International Mortality And Smoking Statistics

IMASS Version 4.02

User's guide and Examples

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1. Description of the IMASS system

1.1 Introduction

The system is designed to give ready access to international data on tobacco consumption, smoking prevalence, and mortality from the major smoking-related diseases. It consists of a set of linked Excel workbooks, containing nationally-based data for 30 countries on mortality from four major smoking-related diseases and on tobacco and smoking statistics. Facilities are provided to help the user explore the relationships in the data via a variety of standard plots and tabulations.

1.2 Data structure - Age, Period and Cohort

In general, the data are organized in tables where the rows represent 5-year periods, and the columns 5-year age groups 0-4, 5-9, 10-14, 15-19, 20-24 .... 80-85, and 85+, for males and females separately. The diagonals of such a table can be interpreted as representing the lifetime experience of people born around the same time, e.g. people aged 0-4 in 1901-1905 would be aged 5-9 in 1906-1910 and aged 10-14 in 1911-1915 etc. Thus the diagonals of the table correspond approximately to the experience of a birth cohort.

One of the main objectives of this system is to allow mortality from smoking-related diseases for a group of people to be related to their tobacco consumption history as recorded at various periods of their life. A cell in the mortality table relates to a group of people dying at a specified age and period. Their lifetime tobacco history can be found by starting at the equivalent cell in the corresponding tobacco table and working backwards up the diagonal of this table. Facilities for this type of analysis are provided.

In general, and subject to availability, results are presented by 5-year periods, starting at 1851-1855 and continuing to 2001-2005, and in the 5-year age groups 15-19, 20-24 .... 80-84, and 85+.

Some limitations to this birth cohort approach should be noted. First, people dying within a 5-year period and a 5-year age group actually include those born in a 10-year age range. For example, those dying at age 60-64 in 1961-65 include 64-year-olds

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ABBREVIATIONS

A	All tobacco products
CB	Chronic bronchitis
COPD	Chronic obstructive pulmonary disease
CPP	Cigarettes per person per day
ICD	International Classification of Diseases
IHD	Ischaemic heart disease
IMASS	International Mortality and Smoking Statistics
ISS	International Smoking Statistics (ISS2 second edition, ISS3 web edition)
MC	Manufactured cigarettes
PNLSC	P.N.Lee Statistics and Computing Ltd.
TC	Total cigarettes
WHO	World Health Organisation

dying in 1961, born in 1896, and 60-year-olds dying in 1965, born in 1905. A more rigorous method taking these overlapping cohorts into account has been used in some other work[1,2] but is not attempted here. Second, the approach ignores the fact that the data in the different cells of a diagonal do not relate to the exact same people, as immigration, emigration and mortality are ignored. Differential mortality, with more smokers than non-smokers dying early, may be an important feature for the oldest age groups, but is not considered here.

1.3 Countries included

30 countries are included as shown below. Coverage is essentially complete for Europe, but elsewhere is restricted to some major developed countries. One limiting factor is the availability of sufficient smoking data for useful study, another is that mortality data submitted to WHO for some other countries are only regional, based on inadequate death registration and/or cover only a very limited period of time.

Australia	Greece	Poland
Austria	Hungary	Portugal
Belgium	Iceland	Romania
Bulgaria	Ireland	Spain
Canada	Israel	Sweden
Czechoslovakia	Italy	Switzerland
Denmark	Japan	UK
Finland	Netherlands	USA
France	New Zealand	USSR
Germany	Norway	Yugoslavia

Between World War II and reunification, data for Germany relate to West Germany only. Data for Czechoslovakia, USSR and Yugoslavia are only included up to 1990.

1.4 Causes of death included

The system currently contains data for four diseases: Lung cancer, Ischaemic Heart Disease (IHD), Chronic Obstructive Pulmonary Disease (COPD) and Respiratory Diseases (non-acute). See section 1.6 for details of how these diseases are defined.

1.5 Data sources

Age-, sex- and cause-specific mortality data are made available on the Internet by WHO[3] and commonly start in the 1950s. The WHO data are provided as numbers of deaths and populations for single years. For all analyses, these are converted to rates (per 100,000) for the 5-year periods. If data are not available for the full 5 years, the rate is calculated from the available years. Table 1 shows, for each country, the period of availability of mortality data (as at November 2006).

For other sources of population data, see the web edition of "International Smoking Statistics" (ISS3)[4] (except that, for data before 1950, the same method of estimation as for the updated chapters is used in IMASS for all countries).

Smoking and tobacco data are of two types: sales-based and survey-based.

Sales-based tobacco consumption data are mostly taken from ISS[4,5]. They have been arranged into 5-year periods matching those used for mortality, but starting earlier if available. They have been entered, so far as they are available, for three product categories:

- manufactured cigarettes (MC),
- total cigarettes (i.e. including hand-rolled) (TC), and
- all tobacco products (A).

They are given as number (or grams, for all tobacco products) per adult per day. They commonly start around the 1920s, but go back much earlier for a few countries. Where original sales data are not available for all 5 years an average from the available years is used. Note that sales-based consumption data are not age- or sex-specific.

Tar data (sales-weighted average yield, mg per cigarette) are also available for some countries from ISS[4,5], commonly starting around the 1960s. Tar is assumed to be 35 mg/cigarette up to 1955 (except in the very few instances of actual data before that year), with simple linear interpolation used to fill in missing years. Tar data are also not age- or sex-specific.

The availability of sales-based tobacco consumption and tar data is shown, for each country, in Table 2.

The main survey-based data consist of:

- prevalence, for each of the three product categories, as a percentage, and
- consumption of manufactured cigarettes and of total cigarettes, as number per person per day adjusted to total sales.

Both these types of data are taken from Supplement 1[6,7] to ISS, which made estimates from all the survey data presented in ISS for standardized age groups, and averaged them by sex $\times$ 5-year period $\times$ 5-year age group. These estimates assume that there were no smokers below the age of 15. Prevalence estimates commonly start around the 1950s, with consumption estimates commonly starting in the 1960s. Fuller details of the availability of the main survey-based tobacco data are shown, for each country, in Table 3. It should be noted that the original surveys on which these estimates are based were drawn from a wide variety of sources, as discussed in the *Methods* section

of ISS, and some cautions regarding the estimation process are discussed in the supplement.

The main survey-based data derive from studies in which subjects are asked about their current-smoking habits. For eleven countries, alternative survey-based data sets are also available. These are based on studies in which subjects are asked about their lifetime smoking history (see ISS2 Appendix V and Supplement 2[8] for a description of this retrospective method and a discussion of some of its advantages and disadvantages). These data commonly relate to birth cohorts born after about 1890 and do not involve the assumption of no smoking below age 15. They are taken from various published sources and are not derived on a consistent basis (see Table 4 for fuller details of the surveys). No attempt has been made to standardize these data. The database simply includes the data for the nearest relevant standard period and age group, either duplicating data or leaving gaps as appropriate to the individual case. For instance, many of the sources are based on 10-year birth cohorts, and these have been entered by repeating the data for the two relevant age groups. The user will need to consider how to use these alternative data sets on an individual basis. Their advantage is that they often allow lifetime tobacco history to be estimated over a longer time period than is possible with the main survey-based data.

1.6 Definitions of causes of death

Deaths are coded according to successive revisions of the International Classification of Diseases (ICD). Countries vary as to when (and if) they introduce the various revisions (see Table 1). In the 1950s the 6th revision was in use, and the latest 10th revision, published in 1992, is now in use by 16 of the countries. Except in the case of the 10th revision, which is used in full, data are provided to WHO according to various summary coding lists based on the ICD, and some countries use their own more limited versions.

Changes between the ICD revisions reflect differences in the understanding of the disease process and changes in terminology. For instance, stroke was a disease of the nervous system up to the 7th revision and of the vascular system subsequently, while COPD is a term of only relatively recent origin. These changes can make it difficult to extract consistently defined series of mortality data. The actual definitions used for the four disease groupings are detailed in Table 5.

As can be seen from Table 5, there is no real difficulty in obtaining a comparable disease definition from the data available for the various ICD revisions for lung cancer, the definition used always including cancers of the trachea, lung and bronchus.

For IHD, the definitions used in the 8th, 9th and 10th revisions are also quite comparable. However, the definitions used in the 6th and 7th revisions are somewhat broader. It has been suggested[9] that comparability might be obtained by using codes 420 + 422.1 in the 6th and 7th revisions, but data are not available from WHO for such detailed codes. Examination of 1965 data for England and Wales showed that deaths for summary code A081 (as used in the database) were about 11% higher for men and 25% higher for women than deaths for 420 + 422.1, so the discontinuity is not a minor one. Given that the alternative was not to have any IHD data before about 1968 (when the ICD 8th revision came in), it seemed better to include earlier data using a somewhat different definition, but making it clear that there was a problem of non-comparability when studying time trends.

For COPD the problem is more complex. Ideally, for comparison with smoking data, one would have liked a disease definition which included the terms chronic bronchitis (CB), emphysema and COPD. However, there were a number of problems:

(i) asthma, as well as bronchitis unqualified as to whether it is acute or chronic, is combined with CB and emphysema in the same WHO broad summary code in the 8th and 9th revisions,
(ii) COPD, a term only commonly used in the last 20 years or so, is classified with "other respiratory disease" in the 6th, 7th and 8th revisions,
(iii) emphysema is classified with "other respiratory disease" in the 6th and 7th revisions, and
(iv) asthma is included under allergic disorders (and not as a respiratory disease at all) in the 6th and 7th revisions and cannot be separately identified from the available data.

After studying the coding systems at some length it became clear that there was no entirely satisfactory solution. The definition of COPD finally selected (as detailed in Table 5) is comparable enough for the 9th and 10th revisions, but will lead to some discontinuities earlier, which may vary by country. As an alternative, data for respiratory diseases (non-acute) are also included. This broader disease grouping has fewer continuity problems, but includes various diseases that are not associated with smoking.

It should also be noted that there are numerous 'rules' used when carrying out the coding, and that these may vary between countries and from time to time. For instance, the death coded is the underlying cause, but between 1985 and 1992 England and Wales adopted its own version of the rule to determine the underlying cause, resulting in a substantial drop in the death rate from pneumonia in that period[10]. A discussion of other aspects of the validity of mortality data is given by Alderson[11].

Tables 1-5 are provided for quick reference to the time span for which the different types of data are available. This information is also given in the Country Details sheet of each workbook.

