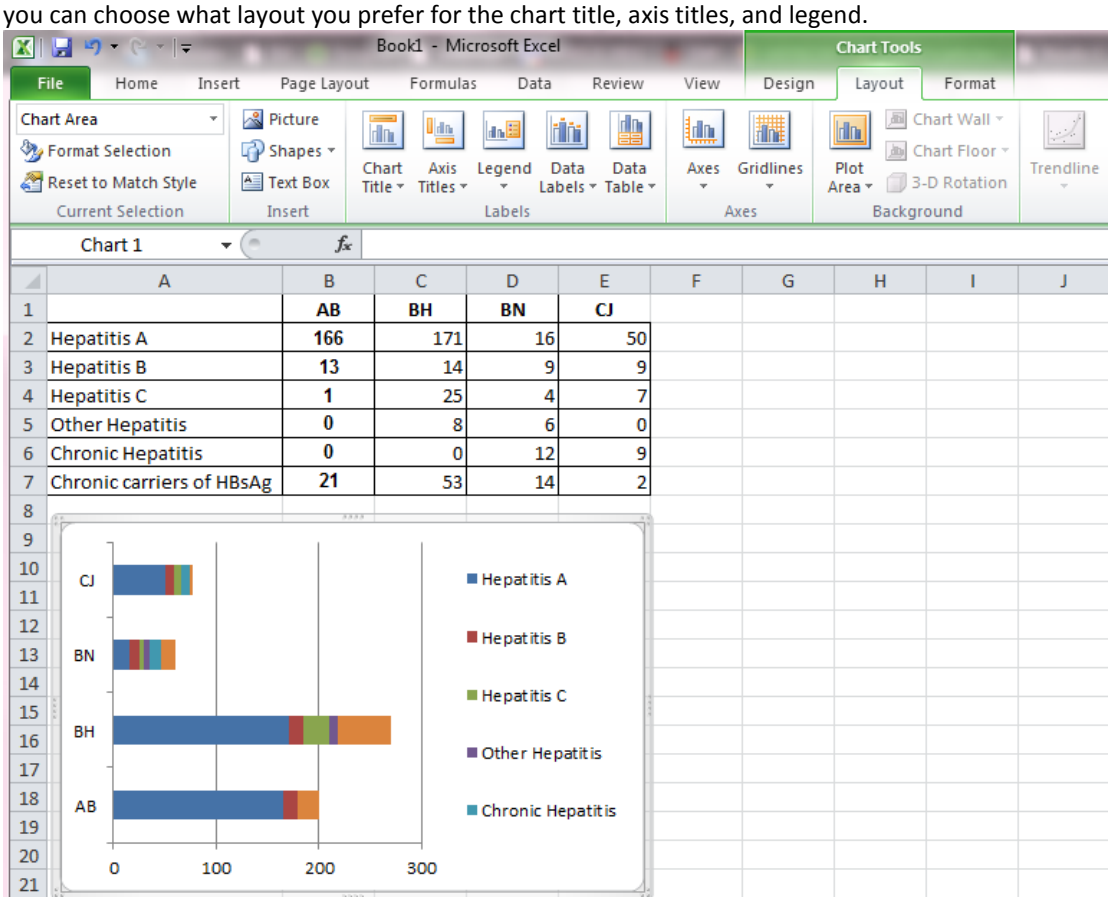
   To represent these data we will use a Bar chart. To make a bar graph, select the data (inclusive the name of the rows and the name of the columns) and **[Insert - Bar]** and choose the type of the chart you wish. For exemplification we will use Stacked Bar.



3. Switch axes if necessary.
   If you want to switch what appears on the X and Y axes, right click on the bar graph, click 'Select Data,' and click 'Switch Row/Column.'

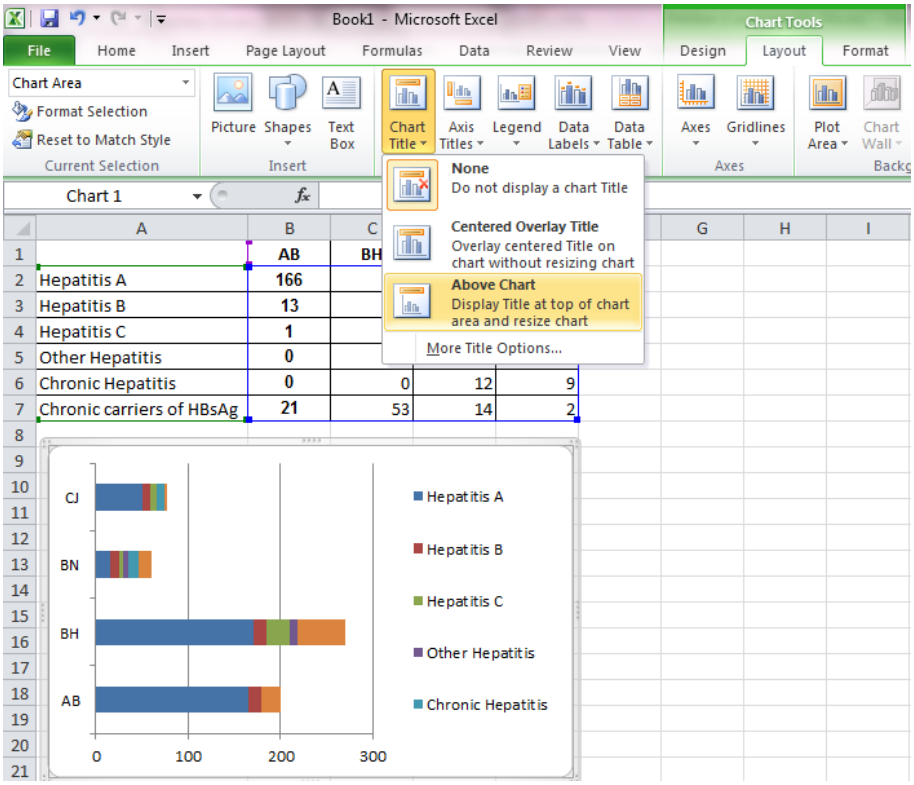


4. Adjust your labels and legends, if desired.
   To change the layout of the labeling and legend, click on the created graph, then click the 'Layout' tab. Here you can choose what layout you prefer for the chart title, axis titles, and legend.

