YORK ONLINE WORKSHOPS IN HEALTH ECONOMIC EVALUATION

Advanced Methods for Cost-Effectiveness Analysis:

Meeting Decision Makers' Requirements

Excel functions you will need to use in the practical exercises

Some exercises use Excel. No other software is required. For the majority of the exercises, you should be fine if you are using a Mac. There are some exercises which involve visual basic for applications (VBA) in Excel to create macros, e.g. for simulation/bootstrapping. There are several versions of Microsoft Excel available for both Mac and Windows operating systems. The version of Excel you have will require VBA compatibility for you to be able to fully participate in this course.

Windows computers. All versions of Microsoft Excel for Windows are compatible with VBA (Microsoft Excel 2007, 2010, 2013, 2016, 2019, 2021, and Office 365).

Mac computers. The following versions of Microsoft Excel for Mac are compatible with VBA: Microsoft Excel 2011, 2016, 2019, 2021, and Office 365. Note VBA is not available for Excel 2008 for Mac and an alternate version of Excel may be required.

NB: To learn how to enable the Developer Tab to access VBA in Excel, please see: https://support.microsoft.com/en-us/excel.

Although many of you will be familiar with Excel functions, we thought it would be useful to let you know which functions you will be using during the practical exercises. It is worthwhile taking a look at the help sections for these prior to the workshop.

NB: The functions listed on the following pages have been confirmed to be available using Excel 2010, 2016, and Excel 365. If you are using another version of Excel,

some of the functions may be different. Please check this out before attending

the workshop. For more information on Excel functions and formulas, please see

https://support.microsoft.com/en-us/excel

AVERAGE: This function allows you to calculate the mean of a range or set of data, e.g. =AVERAGE(a1:d1)

COUNTIF: This counts the number of cells in a data range or set that satisfy a given criteria, e.g. =COUNTIF(a1:d1,"<1")

CORREL: This function allows you to calculate the correlation between two random variables.

INT: This function returns number down to the nearest integer

SUM: This function calculates the total of a range or set of data,

e.g. =SUM(a1:d1)

IF: This is a logical function, such that Excel returns a value or "FALSE" or "TRUE" if a criteria is met, e.g. =IF(a1<1,"TRUE","FALSE")

STDEV.S: This calculates the standard deviation based on a sample of data,

e.g. =STDEV.S(a1:d1)

SQRT: This is used to calculate the square root of a value, e.g. =SQRT(a1)

MEDIAN: This function is used to calculate the median value in a range or set of values, e.g. =MEDIAN(a1:d1)

MIN: This function is used to calculate the minimum value in a range or set of values, e.g. = MIN(a1:d1)

MAX: This function is used to calculate the maximum value in a range or set of values, e.g. = MAX(a1:d1)

RAND(): Returns an evenly distributed random number greater than or equal to 0 and less than 1. A new random number is returned every time the worksheet is calculated (i.e. when you press F9). This function will be used in the Bootstrap exercise.

NORM.DIST: This allows you to draw for a normal distribution for each realisation of a particular variable. The normal distribution is defined using 4 data points: X (the data point we want the distribution for), the mean, standard deviation, and cumulative (logical function that returns the cumulative distribution function if "TRUE" and the probability mass function if "FALSE"),

e.g. =NORM.DIST (a1,a2,a3,TRUE)

NORM.INV: This allows calculating the inverse of the normal cumulative distribution for a specified probability, mean and standard deviation. When a random draw is required the probability should be specified using the RAND() function. It is useful in the calculation of parametric confidence intervals.

GAMMA.DIST: This allows you to draw for a gamma distribution for each realisation of a particular variable. The gamma distribution is defined using 4 data points, X (the data point we want the distribution for, the alpha and beta parameters and cumulative (logical function that returns the cumulative distribution function if "TRUE" and the probability mass function if "FALSE") and), e.g. = GAMMA.DIST(a1,a2,a3,TRUE)

GAMMA.INV: This allows calculating the inverse of the gamma cumulative distribution. If p = GAMMA.DIST(x,...), then GAMMA.INV(p,...) = x. You can use this function to study a variable whose distribution may be skewed.

BETA.DIST: This allows you to draw for a beta distribution for each realisation of a particular variable. The beta distribution is defined using 3 data points (plus optional upper and lower bounds for the interval), the alpha and beta parameters and X (the data point between A and B we want the distribution for).

BETA.INV: This allows calculating the inverse of the beta cumulative distribution. Returns the inverse of the cumulative beta probability density function. That is, if probability = BETA.DIST(x,...), then BETA.INV(probability,...) = x. The cumulative beta distribution can be used in project planning to model probable completion times given an expected completion time and variability.

PERCENTILE: This function returns the k-th percentile of values in a range. You can use this function to establish a threshold of acceptance. For example, you can decide to examine candidates who score above the 90th percentile. In our exercises this function will be used to calculate non-parametric confidence intervals, e.g. = PERCENTILE.EXC(a1, a2, a3, k)

VLOOKUP: This stands for vertical look up. This function searches for a value in the leftmost column of a table, and then returns a value in the same row from a column you specify in the table. VLOOKUP is defined using 4 data points, lookup value (value in the

first column of the array), table array (range or name of table that you are looking up information in), column index number (column number in the table) and range lookup (logical function that allows to return either an exact or approximate match), e.g. =VLOOKUP(1,A1:C10,2)

Macros: Visual basic can be used to write programs to undertake repetitive tasks in Excel. We often use these to run simulations. You will not be required to write macros on the workshop but to run these you will need to go to view>macros or use the automatic links created on the sheet.

You will be required to enable macros when opening Excel. To do this go to 'macro security' on the developer tab and choose 'enable all macros'.

Plotting graphs: You will need to plot graphs in some of the exercises. The graph function can be found at insert>chart. Excel will lead you through the process of building the graph. If you want to make changes after you have inserted the graph just right click on the graph and you will be given a drop down menu.