2. Using the IMASS system

2.1 Getting started

The system works in Excel 97 or later. Macros must be enabled (some systems default to disallowing macros for virus protection). The preferred screen resolution is 1024 × 768. Use View then Full screen (or alternatively Zoom 75%) for the best effect. See also section 2.9, System Requirements.

When the CD is inserted, the install program should auto-run. If it does not, run IMASSinstall.exe from the CD. Files are installed with "read-only" status to prevent accidental corruption of the data. If required, the main file can be copied with read/write status, so that settings for particular analyses can be saved.

IMASS Version 4 installation will not overwrite any previous IMASS versions, and will be identified by new menu entries e.g. IMASS v4 Excel database. The default installation directory is C:\IMASSv4. Previous IMASS versions can still be used to allow continuity of data in existing projects.

The program can then be started from the Windows Start / Programs menu. Alternatively start Excel and then open the workbook C:\IMASSv4\IMASS.xls.

Although this workbook contains many sheets, the user will carry out the majority of operations using just the first few sheets. These are:

Index
Mortality Plots
Prevalence Plots
Consumption (CPP) Plots, including both sales and survey-based consumption
Scatter Plots, comparison of mortality vs prevalence/consumption
Combination Plots, simultaneous plotting of mortality and either consumption (sales and/or survey based) or prevalence

Each of the plot sheets holds a succession of pages, each page containing a single plot. These are reached directly by simply clicking on the relevant button in the Index sheet, or by scrolling down through the plot sheet.

The user may also want to look at the first sheet, Country Details, of the country workbooks, where information on the exact range of available years of data is shown. These too can be reached from the Country Settings section of the Index sheet. The 'raw data' can be found in the country workbooks if the user wishes to create their own analyses beyond those provided in IMASS – see section 2.10.

2.2 Using the Mortality Plots sheet

On this sheet, the user can plot (or tabulate) mortality data according to a number of factors. The mortality data commonly start in the 1950s.

In all plots on this sheet, the mortality rate forms the y-axis. First decide which factor is to form the x-axis of the plot, choosing from age group, period and birth cohort. Then decide which factor is to be represented by lines on the plot, choosing from age group, period, birth cohort, sex and country. Then click on the button labelled with the two chosen factors on the Index sheet to move there directly, or scroll down within the sheet to the relevant page. The pages are:

1 Period and Age group
2 Age group and Birth cohort
3 Period and Birth cohort
4 Sex and Age group
5 Sex and Period
6 Sex and Birth cohort
7 Country and Age group
8 Country and Period
9 Country and Birth cohort

Looking at the first page, Period and Age group, with the default settings, Example 1 will be displayed.

The content and appearance of the plot can be varied in several ways.

By clicking on the X Axis options buttons:

- These buttons allow the two factors in the plot to be swapped. In this Example, if you click on Periods, the appropriate labels will appear on the x-axis (bottom) and the age group will appear in the legend (side-right).

By using the drop-down menus:

- Data will be for a single country, chosen from the Country menu, with the Country Ratio (denominator) set to None (Single Country). Or, for a ratio of two countries, choose the numerator country with the Country menu and the denominator in the Country Ratio (denominator) menu. The relevant workbook(s) will open automatically.
- Sex can be set to Males, Females, Males & Females (combined) or Male/Female Ratio.
- Disease can be set to Lung Cancer, Ischaemic Heart Disease, COPD or Respiratory Disease (non-acute). Definitions of these diseases have been discussed in section 1.6, as has the importance of ICD revision changes – the timing of these can be seen in Table 1 and in the Country Details sheet of each country workbook.

By clicking on the Plot Settings button:

- By default, the x-axis is scaled to fit all the standard age groups. Use Plot Settings, then Age groups to show a restricted range, or to choose, e.g. alternate age groups. Either just click in the individual tick-boxes, or highlight all the ones you want to add (e.g. by using *ctrl click*), then click on the Show Selected Age Groups button. Note that you cannot combine age groups at this point in the program.
- All the standard periods are shown in the legend, and all that have data available appear as a line on the plot. Use Plot Settings, then Periods to show only a restricted selection. The colours/symbols will not be altered*.
- Click on Mortality Plots to get back to your plot.
- Note that Plot Settings apply to the whole of the Mortality Plots sheet. However, as we are working in the Age and Period page of the spreadsheet, only those settings will affect our current plot.

By normal Excel facilities:

- Text can be typed into any of the blank cells outside the chart area.
- To edit the labels on the plot itself, scroll across to the right to column AB, where the automatically generated labels will be found. Edit as required, then press F9.
- For other changes to the plot, first *right-click* on the plot and choose Edit Chart Object. Some of the many possibilities are:
  - To vary the range of the y-axis, *right-click* on an axis value and select Format Axis. Choosing the Scale tab, the default settings for the y-axis are seen as minimum = 0, maximum = automatic, crosses at 0. These can be changed e.g. if you want to create a series of plots all using the same fixed range.
  - To set a logarithmic scale on the y-axis, *right-click* on an axis value, choose Format axis, then the Scale tab and tick Logarithmic scale. You must make sure to avoid having a minimum of zero, the easiest way to do this is to fix the Minimum at a low value (e.g. 0.1) and setting Crosses at to the same value. This is shown later in Example 2.
  - To change the appearance of the axis labels, for instance to change the number of decimal places on the y-axis labels, use Format Axis then choose the Number tab, and alter as required. On the x-axis, you can choose the Alignment tab to change the angle at which the labels are displayed.
  - To change the colours or symbols, *right-click* on a line and choose Format Data Series, Pattern. To display the line label at each point, choose Format Data Series, Data Labels, and tick Series Name.

* There is an Excel problem that if more than 16 colour/symbol definitions are in use (as is the case for periods and cohorts, but not for age groups) and if lines are hidden and then the axes are swapped, then the colours will change. To avoid this, have all periods/cohorts showing when swapping axes.

- Do not use these methods to change the range of the x-axis, or to edit its labels. Use Plot Settings, or edit column AB as described above.

Then click outside the chart area to de-select the plot.

Click on the Print Plots button to print this plot and its settings. Other options for printing and saving the results are discussed below (section 2.8).

Click on the Data Table button to display the equivalent data table. The columns correspond to the x-axis factor and the rows to the lines from the plot. Normal Excel facilities can be used here (e.g. to change the number of decimal places displayed). Those settings which are controlled by the drop-down menus can be changed here too, in which case the plot will also be updated. The Print Table button prints the table (see Example 1T). When finished, click on Go to Mortality Plots which takes you back to the original position in the plot sheet.

The next few pages of the Mortality Plots sheet, for single country or country ratio plots, share many of the features already described. Example 2 shows a plot generated on page 2, Age group and Birth cohort. A restricted age range has been chosen (via Plot Settings) and a Log Scale set on the y-axis (via Edit Chart Settings). Example 3, generated on page 5, Sex and Period, illustrates some features relevant to pages 4-6.

- The x-axis factor is already fixed, since the other factor (i.e. sex) cannot be used on the x-axis and so must appear as the lines.
- Although the available lines include the M/F ratio, it is unlikely that this will be required alongside the other (Male, Female and Combined) lines, since the scale will be inappropriate. It can be hidden via Plot Settings. (See also Example 6 below).
- Since age, period and birth cohort are interdependent, and since one of these must be chosen as the x-axis factor, a single drop-down menu is provided to allow one only of the other two to be chosen. The third is thus implicitly fixed.
- On page 5, Sex and Period, a facility is available to allow an age-group to be defined as a combination of standard age groups. This can be weighted either to the actual population (i.e. unweighted), or to a standard population (WHO-World or European standard populations[12], or a Custom standard population can be defined as any country/year). Click on Combined Age Group Settings to define the combined group and then choose it from the bottom of the Cohort or Age group drop-down menu.
- Also on page 5, a facility is available to allow the data in all lines to be scaled relative to a chosen period. This has the effect of forcing all the lines to pass through a single point at value 1, and the relative changes in the statistic may be more clearly seen. This is demonstrated later in Example 5.

The final pages 7-9 of the Mortality Plots sheets offer plots for multiple countries. Here, unlike the earlier pages, any changes to the drop down menus (including changes to the Combined Age Group Settings and Relative Scaling Period on page 8 only) are not immediately implemented in the plot. Instead, an Update Country Plots button appears. When this is clicked the relevant country workbooks are each opened in turn and the plot is built up. See Example 4 generated on page 8. (Notice that the Plot Settings were used to restrict the periods on the x-axis in Example 3, and this remained set for Example 4).

This is a good page on which to demonstrate two features already mentioned. The Relative Scaling Period is shown in Example 5. Note that any line with missing data at the chosen period will disappear, as happened with Czechoslovakia in the Example. Choosing a period in the centre of the range would avoid this. This page is also appropriate for plotting the sex ratio – see Example 6.

Once a country plot has been updated, a further option becomes available, to convert the mortality rates into country rankings (1 = highest, 2 = next highest, and so on). These can be either unadjusted or normalised*. See Example 7, which is a rank version of Example 4. By default, the rank plots are presented in Portrait orientation to allow all 30 countries to be displayed, but as only a few countries are included in the example, this has be altered by changing the y-axis limits (as described above, and changing the maximum to the number of countries plus one – the 'crosses at' value will update automatically) and dragging the chart area.

2.3 Using the Prevalence Plots sheet, and the Lagging or Averaging option

Prevalence data represent the percentage of the population who smoke. The data are taken from Supplement 1[6,7] to ISS and are estimates based on all the sex-specific surveys in ISS standardized to 5-year age groups and 5-year periods. They are structured in the same way as the mortality data and commonly start around the 1950s.

This sheet is arranged into the same 9 pages as the Mortality plots sheet, and all the features described above apply. Two extra options are available here. Firstly, the Tobacco Type is chosen as Manufactured cigarettes, Total cigarettes (i.e. including hand rolled) or All tobacco products. The second special facility added here is Lagging or Averaging. In Example 8, the Lag or Average Start and End settings (top-right) are both

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* If X countries are selected, but at a particular point data are available for only Y countries, normalised ranks are plotted where:

$$\text{Normalised rank} = \text{Rank} * (X+1)/(Y+1)$$

This adjustment ensures that the country in the middle stays in the middle, and the countries with the highest and lowest ranks stay symmetrically near the top and bottom of the figure.

set to the default values of 0 (Current), so the data relate directly to the period shown, exactly as for mortality plots.