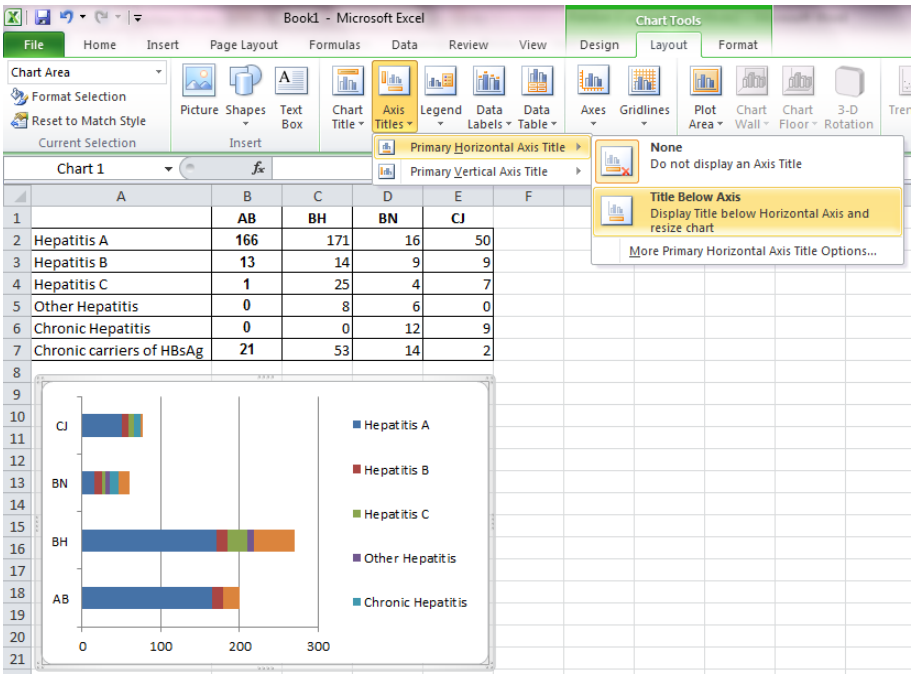


	A	B	C	D	E
1		AB	BH	BN	CJ
2	Hepatitis A	166	171	16	50
3	Hepatitis B	13	14	9	9
4	Hepatitis C	1	25	4	7
5	Other Hepatitis	0	8	6	0
6	Chronic Hepatitis	0	0	12	9
7	Chronic carriers of HBsAg	21	53	14	2

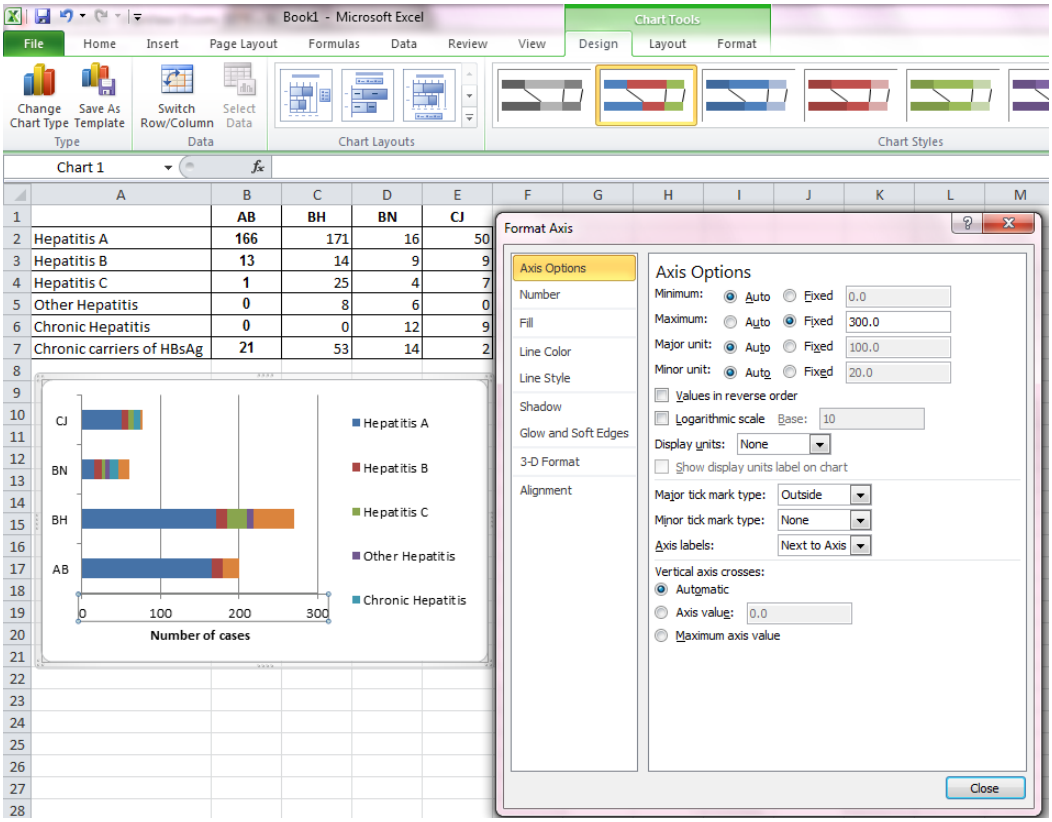
To include a title select **Chart Title**.