As described in section 1.2, a simple approximation to the lifetime tobacco history relevant to a particular cell in the mortality table can be found by starting at the equivalent current cell in the tobacco table and working backwards up the diagonal of the table. The Lag or Average Start and End drop-down menus (top-right) allow this to be carried out. If both are set to the same time, then the tobacco statistic is lagged, e.g. if both are set to 10 years previous, then the value used is taken from two steps up the diagonal from the current cell. If set to different times, then the value is calculated as a simple average, e.g. if the start is set to 15 years previous and the end to 5 years previous, then the value is the average of the 3rd, 2nd and 1st steps up the diagonal. See Example 9.

Some points to note:

- The result will be set as missing, unless all the values in the range are available, i.e. are not themselves missing and fall within the subjects' lifetime, e.g. consumption 20 years ago will automatically be missing for 15-19 year olds.
- For the standard ISS survey-based data, it is implicitly assumed that prevalence and consumption were zero below age 15. So if a lag of 10 years is set, data for age groups 15-19 and 20-24 will automatically be zero. This assumption is made even for periods with no data available, so that these zeros are available for lag/average calculations.
- Consumption during lifetime or adulthood can be calculated by setting the Start point to Age 0-4 or Age 15-19 respectively, and End to 0 (Current).
- If creating a Combined age-group, or using Sexes-combined, then the simple average/lag is calculated first on the original single sex/5-year age group, then the population weighted average is calculated. In other words, only the population at the current time-point is used.
- Some limitations on the validity of this process have been described in section 1.2. Note also that the 85+ age group is clearly wider than 5 years, so its use in lagged or averaged calculations is not recommended.

2.4 Using the Consumption Plots sheet

Consumption data are of two types. Sales data are taken from ISS[4,5] and are given as number of cigarettes (or grams, for all tobacco products) per adult per day. They start commonly around the 1920s, but much earlier for a few countries. Tar data (mg per cigarette) are also available for some countries, commonly starting around the 1960s. Where original sales data are not available for all 5 years an average from the available years is used, and for tar data, a value of 35 mg is assumed up to 1955, with a simple linear interpolate used across any missing period. Survey data are taken from Supplement 1[6,7] to ISS, and have been estimated similarly to the prevalence data.

They are given as number of cigarettes (or grams, for all tobacco products) per person per day.

This sheet is very similar to the Prevalence Plots sheet, with some additional options:

- Either sales-based or survey-based consumption data can be chosen. Since sales-based data are not sex-specific, whereas survey-based data are, this is combined with the choice of sex (on a single drop-down menu for pages 1-3 and 7-9, and in Plot Settings for pages 4-6. In Example 10, Males & Females, (Sales) has been chosen.
- Sales data are also not age-specific, and so when current or lagged data have been chosen (i.e. if Start and End are set the same) the choice of Age group does not affect the results. However if an average (e.g. Start = Age 15-19, End = 0 (Current)) has been set, then the Age group setting will affect the result. Setting a lag for sales data simply shifts the data. It is possible to choose sales data for e.g. a Sex and Age group plot, but this is not particularly appropriate as the data will all be the same.
- Tar Adjustment is chosen as None, Standard or Sq'root Standard. In Standard adjustment, consumption is expressed in "constant tar cigarettes" estimated as

  number of cigarettes × tar / 35

  where 35mg is the standard tar yield per cigarette assumed before 1955. Sq'root Standard (i.e. square root of Standard), involves an adjustment proposed to model "compensation" by smokers when smoking lower tar cigarettes[13,14]. Tar adjustment can be applied to any tobacco type, although its relevance is primarily to manufactured cigarettes. See Example 11. Note that tar adjustment is only possible where tar data are available or have been estimated (see section 1.5 and Table 2). Thus in Example 11, many of the lines stop earlier than in Example 10.

Notice that in Examples 10 and 11, a wider range of periods has been set (via Plot Settings) than in Examples 3-5, because sales data are available earlier than mortality data. Notice also that there may be a gap in the data series (e.g. Bulgaria has no sales data for the 1940s or 1950s – Example 10).

2.5 Using the Scatter Plots sheet

In this sheet, there are two pages, with page 1 – Consumption and page 2 – Prevalence respectively set on the x-axis, and mortality set on the y-axis. The countries are shown in the legend and as single points in the plot. The Age and Period or Cohort settings apply to both the tobacco statistic and mortality. Sex is chosen separately – in most cases one will want to choose the same setting for both. However if having chosen sales-based consumption, one might wish to choose a particular sex for the mortality. The other settings, including the Lagging or Averaging, apply only to the tobacco statistic. Like multi country plots on the previous sheets any changes to the drop down menus are not immediately implemented in the scatter plots. Instead, an

Update Scatter Plots button appears. When this is clicked the relevant country workbooks are each opened in turn and the plot is built up. See Example 12.

2.6 Using the Combination Plots sheet

This sheet allows plots to be constructed showing lines for both mortality and tobacco statistics, with each line individually defined. The first three pages have Age, Period and Cohort on the x-axis respectively. Both Consumption and Mortality are available on the y-axis, with the scale relevant to the tobacco statistics shown on the left, and the scale relevant to the mortality statistics on the right. The next three pages repeat the sequence with Prevalence and Mortality.

On each plot, up to 3 tobacco lines and 3 mortality lines can be drawn. If less than the full 6 lines are required, use Plot Settings to hide unwanted ones. See Example 13, generated on page 5, where the third mortality line has been hidden.

Then for each line in turn, use the drop-down menus to choose:

Age (including combined age group), Period or Cohort (except for the one in use on the x-axis)
Sex (including combined and ratio) and
Country (including country ratio).

Other options applicable to the tobacco lines are: Tobacco type, Tar adjustment (not available for prevalence) and Lagging / averaging, and to the mortality lines: Disease. Note that in the consumption plots, the choice between Sales and Survey based data is made by the Sex & Source drop-down, since sales data are not sex-specific.

Changes to the drop-down menus are not immediately reflected in the plot. Instead, a marker (Update Req') is shown alongside the line in question and an Update Required button is displayed over the plot. When all the line definitions are ready, click on the Update Required button and all the changes to the plot are implemented. If you make any changes to the drop-down menus from the Data Table part of the sheet, then you will be transferred back to the plot in order to carry out the update.

In the legend, the lines are simply labelled as Mort1, Mort2 etc, but these can be replaced by more meaningful labels by using Plot Settings, then editing in the relevant sections of column K or N.

If you require a long label split over 2 lines as in Example 14, use the keystroke combination <Alt>+<Ret> to insert a hard return in the cell text, like this

US sales <Alt>+<Ret> (20 year average)

or use the following formula format :-

="US sales"&CHAR(10)&"(20 year average)"

If a long label causes the legend to overlap with the axis labels, use Edit Chart Object, *right-click* in the legend, and choose Format Legend, Placement, Right.
On pages 2 and 5 with Period on the x-axis, there is also a scaling option. This applies to all the lines, causing the data to be scaled relative to a chosen period. In this case, it will probably be desirable to change the y-axis settings so that both tobacco and mortality have the same maximum value (using Edit Chart Object, then Format Axis, Scale as previously described). See Example 15. Note in this case the plot axes are not automatically labelled as relative. In the example the labels have been edited manually.

Note that when two y-axis scales are in use, it is not possible to have grid lines. If all mortality lines are hidden, the mortality scale is hidden. However if all the tobacco lines are hidden, then the plot border, the background shading and x-axis scale get hidden as well as the tobacco scale – this appears to be a deficiency in Excel, which can be got round by first *right-clicking* on each mortality line and choosing Format Data Series, Axis, Primary Axis, before deselecting the tobacco lines. Then edit the x-axis label to Mortality.

2.7 Using alternative (retrospective) tobacco data

As described in section 1.5, alternative survey-based data sets are available for 11 countries. To choose an alternative data set, go to Country Settings from the Index. Information on the available sources can be displayed by choosing a country, then clicking the Display ... Survey Sources ... button. The data sets can be chosen from the Survey Source drop-down menus. Any country, scatter or combination plots already using tobacco data for the country in question will immediately be marked as needing update. Thereafter, whenever the country in question is displayed, either in a Country menu or in a legend, the abbreviated name of the data set will also be shown. (Note that the generic labels Source 2 or Source 3 are used in Plot Setting and are initially displayed until a plot is updated. The country name is not altered on the Mortality Plots sheets). See Example 16, using UK [HALS]. Because this data set relates to 10-year birth cohorts, it is appropriate to show only alternate cohorts.

2.8 Printing and saving results

As mentioned earlier, the Print Plots button prints out the current plot with its settings. Use the normal Excel print facilities to change the printer properties.

When working on drafts for a report, a quick way of saving a sequence of plots and their settings is to select and copy the relevant area (including one column to the right of the plot), and then in Word, set the page to Landscape and use Paste Special, Picture (Enhanced Metafile). Each plot will fill naturally one page. The Worked example was generated by this method. Alternatively, *Alt PrintScreen* in Excel and a simple paste in Word will give a screen image. By these methods, the drop-down settings are

stored as part of a graphic, so the format and wording cannot be edited. Data tables can be copied by the same methods.
For plots in a more polished report, it may be better to type the headings directly into Word and copy just the plot – *right-click* on the plot and select 'Edit Chart Object' then *right-click* in the plot area (i.e. the white area of the plot) and select Copy, then in Word use Paste Special, Picture (Enhanced Metafile). The plot can be dragged to size either in Excel or in Word, but any changes to the labels must be done while still in Excel. Another possibility is to create a second copy of a plot within Excel, just using simple copy and paste, then *right-click* on the new copy of the plot and choose Location, As a new sheet. This has two purposes:

- You can create customized labels directly on the second copy, rather than by editing in column AB. When a change is made to a drop-down menu, the data will be updated in both copies but labels will be updated only in the original. Thus the customized labels will not be destroyed in the second copy. Note that you must be careful not to leave erroneous labels.
- The size of the second copy can be controlled precisely by using Page Setup, Margins. This will give more accurate sizing than dragging, and will avoid the fonts becoming distorted.

A data table can be transferred to a Word table by using Paste Special, Formatted text (RTF). (This is preferable to Paste Cells which also includes any hidden data.)

When transferring results to another Excel file, a simple copy and paste will usually create links to the original IMASS files. If a stand-alone file containing results only is required, a data table can be copied using Paste Special, Values and Paste Special, Formats. Any hidden rows or columns will also be copied. To copy a plot, the following method can be used:

Right-click on the plot area, choose Edit Chart Object, then Source Data and looking at the Data Range tab, make a note of the data range (e.g. sheet = Prev Plot Data, cells = A9:P43), then cancel. Copy the chart to the new file. Also copy the data from the data range to another sheet in the new file, starting at the same start cell (e.g. A9), and using Paste Special, Values. Hide any rows and/or columns that are not required. On the new chart, go to the Data Range tab (as before) and change IMASS and the sheet name to the names of the new file and the new data sheet respectively.

2.9 System requirements and configuration

The preferred minimum system requirement is a 1200 MHz PC with 512 MB RAM running Excel 2002 (which is supplied with Office XP).
Macros must be enabled within Excel for IMASS to function correctly. In Excel 2000 this is done from menu option Tools, Macros, Security, select the Security Level tab and set to Low.

If you see the message requesting virus scan each time Excel opens a workbook, it probably means that the Microsoft Office plug-in is enabled in your antivirus software. The opening of work books can be speeded up by disabling that plug-in. Consult your antivirus documentation, but for example in Norton Internet Security 2003 select menu item Options, Norton AntiVirus and the plug-in option can be found in the Miscellaneous section.

2.10 Customized analysis

The files provide full Excel functionality, so that users can create their own customized analyses or add extra data. Note that background calculations are switched off, so that pressing key F9 (Calculate Now) is required (or change to automatic by Tools, Options, Calculation, Automatic).

The 'raw data', i.e. for single years rather than 5-year periods as used in all the provided analyses, can be found in the country workbooks:

Data type	Sheet	Start row
Numbers of deaths	Deaths Male, Deaths Female	143
Population (in hundreds)	Pop Male, Pop Female	43
Sales and tar	Tobacco Data	43

Prevalence and survey-based consumption are not available for single years.

If changes are to be made to a country workbook, remove the 'Read only' attribute from the file properties. You should always open the main IMASS workbook first before opening the country workbook, and save changes to the country workbook before returning to IMASS.

Additional tobacco data sources can be added to a country workbook, by adding the source description to rows 59 or 60 of the Country Details sheet, and entering the data in the appropriate Retro or Retro 2 sheet (e.g. Prev MC Male Retro).

3. Acknowledgments

We thank the tobacco industry for providing generous financial support towards the development of IMASS. We are grateful to WHO for making publicly available the mortality data used in IMASS. The authors are responsible for the accuracy of transferring the data into IMASS and the implementation of the software.

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Appendix: IMASS Revision History

IMASS v4.02
(IMASS.XLS 15.11.07)
1. Fixed bug in Prevalence plot settings for Birth cohort and Sex not correctly selecting lines on associated plots

2. Fixed bug in Prevalence plot settings for Country not correctly selecting lines on associated country Rank plots

IMASS v4.01
1. IMASS v4.01 contains updated smoking statistics and sales data from the following ISS3 (Web edition) chapters and the ISS3 Supplement 1 update:-

ISS3 chapter	IMASSv4.01 workbooks
Australia	Australia.xls
Canada	Canada.xls
Japan	Japan.xls
United Kingdom	UK.xls
USA	USA.xls

(See release notes and country workbooks for detailed change history)

IMASS v4.00

1. IMASS v4.00 contains updated population and mortality data from The World Health Organisation (WHO) as of 17 Nov 2006. There have also been some minor changes to pre-1950 population in some countries to bring IMASSv4.00 in line with the population data used in the International Smoking Statistics publication (ISS). The updated population data will be used for ISS3 (Web Edition).

   (See release notes and country workbooks for detailed change history)

IMASSv3.02 30.01.07

(IMASS.XLS 30.01.07)
1. Excel 2003 compatibility issues fixed.

IMASSv3.01 23.05.06
(IMASS.XLS 23.05.06)

1. Dropdown menu corrections in main IMASS workbook

Note.
The specific source of the standardizing populations (World Standard and European Standard) was mistakenly not included in the documentation of Version 3. It is given here for information only, and will be included in a future release of the documentation.

International Agency for Research on Cancer. Waterhouse J, Muir C, Correa P, Powell J, editors. Cancer incidence in five continents, Volume III. Lyon, France: IARC; 1976.

IMASS v3.00

1. Country workbooks are now opened automatically when required, and Excel background calculations are 'off'. This gives a considerable improvement in performance and ease of use.

2. There is no longer a limit on the number of countries that can be included in a country plot or scatter plot. These plots now operate with an 'Update' button, which triggers the automatic opening of each relevant country workbook in turn.

3. An Index button available throughout to return to the Index sheet.

4. Within the mortality, prevalence and consumption sheets, data settings made through drop-down menus are now shared between pages 1-6, and between pages 7-9, rather than throughout the whole sheet. None are shared between sheets.

5. Ranking is now available on country plots.

6. Colours and symbols have been improved.

7. There is improved consistency in the method of selecting Source (sales or survey) and Sex for consumption data.

8. Plot labels and title are now in worksheet cells (in column AB) to allow for easy editing. Previously this had to be done as a chart edit.

9. In multi country and combination plots, any gap in a data series now shows as a gap on the plot, rather than being bridged by a straight line.

10. Selection of alternative tobacco data sources is now done in the main workbook, accessed via the Index page. Alternative data source added for Spain.

11. Mortality and population data have been updated using WHO data as at 2nd September 2003.
    a. Although WHO has added provision for the 85+ age group to be split into 85-89, 90-94 and 95+, such data are available only for very recent years, and they remain combined in IMASS. Population data are now available as single persons rather than hundreds, but they remain as hundreds in IMASS.
    b. This update has provided one more recent year of mortality data for several countries and 2 more years for Switzerland, but removed 1951 data for France.
    c. Data for Switzerland for the 10th revision (1995-1997) were previously coded with special "G" codes; these remain for 1995-1996, but 1997 has been recoded and now uses the "ICD 10 Tabulation List 1", as do the new years 1998-1999. This involved minor changes to the definition of COPD, but more major problems with continuity in respiratory diseases (non-acute). Consequently, data for this disease definition are not now included for Switzerland after 1994.
    d. WHO data codes no longer distinguish between the 6th and 7th ICD revisions, but the data are unchanged and the start dates for the 7th revision are still shown in Table 5 and in the 'Country Details' worksheet of each country workbook.

Table 1 Availability of mortality data (as at 17th November 2006)

Country	Deaths				ICD revision – year first used				
	Single years		Periods		6	7	8	9	10
	Start	End	Start	End					
Australia	1950	2003	1946-1950[a]	2001-2005[b]	1950	1958	1968	1979	1998
Austria	1955	2005	1951-1955[a]	2001-2005	1955	1958	1969	1980	2002
Belgium	1954	1997	1951-1955[a]	1995-2000[b]	1954	1958	1968	1979	-
Bulgaria	1964	2004	1961-1965[a]	2001-2005[b]	-	1964	1968	1980	-
Canada	1950	2003	1946-1950[a]	2001-2005[b]	1950	1958	1969	1979	2000
Czechoslovakia[c]	1953	1990	1951-1955[a]	1986-1990	1953	1958	1968	1979	-
Denmark	1951	2001	1951-1955	2001-2005[b]	1951	1958	1969	-	1994
Finland	1952	2004	1951-1955[a]	2001-2005[b]	1952	1958	1969	1987	1996
France	1950[d]	2003	1946-1950[a]	2001-2005[b]	1950	1958	1968	1979	2000
Germany[e]	1952	2004	1951-1955[a]	2001-2005[b]	1952	1958	1968	1979	1998
Greece[f]	1961	2004	1961-1965	2001-2005[b]	-	1961	1968	1979	
Hungary	1955	2003	1951-1955 [a]	2001-2005[b]	1955	1958	1969	1979	1996
Iceland	1951	2004	1951-1955	2001-2005[b]	1951	1958	1971	1981	1996
Ireland	1950	2005	1946-1950[a]	2001-2005	1950	1958	1968	1979	-
Israel[g]	1950	2003[g]	1946-1950[a]	2001-2005[b]	1950	1958	1969	1979	1998
Italy	1951	2002	1951-1955	2001-2005[b]	1951	1958	1968	1979	-
Japan	1950	2004	1946-1950[a]	2001-2005[b]	1950	1958	1968	1979	1995
Netherlands	1950	2004	1946-1950[a]	2001-2005[b]	1950	1958	1969	1979	1996
New Zealand	1950	2003	1946-1950[a]	2001-2005[b]	1950	1958	1968	1979	2000
Norway	1951	2004	1951-1955	2001-2005[b]	1951	1958	1969	1986	1996
Poland	1959	2004[h]	1956-1960[a]	2001-2005[b]	-	1959	1969	1980	1999
Portugal	1955	2003	1951-1955[a]	2001-2005[b]	1955	1958	1971	1980	2002
Romania	1959	2004[i]	1956-1960[a]	2001-2005[b]	-	1959	1969	1980	1999
Spain	1951	2004	1951-1955	2001-2005[b]	1951	1958	1968	1980	1999
Sweden	1951	2002	1951-1955	2001-2005[b]	1951	1958	1969	1987	1997
Switzerland[j]	1951	2004	1951-1955	2001-2005[b]	1951	1958	1969	-	1995[j]
UK	1950	2004	1946-1950[a]	2001-2005[b]	1950	1958	1968	1979	2001[k]
USA	1950	2002	1946-1950[a]	2001-2005[b]	1950	1958	1968	1979	1999
USSR[l]	1982	1990	1981-1985[a]	1986-1990	-	-	-	1982[l]	-
Yugoslavia[f]	1960	1990	1956-1960[a]	1986-1990	-	1960	1968	1979	-

- Not used
a First period based on less than 5 years' data – see 'Single years, Start' column
b Final period based on less than 5 years' data – see 'Single years, End' column
c Data for Czechoslovakia for 1991, for Czech Republic from 1985, and for Slovakia from 1992 are available but have not been entered
d 1951 missing
e W Germany (former Federal Republic) to 1990, unified Germany from 1991
f Earlier data are available but with insufficient detail
g Jewish population only to 1974, then total population. 2002 missing
h 1997 and 1998 missing
i 1979 missing
j Data for Switzerland under the 10th revision are available in less detail than for other countries. See Table 5
k 2000 in Scotland
l Data for USSR under the 9th revision are available in less detail than for other countries, and it is not possible to extract data for an equivalent definition of COPD. See Table 5