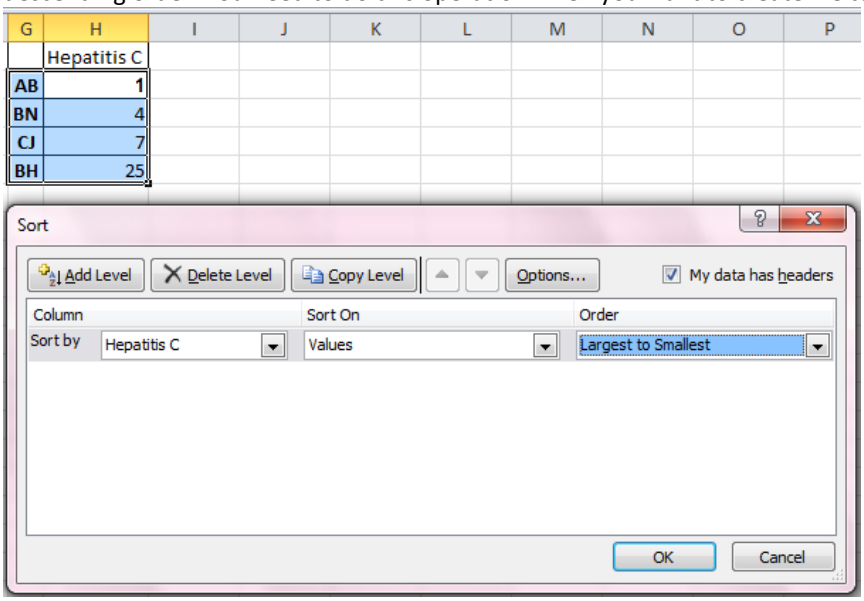
To define axis select **Axis Titles**.

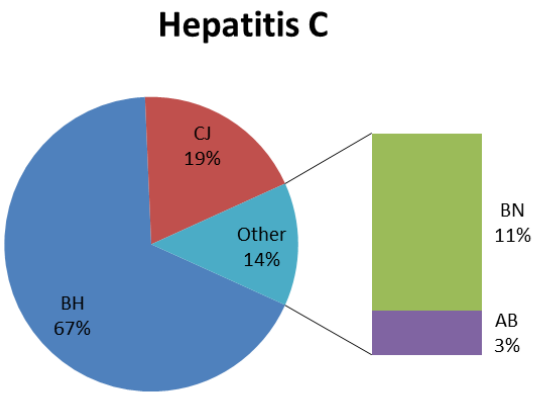


5. Change the axis measurement option, if desired.
   To change the type of measurement shown on the Y axis or X axis, right click on the axis and click on **Format Axis**. Here you can change the minimum and maximum value as well as major am minor units (Axis Options) or you can decide if you want to display number with 2 decimals or with 0 decimal (Number).

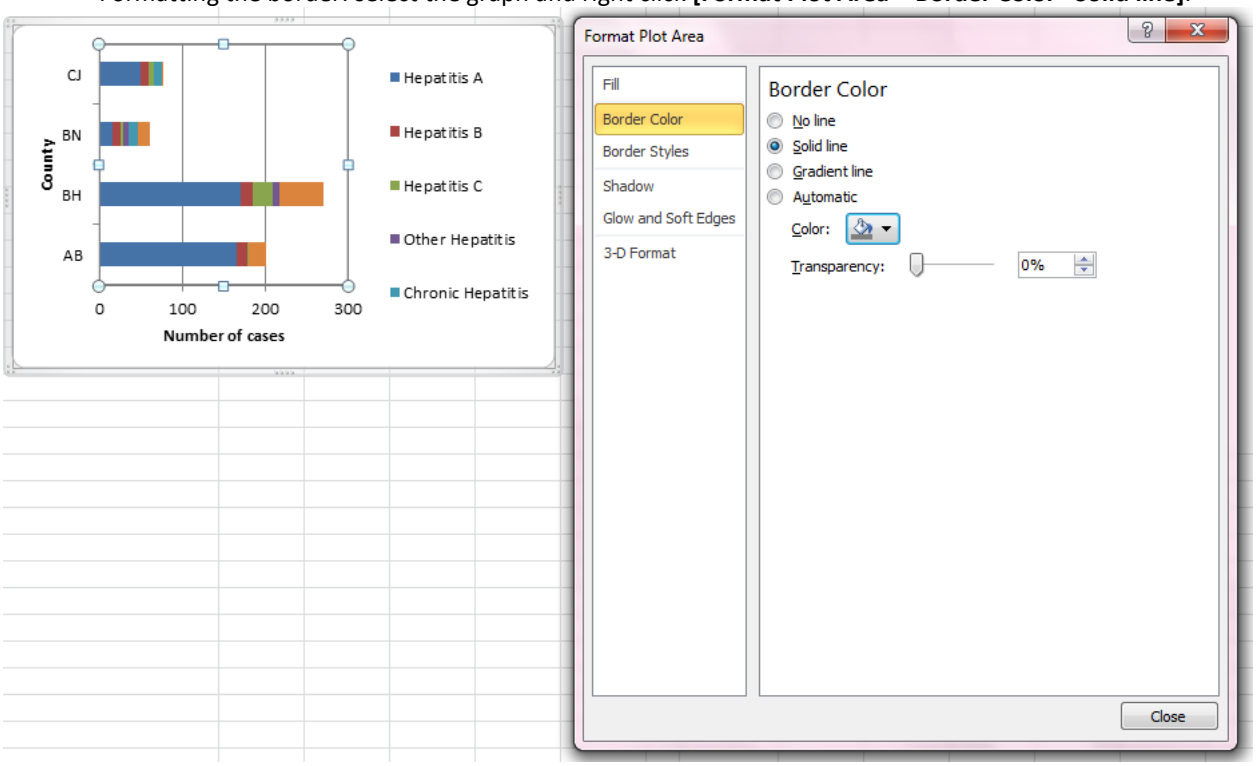


6. Reorder data, if needed.
To sort the data so that the software choices appear in descending order, click on the column that is most important (in this case I picked column H), and [Data – Sort & Filter – Custom sort…] and sort for example in descending order. You need to do this operation when you want to create Pie to Pie or Bar to Pie.