Table 2 Availability of sales-based tobacco data

Country	Sales data[a]						Tar data[b]	
	MC		TC		A			
	Start	End	Start	End	Start	End	Start	End
Australia	1920	2004	1925[c]	2004	1920	2004	1969[d]	2004
Austria	1923	1997	1923	1997	1923	1997	1960	1984
Belgium	1921	1995	1950	1995	1921[d]	1995	1973[d]	1993
Bulgaria	1913[d,e]	1997	×		1913[d,e]	1997	×	
Canada	1920	2004	1955	2004	1920	2004	1968	1999
Czechoslovakia	1923[d,f]	1992	×		1923	1934	×	
Denmark	1920	1995	1950	1995	1920	1995	1964	1990
Finland	1920	1995	×		1920	1995	1970[d]	1992
France	1865[c]	1997	1950	1997	1865[c]	1997	1950[d]	1997
Germany[g]	1906[d,h]	1995	1906[d,i]	1995	1925[d,f]	1995	1966[d]	1985
Greece	1920	1995	×		1920	1995	×	
Hungary	1920[d,j]	1995	1940[d,k]	1988	1920[d,k]	1988	×	
Iceland	1932	1995	×		1862[c]	1995	×	
Ireland	1920	1995	1950	1995	1920	1995	×	
Israel	1967	1995	×		1970[c]	1989	×	
Italy	1921[c]	1995	1951[c]	1995	1921[c]	1995	1984[d]	1993
Japan	1920	2005	×	×	1920	1998	1969	2005
Netherlands	1923[d,f]	1997	1960	1997	1923[d,f]	1995	×	
New Zealand	1920	1995	1950	1995	1920	1995	1990[d]	1995
Norway	1927	1995	1939[d,f]	1995	1927	1995	1970[d]	1980
Poland	1925[c,f]	1995	×		1925[c,f]	1995	×	
Portugal	1940	1998	1950[d]	1992	1940[d]	1992	×	
Romania	1920[d,e]	1995	×		1920[d,e]	1995	×	
Spain	1927[d]	1995	1957[d]	1993	1927[d]	1993	×	
Sweden	1920	1995	1950	1995	1920	1995	1964	1980
Switzerland	1934[c]	1997	×		1934[c]	1973	1970	1978
UK	1880[c]	2004	1931[d,f]	2004	1880[c]	2004	1921[c]	2002
USA	1900[c]	2005	1949	2005	1920	2005	1954	1999
USSR	1960	1994	×		1960	1994	×	
Yugoslavia	1922[d,e]	1993	×		1922	1935	×	

× No data

a This table shows start and end of single year data. Missing intermediate years are indicated by footnotes c or d. Data are presented by 5-year periods, using an average of the available years when the full 5 years are not available, and intermediate missing periods are indicated by other footnotes. ISS2 presented data up to 1995 and ISS3 up to date of publication of individual chapters. Later data have been entered occasionally for other countries, but no consistent attempt was made to collect later data.

b This table shows start and end of single year data. Missing intermediate years are indicated by footnote d. Data are used for tar-adjustment as 5-year averages, using, for years with no data available, an estimate of 35 mg/cigarette up to 1955 and linear interpolation between available data points thereafter, and, if applicable, an average based on less than 5 years data in the final period. So there are no intermediate missing periods.

c Early data only available at 3 or 5 yearly intervals

d Data missing for some intermediate years, for details see the lower part of the Tobacco Data worksheet for the relevant country. (Also Tables 1-2 of the relevant chapter in ISS)

e Periods 1936-…-1955 Missing

f Period 1941-45 Missing

g Unified up to 1938 and from 1991, otherwise West

h Periods 1916-20, 1941-45 Missing

i Periods 1916-…-1930, 1941-45 Missing

j Periods 1941-…-1955 Missing

k Periods 1941-…-1985 Missing

Table 3 Availability of survey-based tobacco data

Country	Contemporary surveys (ISS)										Alternative (retrospective) surveys (see also Table 4)
	Prevalence						CPP				
	MC		TC		A		MC		TC		
	Start	End	Start	End	Start	End	Start	End	Start	End	
Australia	1976-80	2001-05	1971-75	2001-05	1941-45	2001-05	1976-80	2001-05	1971-75	2001-05	ABS-NHS, Hyndman
Austria	1951-55	1991-95	1951-55	1991-95	1951-55	1991-95	1971-75	1991-95	1971-75	1991-95	×
Belgium	1971-75	1986-90	1961-65	1981-85	1951-55	1991-95	1976-80	-	1976-80	1981-85	×
Bulgaria	1986-90[a]	-	1986-90[a]	-	1986-90[a]	-	×		×		×
Canada	×		1956-60[b]	2001-05	1966-70[c]	2001-05	×		1961-65	2001-05	Ferrence
Czechoslovakia	1961-65[d]	1986-90	1961-65[d]	1986-90	1961-65[d]	1986-90	1981-85	1986-90	1981-85	1986-90	×
Denmark	1976-80	-	1951-55	1991-95	1951-55	1991-95	1971-75	-	1951-55	1991-95	×
Finland	1956-60[d]	1991-95[e]	1956-60[d]	1991-95[e]	1956-60	1991-95	1956-60[d]	1986-90	1956-60[d]	1986-90	×
France	1956-60	1991-95	1951-55	1991-95	1951-55	1991-95	1976-80	-	1961-65	1991-95	×
Germany	1956-60	1981-85	1946-50	1991-95	1946-50	1991-95	1966-70	1981-85	1966-70[f]	1991-95	Brenner, Heuer
Greece	1956-60[g]	1991-95	1956-60[g]	1991-95	1956-60[g]	1991-95	1956-60[g]	1986-90	1956-60[g]	1986-90	×
Hungary	1961-65[d]	1991-95	1961-65[d]	1991-95	1961-65[d]	1991-95	1966-70	1991-95	1966-70	1991-95	HPGS
Iceland	1981-85	1991-95	1981-85	1991-95	1966-70[g]	1991-95	1981-85	-	1981-85	-	×
Ireland	1956-60[c]	1991-95	1956-60[c]	1991-95	1961-65	1991-95	1956-60[d]	1986-90	1956-60[d]	1986-90	×
Israel	1961-65[g]	1991-95	1961-65[g]	1991-95	1961-65[g]	1991-95	1961-65[g]	1991-95[e]	1961-65[g]	1991-95[e]	×
Italy	1946-50	1991-95	1946-50	1991-95	1961-65	1991-95	1946-50	1991-95	1946-50	1991-95	LaVecchia
Japan	1946-50	2006-10	1946-50	2006-10	1946-50	2006-10	1956-60[d]	2001-05	1956-60[d]	2001-05	×
Netherlands	1966-70	1981-85	1956-60	1981-85[e]	1946-50[g]	1991-95	1976-80	-	1956-60	1991-95	×
New Zealand	×		1956-60[c]	1991-95	1956-60[c]	1991-95	1956-60[c]	1986-90[e]	1956-60[c]	1986-90[e]	×
Norway	×		1951-55	1991-95	1951-55	1991-95	×		1956-60	1991-95	Ronneberg
Poland	1956-60	1991-95	1956-60	1991-95	1956-60	1991-95	1956-60	1986-90	1956-60	1986-90	×
Portugal	1971-75	1991-95	1971-75	1991-95	1971-75	1991-95	1986-90	1991-95	1986-90	1991-95	×
Romania	1966-70	1991-95	1966-70	1991-95	1966-70	1991-95	1966-70	-	1966-70	-	×
Spain	1966-70	1991-95	1966-70	1991-95	1966-70	1991-95	1966-70[g]	1991-95	1966-70[g]	1991-95	Fernandez
Sweden	1961-65	1991-95	1961-65	1991-95	1946-50	1991-95	1961-65	1991-95	1961-65	1991-95	Nordlund
Switzerland	1956-60[g]	1986-90	1956-60[g]	1986-90	1956-60[g]	1991-95	1956-60[g]	1981-85	1956-60[g]	1981-85	SOMIPOPS
UK	1946-50	2001-05	1956-60[c]	2001-05	1926-30	2001-05	1946-50	2001-05	1971-75	2001-05	HALS, AHIP
USA	1931-35	2001-05	1931-35	2001-05	1946-50	2001-05	1946-50	2001-05	1946-50	2001-05	Harris
USSR	1971-75	1986-90	1971-75	1986-90	1971-75	1986-90	1971-75	1986-90	1971-75	1986-90	×
Yugoslavia	1956-60[d]	1986-90	1956-60[d]	1986-90	1956-60[d]	1986-90	1956-60[f]	1986-90	1956-60[f]	1986-90	×

× No data
- Data for single period
a Restricted age range for females
b Restricted age range for initial period(s) for females
c Restricted age range for initial period(s)
d Restricted age range for initial period(s) for males, females start later
e Restricted age range for final period(s)
f Restricted age range for initial period(s), females start later
g Females start later
See references 6,7 for further detail

Table 4 Availability of data from retrospective survey-based tobacco data

Country	Name	Source	Periods		Product[a]	Notes
			Start	End		
Australia	ABS-NHS	Australian Bureau of Statistics (personal communication). Based on 1989-90 National Health Survey.	1906-1910[b]	1986-1990	MC	c,d,e,f
Australia	Hyndman	Hyndman J, Hobbs M, Jamrozik K, Hockey R, Parsons R. A retrospective cohort study of smoking habits in Australia. In: Durston B, Jamrozik K, editors. Tobacco and health 1990. The global war, Proceedings of the 7th world conference on tobacco and health, Perth, Western Australia, 1st-5th April 1990. 189 Royal Street, East Perth, Western Australia 6004: Organising committee of the Seventh World Conference on Tobacco and Health, 1990;264-7.	1906-1910[b]	1976-1980[g]	A	f,h,i
Canada	Ferrence	Ferrence RG. Sex differences in cigarette smoking in Canada, 1900-1978: a reconstructed cohort study. Can J Public Health 1988;79:160-5.	1911-1915	1976-1980[g]	TC	e,f,h,i
Germany	Brenner	Brenner H. A birth cohort analysis of the smoking epidemic in West Germany. J Epidemiol Community Health 1993;47:54-8.	1926-1930	1981-1985	TC	e,f,h,i,j
Germany	Heuer	Heuer C, Becker N. Smoking prevalence and lung cancer mortality in Germany. J Epidemiol Biostat 1999;4:45-52.	1921-1925	1991-1995	TC	j,k,l
Hungary	HGPS	Estimates derived at PNLSC from Hungarian General Practitioners Study	1936-1940	1991-1995	MC,TC	e,f,h
Italy	LaVecchia	La Vecchia C, Decarli A, Pagano R. Prevalence of cigarette smoking among subsequent cohorts of Italian males and females. Prev Med 1986;15:606-13.	1906-1910	1976-1980	TC	c,d,e,f,j
Norway	Ronneberg	Ronneberg A, Lund KE, Hafstad A. Lifetime smoking habits among Norwegian men and women born between 1890 and 1974. Int J Epidemiol 1994;23:267-76.	1906-1910	1986-1990	A	k
Spain	Fernandez	Fernandez E, Schiaffino A, Borràs JM, Shafey O, Villalbi JR, La Vecchia C. Prevalence of cigarette smoking by birth cohort among males and females in Spain, 1910-1990. Eur J Cancer Prev 2003;12:57-62	1916-1920	1986-1990	TC	b,c,d,e,f,j
Sweden	Nordlund	Nordlund LA. Trends in smoking habits and lung cancer in Sweden. Eur J Cancer Prev 1998;7:109-16.	1916-1920	1986-1990	A	c,k,m
Switzerland	SOMIPOPS	Estimates derived at PNLSC from SOMIPOPS (Swiss National Health Survey) 1981-83. These estimates should be regarded with caution due to some problems in the data set	1916-1920	1981-1985[g]	A	e,f
UK	HALS	ISS2 Appendix V – Health and Lifestyle Study	1916-1920	1981-1985	MC,A	c,e,f
UK	AHIP	ISS2 Appendix V – Alderson Hospital In Patient Study	1916-1920	1976-1980	MC,A	c,e,f
USA	Harris	Harris JE. Cigarette smoking among successive birth cohorts of men and women in the United States during 1900-80. J Natl Cancer Inst 1983;71:473-9.	1901-1905	1976-1980	TC	e,f,h,i

a All data are prevalence, except AHIP, which has both prevalence and consumption per person data
b Females start later
c Data relate to a single year
d Data given at 10-yearly intervals, so alternate periods missing
e Based on 10 year cohorts so pairs of adjacent age groups have duplicate data
f Retrospective data
g Final period based on less than 5 years
h Single year data have been averaged to give period
i Data extracted from graph
j Corrected for differential mortality
k Early data retrospective, combined with later contemporary surveys
l Data as given for periods 1920-24 have been entered for 1921-25 etc
m Data published as graph, table supplied in personal communication from author

Table 5 Definitions of causes of death

ICD Revision	Lung Cancer		IHD	
	Summary	Full	Summary	Full
6th and 7th	A050	162 = malignant neoplasm of bronchus and trachea, and of lung specified as primary 163 = malignant neoplasm of lung, unspecified	A081	420 = arteriosclerotic heart disease, including coronary disease 421 = chronic endocarditis, not specified as rheumatic 422 = other myocardial degeneration
8th	A051	162 = malignant neoplasm of trachea, lung and bronchus	A083	410 = AMI 411 = other acute and subacute IHD 412 = chronic IHD 413 = angina pectoris 414 = asymptomatic IHD
9th	B101	162 = malignant neoplasm of trachea, lung and bronchus	B27	410 = AMI 411 = other acute and subacute IHD 412 = old MI 413 = angina pectoris 414 = other forms of chronic IHD
10th (except Switzerland)	C33 = malignant neoplasm of trachea C34 = malignant neoplasm of bronchus and lung		I20 = angina pectoris I21 = AMI I22 = subsequent MI I23 = certain current complications following acute MI I24 = other acute IHD I25 = chronic IHD	
10th (Switzerland 1995-1996)	G026	Same as other countries	G051, G052	Same as other countries
10th (Switzerland 1997 on)	1034	Same as other countries	1067	Same as other countries

AMI acute myocardial infarction
IHD ischaemic heart disease
MI myocardial infarction

Table 5 Definitions of causes of death - continued/1

ICD Revision	COPD		Respiratory Diseases (non-acute)	
	Summary	Full	Summary	Full
6th and 7th	A093	501 = bronchitis unqualified	As COPD +	
		502 = CB	A094	510 = hypertrophy of tonsils and adenoids
	A097	511 = peritonsillar abscess	A095	518, 521 = empyema and absess of lung
		512 = chronic pharyngitis and nasopharyngitis	A096	519 = pleurisy
		513 = chronic sinusitis		
		514 = deflected nasal septum		
		515 = nasal polyp		
		516 = chronic laryngitis		
		517 = other diseases of URT		
		520 = spontaneous pneumothorax		
		522 = pulmonary congestion and hypostasis		
		523 = pneumoconiosis due to silica and silicates (occupational)		
		524 = other specified pneumoconiosis and pulmonary fibrosis of occupational origin		
		525 = other chronic interstitial pneumonia		
		526 = bronchiectasis		
		527 = other diseases of lung and pleural cavity **(including emphysema)**		
8th	A093	490 = bronchitis, unqualified	As COPD +	
		491 = CB	A094	500 = hypertrophy of tonsils and adenoids
		492 = emphysema	A095	510 = empyema
		493 = asthma		513 = abscess of lung
	A096	501 = peritonsillar abscess		
		502 = chronic pharyngitis and nasopharyngitis		
		503 = chronic sinusitis		
		504 = deflected nasal septum		
		505 = nasal polyp		
		506 = chronic laryngitis		
		507 = hay fever		
		508 = other diseases of URT		
		511 = pleurisy		
		512 = spontaneous pneumothorax		
		514 = pulmonary congestion and hypostasis		
		515 = pneumoconiosis due to silica and silicates		
		516 = other pneumoconiosis and related diseases		
		517 = other chronic interstitial pneumonia		
		518 = bronchiectasis		
		519 = other diseases of respiratory system (**including COPD**)		

CB chronic bronchitis
COPD chronic obstructive pulmonary disease
URT upper respiratory tract

Table 5 Definitions of causes of death - continued/2

ICD Revision	COPD		Respiratory Diseases (non-acute)	
	Summary	Full	Summary	Full
9th (except USSR)	B323	490 = bronchitis, not specified as acute or chronic	As COPD +	
		491 = CB	B313	470,471 = deflected nasal septum and nasal polyps
		492 = emphysema	B314	472,473 = chronic pharyngitis, nasopharyngitis and sinusitis
		493 = asthma	B315	474 = chronic diseases of tonsils and adenoids
	B324	494 = bronchiectasis	B319	475-478 = peritonsillar abscess, chronic laryngitis, laryngotracheitis, allergic rhinitis, other diseases of URT
	B325	495 = extrinsic allergic alveolitis		
		496 = chronic airways obstruction NEC (**including COPD**)	B326	500-508 = pneumoconiosis and other lung disease due to external agents
			B327	511 = Pleurisy
			B329	510, 512-519 = empyema; pneumothorax; absess of lung and mediastinum; pulmonary congestions and hypostasis; post inflammatory pulmonary fibrosis; other alveolar and parietoalveolar pneumopathy; lung involvement in conditions classified elsewhere; other diseases of lung; other diseases of respiratory system
9th (USSR)	not possible		S329, B323	Same as other countries
10th (except Switzerland)	J40 = bronchitis, not specified as acute or chronic J41 = simple and mucopurulent CB J42 = unspecified CB J43 = emphysema J44 = other COPD J45 = asthma J46 = status asthmaticus J47 = bronchiectasis J67 = hypersensitivity pneumonitis due to organic dust (farmer's lung etc)		As COPD + J30-J39 = vasomotor and allergic rhinitis; chronic rhinitis, nasopharyngitis and pharyngitis; chronic sinusitis; nasal polyp; other disorders of nose and nasal sinuses; chronic disease of tonsils and adenoids; peritonsillar abscess; chronic laryngitis and laryngotracheitis; diseases of vocal chords and larynx NEC; other diseases of URT J60-J66 = pneumoconiosis (coalworker's; due to asbestos and other mineral fibres; due to dust containing silica; due to other inorganic dust; unspecified; associated with tuberculosis) J68-J70 = RC due to inhalation of chemicals, gases etc; pneumonitis due to solids and liquids; RC due to other external agents J80-J82 = adult respiratory distress syndrome; pulmonary oedema; pulmonary eosinophilis NEC J84-J86 = other interstitial pulmonary diseases; abscess of lung and mediastinum; pyothorax J90-J94 = other disease of pleura J95-J96 = postprocedural RD NEC; respiratory failure NEC J98-J99 = other RD; RD in DCE	
10th (Switzerland 1995-1996)	G063	J40-J46, i.e. same as other countries except excludes J47 = bronchiectasis and J67 = hypersensitivity pneumonitis due to organic dust (farmer's lung etc)	not possible	
10th (Switzerland 1997 on)	1076	J40-J47, i.e. same as other countries except excludes J67 = hypersensitivity pneumonitis due to organic dust (farmer's lung etc)	not possible	

CB chronic bronchitis
COPD chronic obstructive pulmonary disease
DCE diseases classified elsewhere
NEC not elsewhere classified
RC respiratory conditions
RD respiratory disorders
URT upper respiratory tract