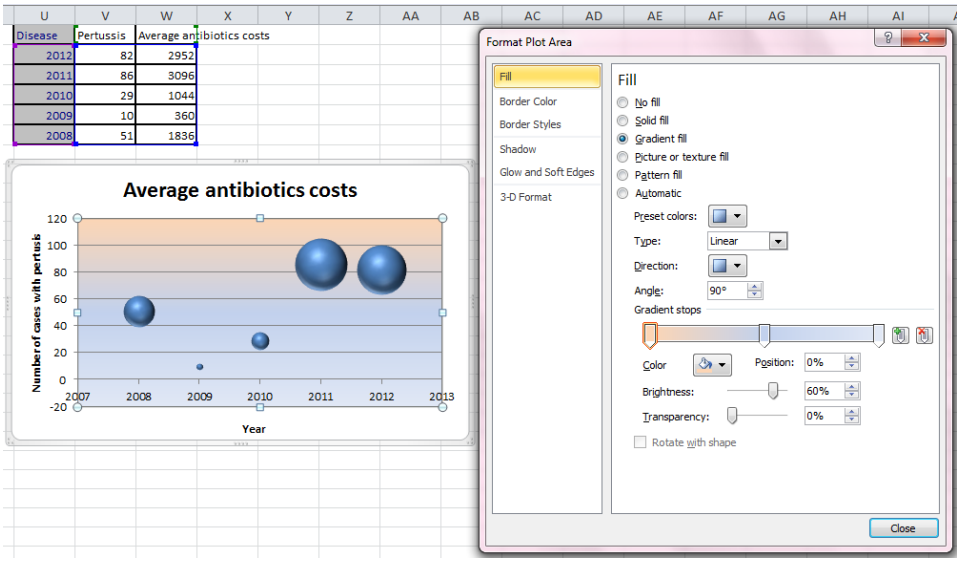




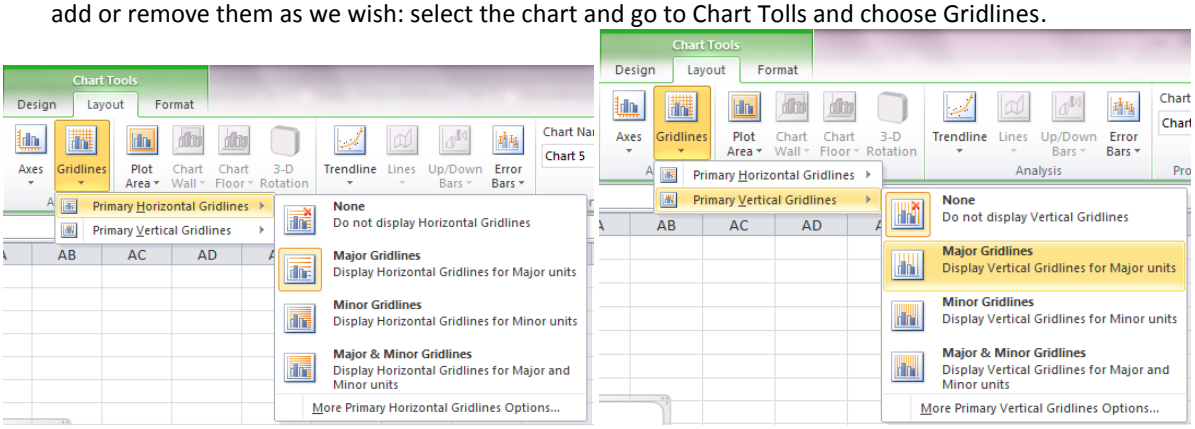
7. Formatting the background.
   - Formatting the border: select the graph and right click **[Format Plot Area – Border Color –Solid line]**.



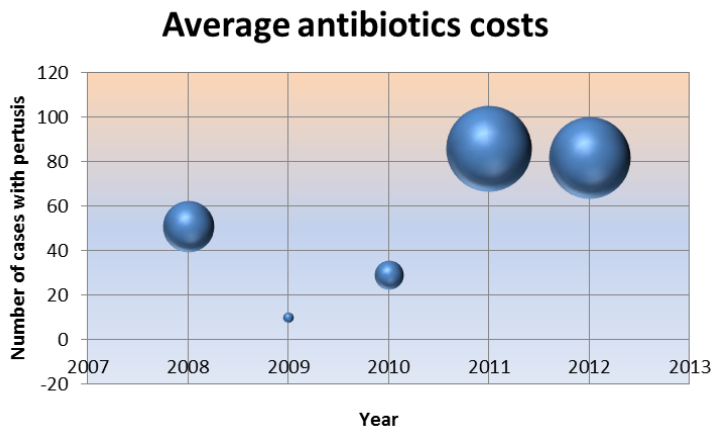
   - Filling with a solid color: right click on the Chart Area (white background) and [Fill – Solid Fill] and choose the color that you want.



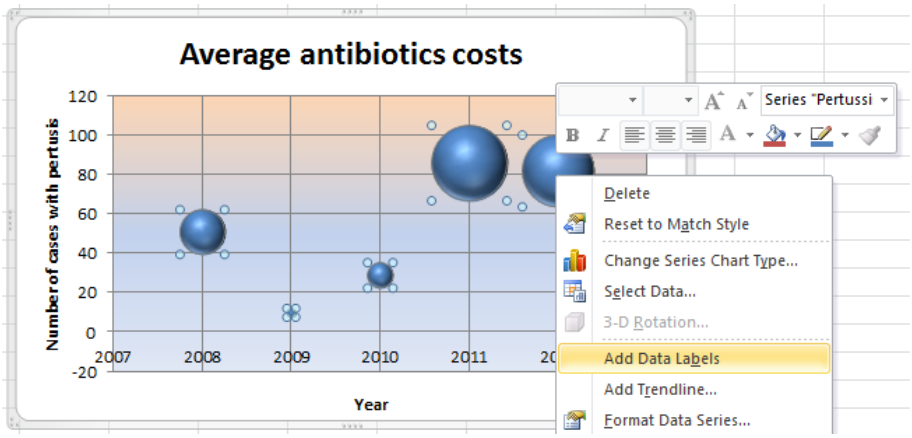
- Gridlines. Gridlines are horizontal and vertical lines that help us to see where precisely a particular data marker is in relation with the axes. The default for most chart types involves some gridlines but we can add or remove them as we wish: select the chart and go to Chart Tolls and choose Gridlines.



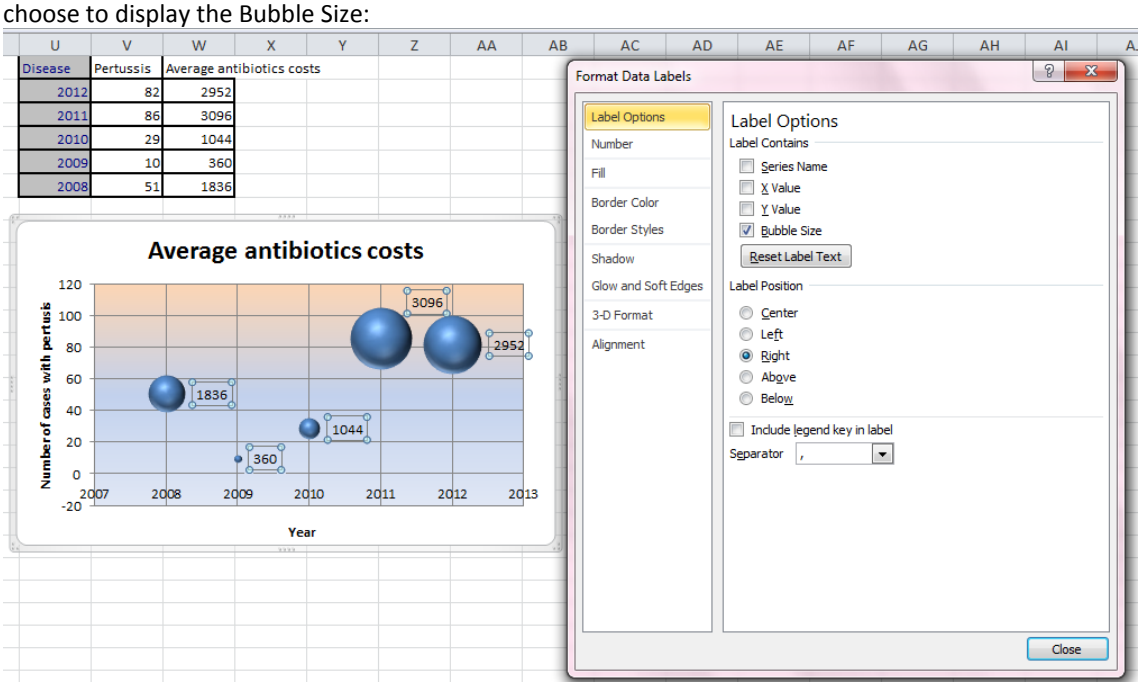
For our example we choose to include the major vertical gridlines:



- Data labels: can be attached to data points (such as series name, category name, or value). To add labels, select first the data point to which you want to add labels and right click and choose add data labels:



If you choose Format Data Labels you will be able to display the desired label. For our example, we choose to display the Bubble Size:



FORMULAS & FUNCTIONS

Predefined Functions

Functions are predefined formulas that perform calculations by using specific values, called arguments, in a particular order or structure. Functions can be used to perform simple or complex calculations.

Any function has the following structure: equal sign (=) followed by the function name, an opening parenthesis, the arguments for the function separated by commas, and a closing parenthesis. Arguments can be numbers, text, logical values such as TRUE or FALSE, arrays, error values such as #N/A, or cell references. The argument you designate must produce a valid value for that function. Arguments can also be constants, formulas, or other functions.

The main types of operators are:

1. Arithmetic operators: addition (+), subtraction (-), negation (-), multiplication (* - asterisk), division (/ - forward slash), percent (%), exponentiation (^ - caret).
2. Comparison operators: equal sign (=), greater than sign (>), less than sign (<), greater than or equal to sign (>=), less than or equal to sign (<=), not equal to sign (<>).
3. Text operator: ampersand (&).
4. Reference operators: colon (: - range operator - produces a reference to all cells between two references, including the two references), comma (, - union operator - combines multiple references into one reference), space (intersection operator, which produces one reference to cells common to the two references).

Formulas calculate values in a specific order. The equal sign tells Excel that the succeeding characters constitute a formula. Following the equal sign there are the elements to be calculated (the operands), which are separated by calculation operators. Excel calculates the formula from left to right, according to a specific order for each operator in the formula: reference operators (colon, single space, and comma), negation, percent, exponentiation, multiplication and division, addition and subtraction, concatenation and comparison. To change the order use round brackets to identify explain Excel which part to calculate first.

The most useful functions in medical statistics are presented in Table 1.

Click on an empty cell. To open the function wizard: [Formulas – Insert Function] and select the desired function by click OK (Figure 1). The shortcut is **Shift+F3** or click on the INSERT FUNCTION icon next to the formula bar (Figure 2).