Example 1 Mortality Plots Page 1

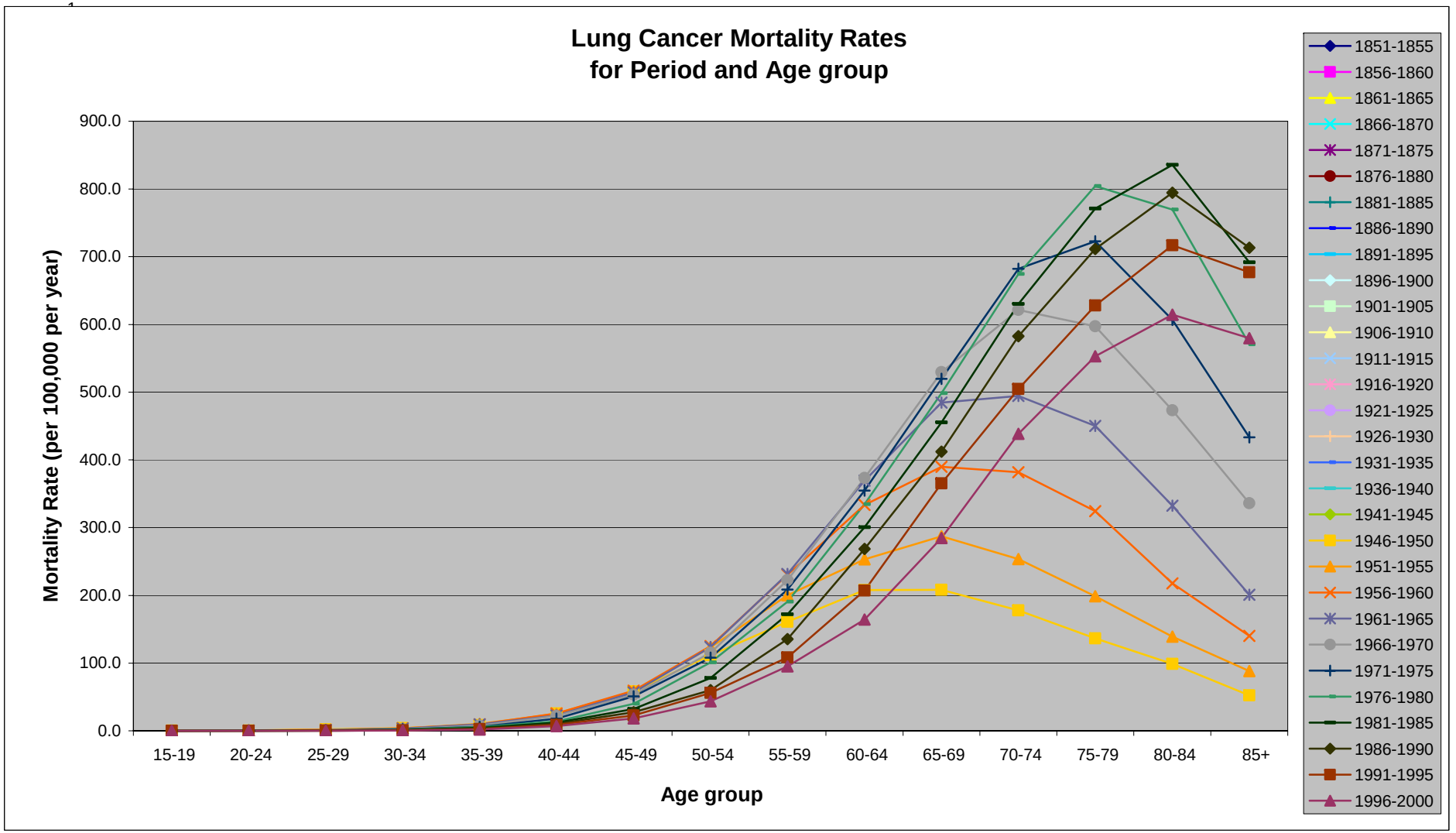
Country UK

Sex Males

Disease Lung Cancer

Country Ratio (denominator)

None (Single Country)



Example 1T Mortality Plots Page 1 (Associated Data Table)

Lung Cancer Mortality Rate for Period (Rows) and Age group (Columns)

Country: UK | Sex: Males | Disease: Lung Cancer

Country Ratio (denominator): None (Single Country)

	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
1851-1855															
1856-1860															
1861-1865															
1866-1870															
1871-1875															
1876-1880															
1881-1885															
1886-1890															
1891-1895															
1896-1900															
1901-1905															
1906-1910															
1911-1915															
1916-1920															
1921-1925															
1926-1930															
1931-1935															
1936-1940															
1941-1945															
1946-1950	0.38	0.41	2.03	3.94	8.60	25.49	58.36	111.73	160.98	207.86	208.26	177.70	136.35	98.90	52.49
1951-1955	0.17	0.72	1.35	3.67	10.14	24.99	58.68	123.17	200.22	253.19	287.30	253.70	198.64	139.08	88.13
1956-1960	0.17	0.40	1.34	3.56	9.49	25.59	59.43	125.27	230.74	333.30	389.91	381.86	324.17	217.75	140.24
1961-1965	0.16	0.48	1.17	3.30	9.44	22.66	56.77	123.57	231.58	369.36	484.46	494.34	450.27	332.44	200.81
1966-1970	0.22	0.47	1.04	2.49	7.50	22.13	53.45	115.11	222.71	373.28	529.66	621.39	597.39	473.07	335.95
1971-1975	0.07	0.35	0.91	2.33	5.97	17.96	50.83	107.90	208.53	354.53	519.89	682.12	722.75	606.68	433.31
1976-1980	0.04	0.16	0.53	1.77	5.49	14.05	39.92	100.98	190.55	334.61	498.48	674.41	804.57	769.55	570.43
1981-1985	0.01	0.11	0.43	1.28	4.23	12.00	32.10	77.86	171.91	300.44	455.35	630.10	771.18	835.75	691.60
1986-1990	0.02	0.13	0.16	0.83	3.43	10.41	27.61	60.01	135.37	268.51	412.17	582.82	711.65	794.42	713.27
1991-1995	0.02	0.09	0.22	0.74	2.69	8.63	22.80	56.14	108.20	207.17	365.37	504.88	627.91	716.99	677.03
1996-2000	0.01	0.07	0.17	0.49	1.83	6.85	18.46	43.42	95.08	164.23	284.61	438.58	553.00	614.69	579.57

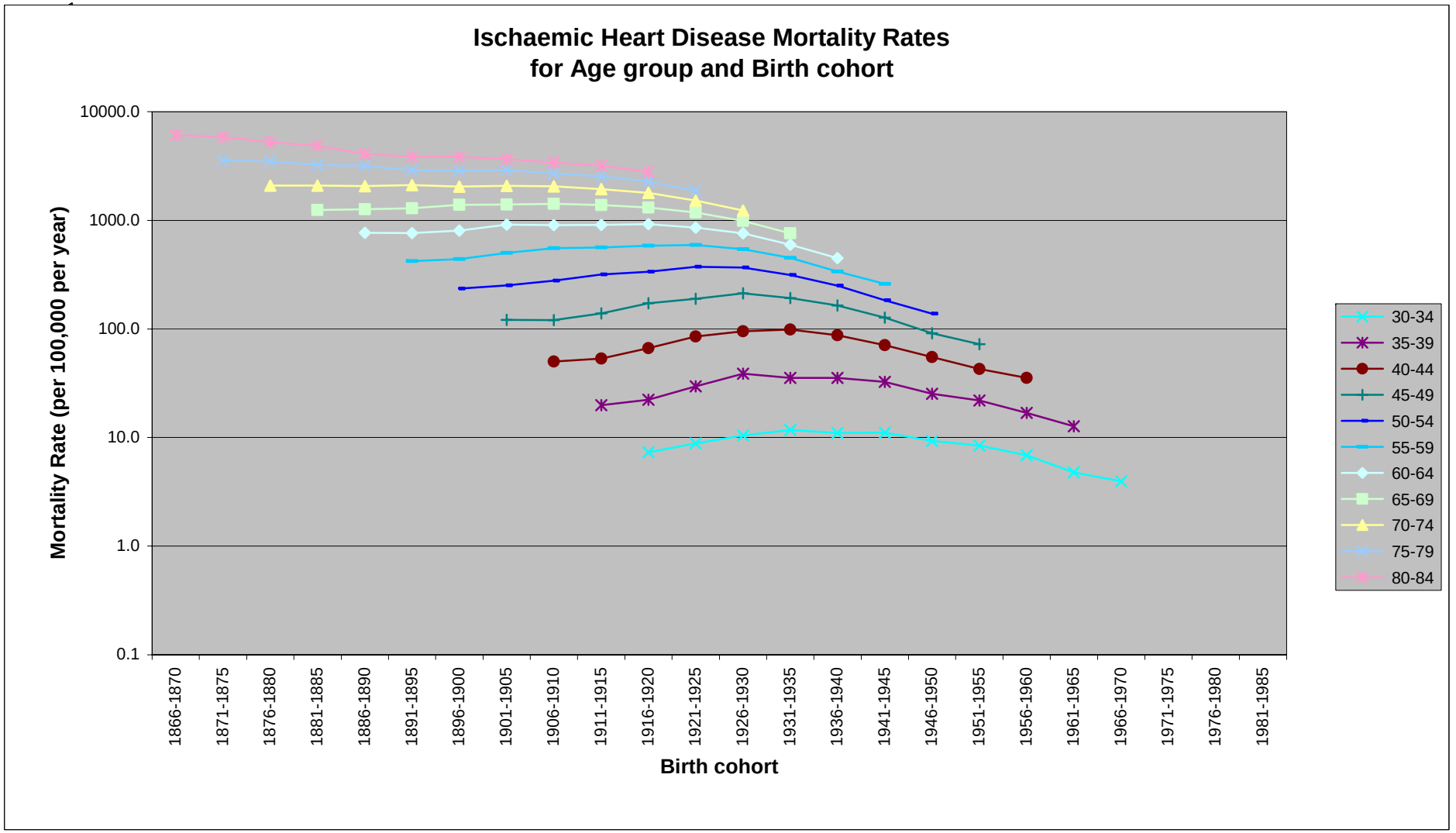
Example 2 Mortality Plots Page 2

Country UK

Sex Males

Disease Ischaemic Heart Disease

Country Ratio (denominator) None (Single Country)