The wizard window allows searching a function using some keyword (1) such as “arithmetic mean” (Figure 1); the wizard will recommend us some functions related to the used keywords. If we did not have any idea about the keywords, the name of the function could be choose using the drop down list (2) and we will find all statistical function in the list of *Statistical*. If we want to use some of the functions recently used we could select the *Most Recently Used* category – this is a list of the last used 10 functions. As a function was selected, a brief description is available (3) while a full description of the function could be found on the Internet (4).

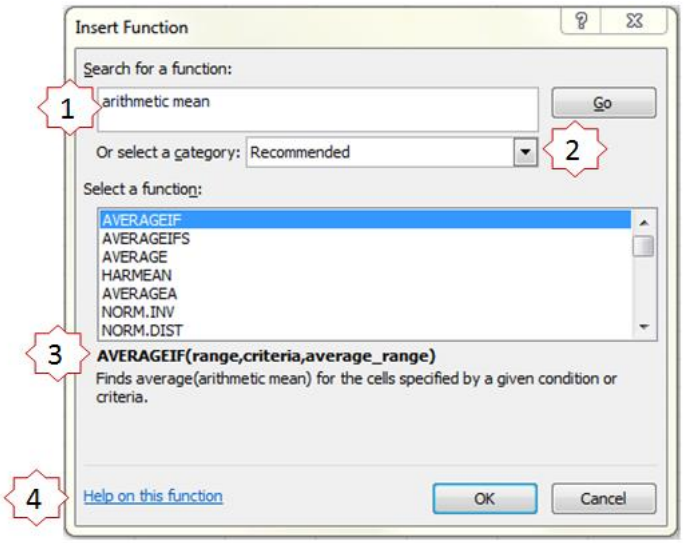


Figure 1. Insert Function window.

Table 1. Statistics functions.

Function	Statistical parameter
Descriptive statistics	
=SUM(*data_range*)	Total sample
=COUNT(*data range*)	Sample size (n)
=AVERAGE(*data_range*)[a]	Arithmetic mean
=MODE(*data_range*)	Mode
=MEDIAN(*data_range*)	Median
=MAX(*data_range*)-MIN(*data_range*)	Range
=VARP(*data_range*) =VAR(*data_range*)	Population variance Sample variance
=STDEVP(*data_range*) =STDEV(*data_range*)	Population standard deviation Sample standard deviation
=CONFIDENCE(0.05,STDEV(*data_range*),COUNT(*data_range*))	Return the value that must be extracted and added from the mean to find the lower an upper bounds of confidence interval
=quartile(*data_range,x*) =quartile(data_range, 3)-quartile(data_range, 1)	Quartiles – where 1≤x≤4,Q1 = minimum, Q2 = median, Q4 = maximum Interquartile range
=SKEW(*data_range*)	Skewness (if data are normal distributed the skewness is 0)
=KURT(*data_range*)	Kurtosis – this function return the excess kurtosis (if data are normal distributed the KURT must return 0; a negative value indicate a platykurtotic shape while a positive value is indicative of leptokurtotic distributions)
=frequency(*data_range*,*bins_range*)	Counts how many of the values in the data occur within each interval
Measures of associations	
=CORREL(*Y data_range, X data_range*)	Compute the Pearson correlation coefficient between Y and X
=SLOPE(*Y data_range, X data_range*)	Compute the slope (b) for Y = a + b·X
=INTERCEPT(*Y data_range, X data_range*)	Compute the intercept (a) for Y = a + b·X
Functions that produce p-values	
=TDIST(*t,df,2*)	Two sided p-value for t-statistics (df=degrees of freedom)
=2*(1-NORMSDIST(ABS(z)))	P-value for two-tailed z-test (z value need to be previously calculated)
=CHIDIST(X^2, *df*)	Chi-Square distribution (X^2 = the Chi-Square value, df = degrees of freedom)
=CHITEST(*observed_frequency, expected_frequency*)	P-value for testing observed vs. expected frequencies.
=FDIST(*F, df1, df2*)	P-value for F distribution (df1 = degrees of freedom for numerator; df2 = degrees of freedom for numerator)
Other useful functions	
=SQRT(*number*)	Finds the square root of a number
=IF(*logical_expression, results-if-true, result-if-false*)	Returns one value if a specified condition evaluates to true, or another value if it evaluates to false
=COUNTIF(*data_range, criterion*)	Returns the absolute frequency of cases that accomplished the imposed criterion
=SUMIF(*data_range, criterion, reference*)	Sums values that accomplished a given criterion

data_range = the array where you have data in Excel (for example A2:A101)

Once a function has been selected, the Function Arguments dialog box will be available (Figure 2).

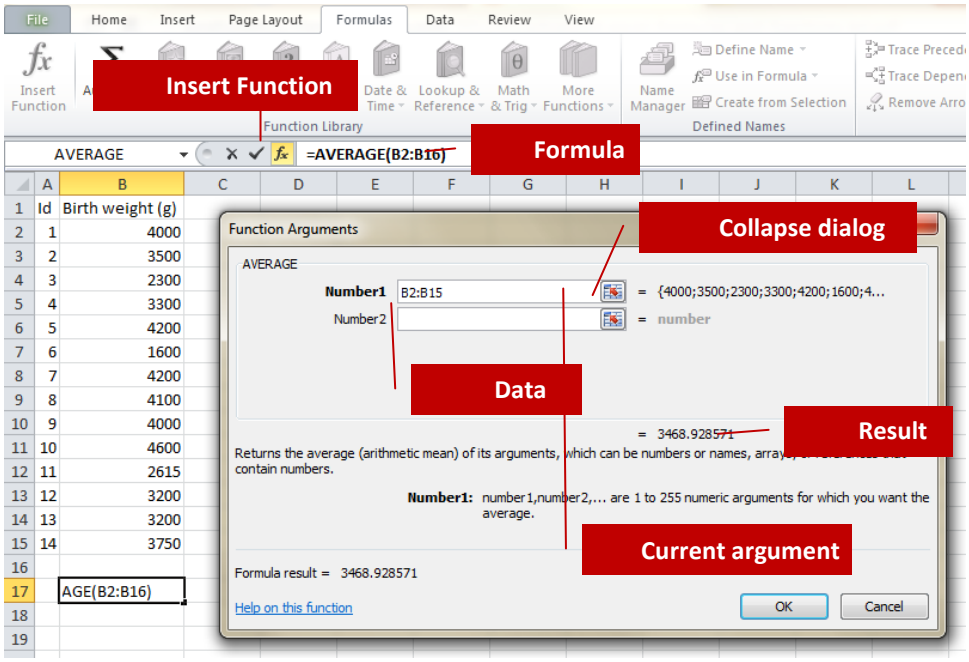


Figure 2. Function arguments dialog box.

User Defined Formulas

Three types of cell reference can be used when a formula is defined in Excel:

1. Relative reference will change column and row as formula is copied to other cells.
2. Absolute reference is the one that does not change when the formula is copied to other cells. If you refer to a cell in a certain row and column (for example $A$1) and then copy the formula elsewhere, it will still refer to exactly the same cell. Absolute reference could be also applied to range (e.g. $A$1:$D$1). An absolute address is defined by using the $ symbol
3. Mixed reference is the one that is half absolute and half relative (e.g. A$1 or $A1).

The following are some example of user defined functions useful in medical practice:

- Body Mass Index (BMI, also called Quetelet Index) [1]:

$$BMI = Weight\ (Kg)/Height\ (m^2)$$

The interpretation of this indicator is as follows [2]:

- $BMI < 15\ (kg/m^2) \rightarrow$ very severely underweight
- $15(kg/m^2) \leq BMI < 16(kg/m^2) \rightarrow$ severely underweight
- $16(kg/m^2) \leq BMI < 18.5(kg/m^2) \rightarrow$ underweight
- $18.5(kg/m^2) \leq BMI < 25(kg/m^2) \rightarrow$ normal
- $25(kg/m^2) \leq BMI < 30(kg/m^2) \rightarrow$ overweight
- $30(kg/m^2) \leq BMI < 35(kg/m^2) \rightarrow$ moderately obese

- $35(kg/m^2) \leq BMI < 40(kg/m^2) \rightarrow$ severely obese
- $BMI \geq 40(kg/m^2) \rightarrow$ very severely obese

- Ponderal Index (PI, also known as Corpulence Index) [3]: provide the relationship between mass and height and has the following formulas:

$$PI = weight(kg)/height(m^3) – normal\ values\ for\ 12\ month\ of\ infant\ [10.3\text{-}13.9]$$

$$PI = 100*(weight(kg)\text{^}(1/3))/height(cm) – normal\ values\ [2.175 - 2.4]$$

$$PI = height(inches)/((weight(pounds))\text{^}(1/3)) – normal\ values:\ [12.49 - 13.92]$$

- HC/AC ratio [4]: is a means of distinguishing different patterns of growth retardation with a high ratio implying malnutrition of the fetus

$$HC/AC = Head\ Circumference/Abdominal\ Circumference$$

The main useful statistical formulas that could be translated in a user defined formula in Excel are as follow:

- Amplitude (Range): = MAX(*data_range*) – MIN(*data_range*)
- Central value: = (MAX(*data_range*) + MIN(*data_range*))/2
- Standard error: = STDEV(*data_range*)/SQRT(COUNT(*data_range*))
- Coefficient of variation (CV, also known as *relative variability*): = 100*STDEV(*data_range*)/AVERAGE(*data_range*)) (computed whenever data follow a normal distribution) [5]. This indicator assesses the variability of data and is not proper to be computed when experimental data take both positive and negative values. When data did not follow a normal distribution, Quartile Variation Coefficient (QVC) must be computed (QVC): = 100*(Q3-Q1)/(Q3+Q1), where Q3 = 3rd quartile, Q1 = 1st quartile [6].

3. IF Function

One particular case of a logic function that could be very useful when you deal with medical data is the IF function. This function is very useful whenever different criteria are applied on a set of variables to return different answers.

The syntax of the function is as follows: = IF(*logical_test*, *value_if_true*, *value_if_false*), where *logical_test* is the test performed on a value or expression and could comprise the following operators: = (equal to), > (higher than), < (smaller than), ≥ (higher than or equal to), ≤ (smaller than or equal to), <> (not equal to). An example with two quantitative criteria is presented in Figure 3 (Q: The patient has hypertension? – is considered that a patient has hypertension if SBP ≥140 mmHg or DBP≥90 mmHg) while an example with a combination of qualitative and quantitative criteria is presented in Figure 4 (Q: The patient has a cardiovascular risk? A person has a cardiac risk if the *age of the person is greater than 30 year AND the person smoke AND the person has hypertension AND the person has glycemia higher or equal to 100 mg/dl*.). In each example an operator is used; OR will return the results if one of criterion is accomplished while AND will return a true value if all criterion ware accomplished. In the first example

(Figure 3), a patient that has a SBP ≥ 140 mmHg and a DBP < 90 mmHg is consider at having hypertension (the same result is obtained if SBP < 140 mmHg and DBP ≥ 90 mmHg or SBP ≥ 140 mmHg and DBP ≥ 90 mmHg). In the second example (Figure 4), a patient will be considering of having a cardiac risk if his/her age is higher than 30 years, he/she is a smoker, he/she has hypertension and he/she has a value of glycemia ≥ 100 mg/dl. Thus, all criteria must be accomplished to be considered of having cardiac risk. If one criterion is not accomplished the person is considered not having a cardiac risk (such as, a person with age > 30 years, non-smoker, with hypertension and with glycemia higher than or equal to 100 mg/dl).

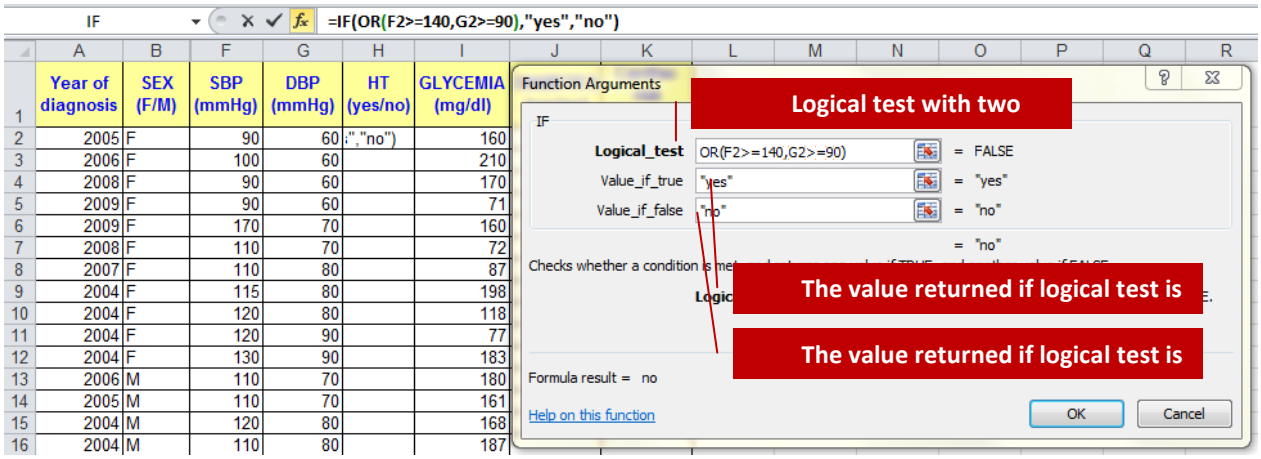


Figure 3. IF function by example: two criteria

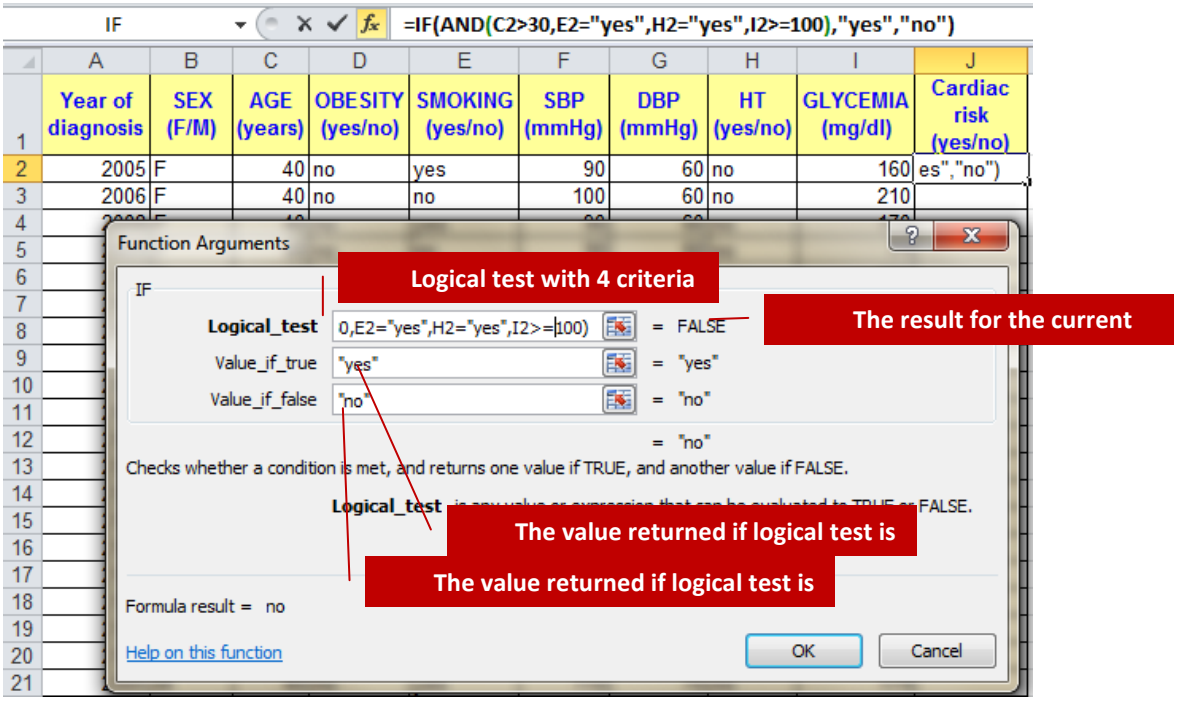


Figure 4. IF function by example: four criteria.

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[1] Keys A, Fidanza F, Karvonen MJ, Kimura N, Taylor HL. Indices of relative weight and obesity. Journal of Chronic Diseases 1972;25(6-7):329-43. doi:10.1016/0021-9681(72)90027-6.
[2] BMI classification. World Health Organization [online] [last update 24/07/2013] [accessed July 24, 2013]. Available from: http://apps.who.int/bmi/index.jsp?introPage=intro_3.html
[3] Rohrer F. Der Index der Körperfülle als Maß des Ernährungszustandes. Münchner Med Wschr 1921;68:580-582.
[4] Colley NV, Tremble JM, Henson GL, Cole TJ. Head circumference/abdominal circumference ratio, ponderal index and fetal malnutrition. Should head circumference/abdominal circumference ratio be abandoned? Br J Obstet Gynaecol 1991;98(6):524-7.
[5] Pearson K. Mathematical Contributions to the Theory of Evolution. III. Regression, Heredity, and Panmixia, Philosophical Transactions of the Royal Society of London, Series A 1896;187:253-318.
[6] Zwillinger D, Kokoska S. Standard Probability and Statistical Tables and Formula. Chapman & Hall: Boca Raton, 2000.