Example 3 Mortality Plots Page 5

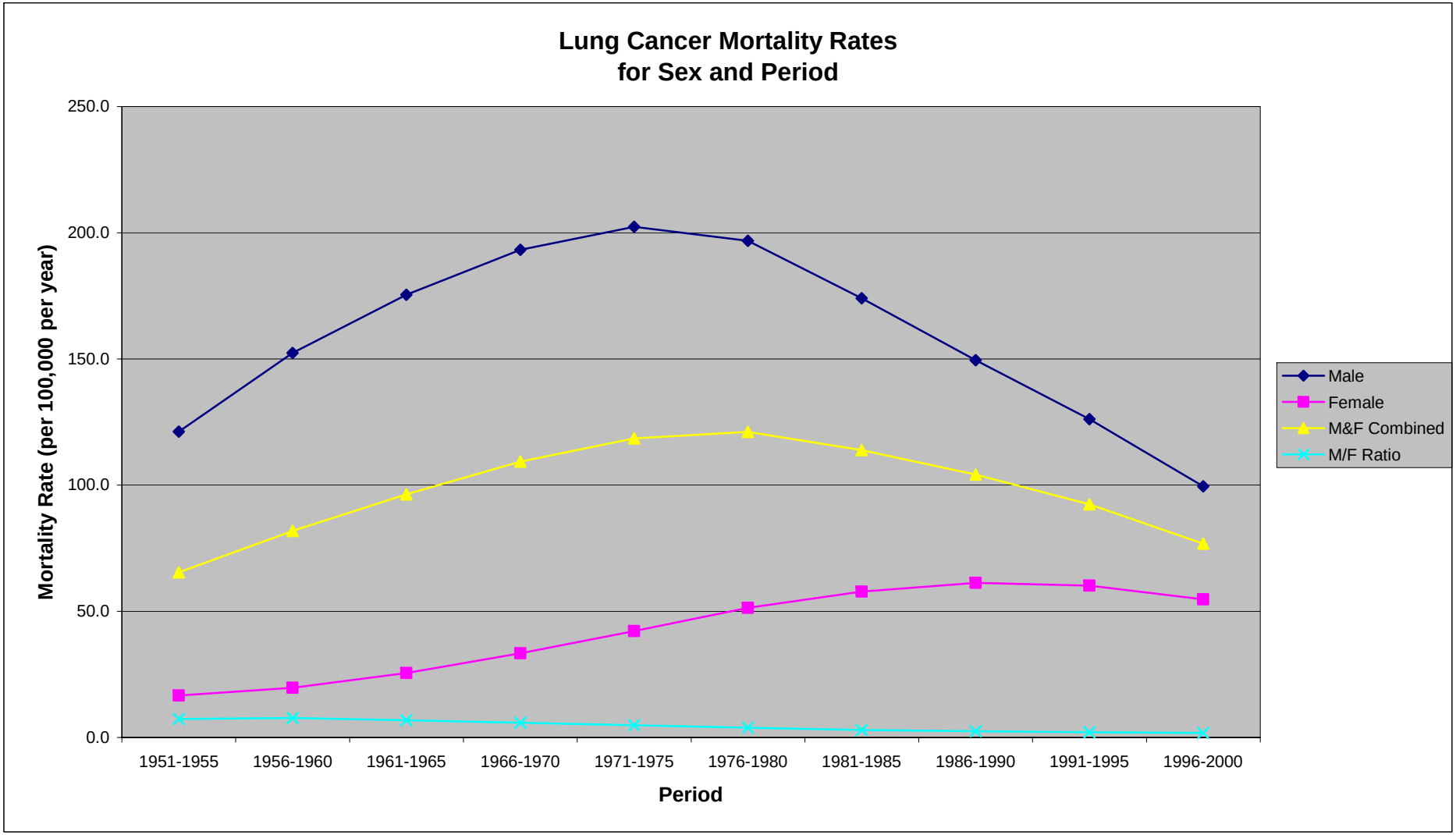
Country UK

Cohort or Age group Combined 35 - 74

Disease Lung Cancer

Country Ratio (denominator) None (Single Country)

Relative Scaling Period None

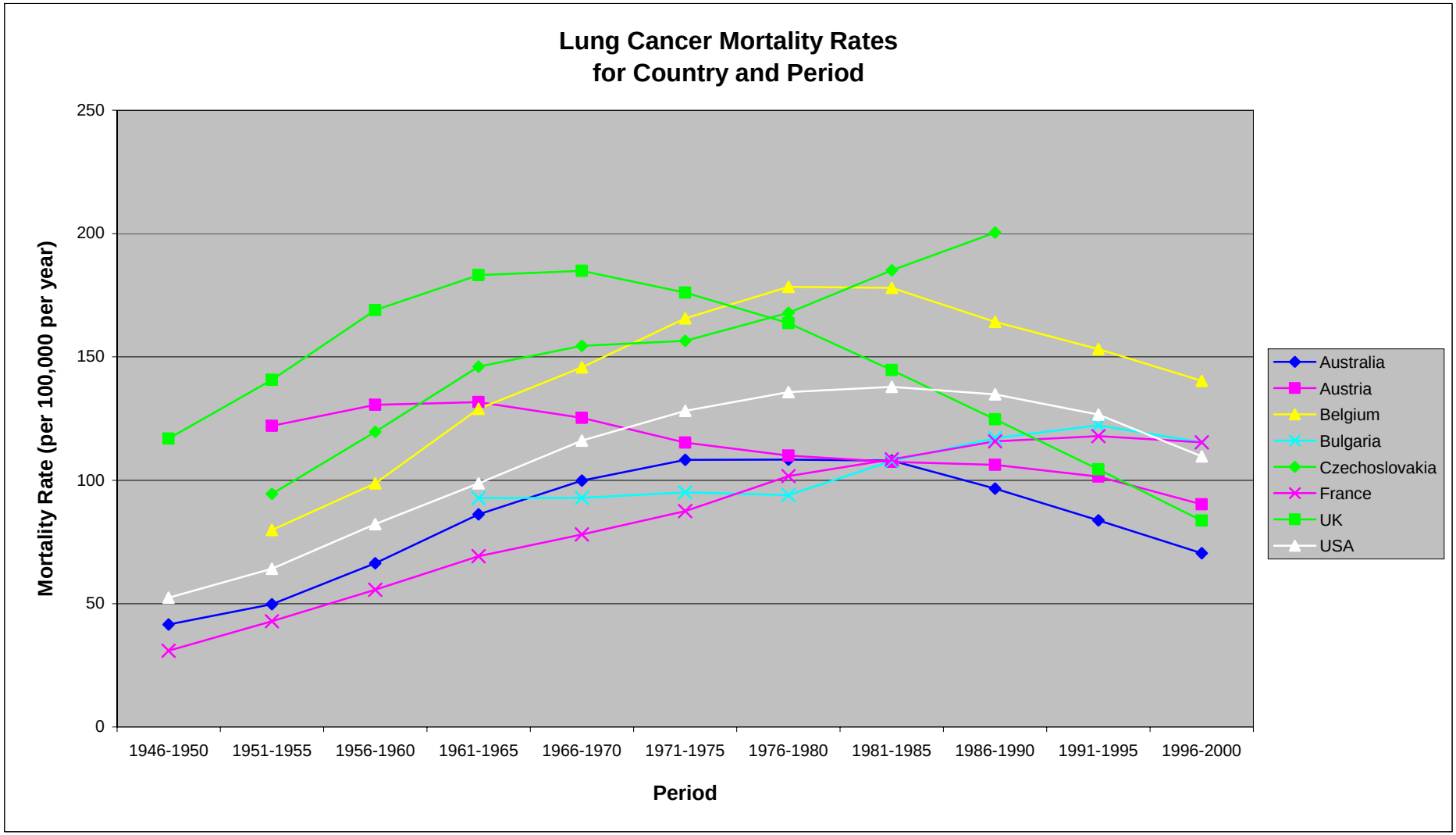


Example 4 Mortality Plots Page 8

Sex	Cohort or Age group	Disease
Males	Combined 40 - 69 [E Std]	Lung Cancer

Relative Scaling Period

None



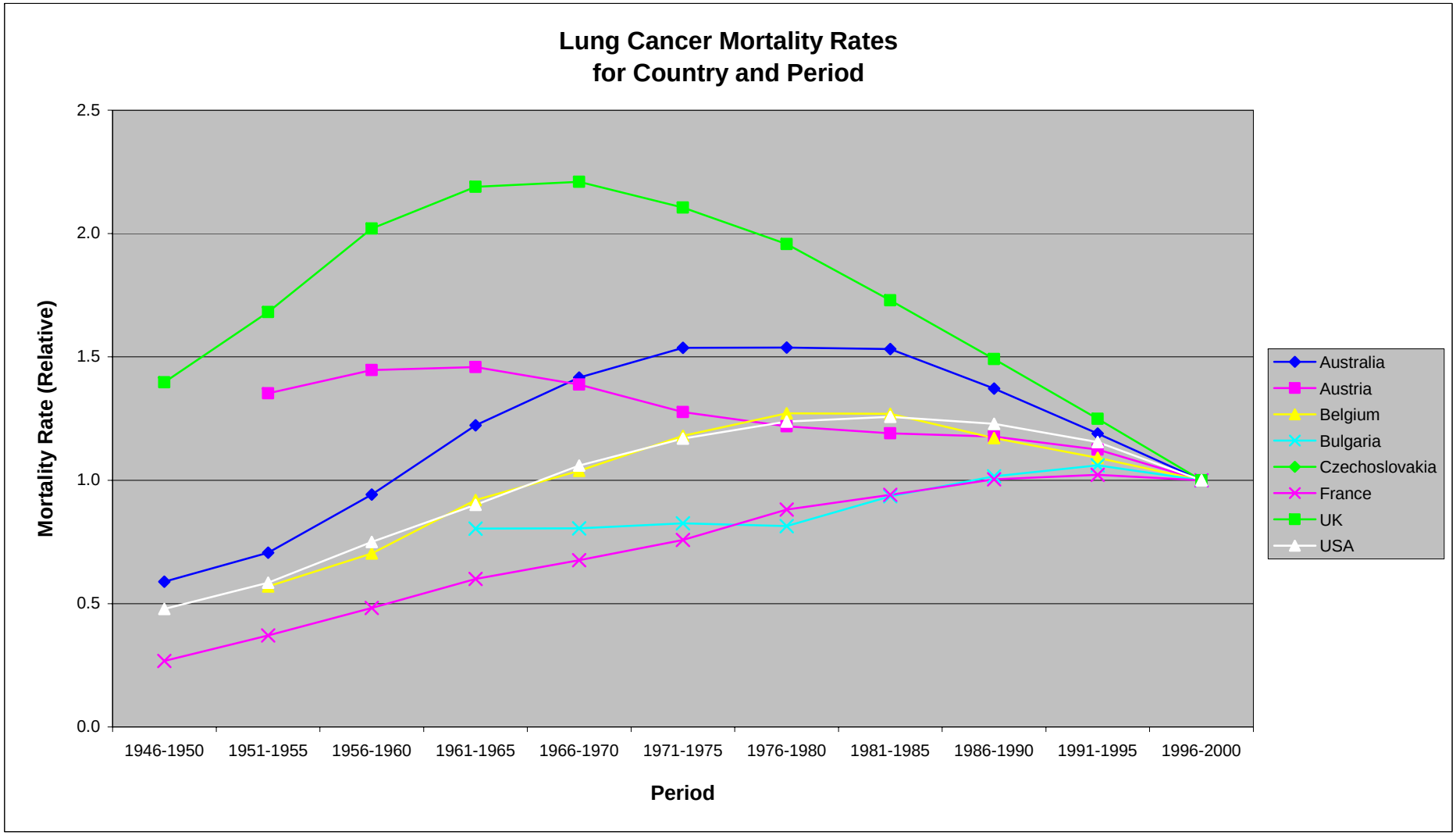
Example 5 Mortality Plots Page 8 (Relative Scaling)

Sex Males

Cohort or Age group Combined 40 - 69 [E Std]

Disease Lung Cancer

Relative Scaling Period 1996-2000



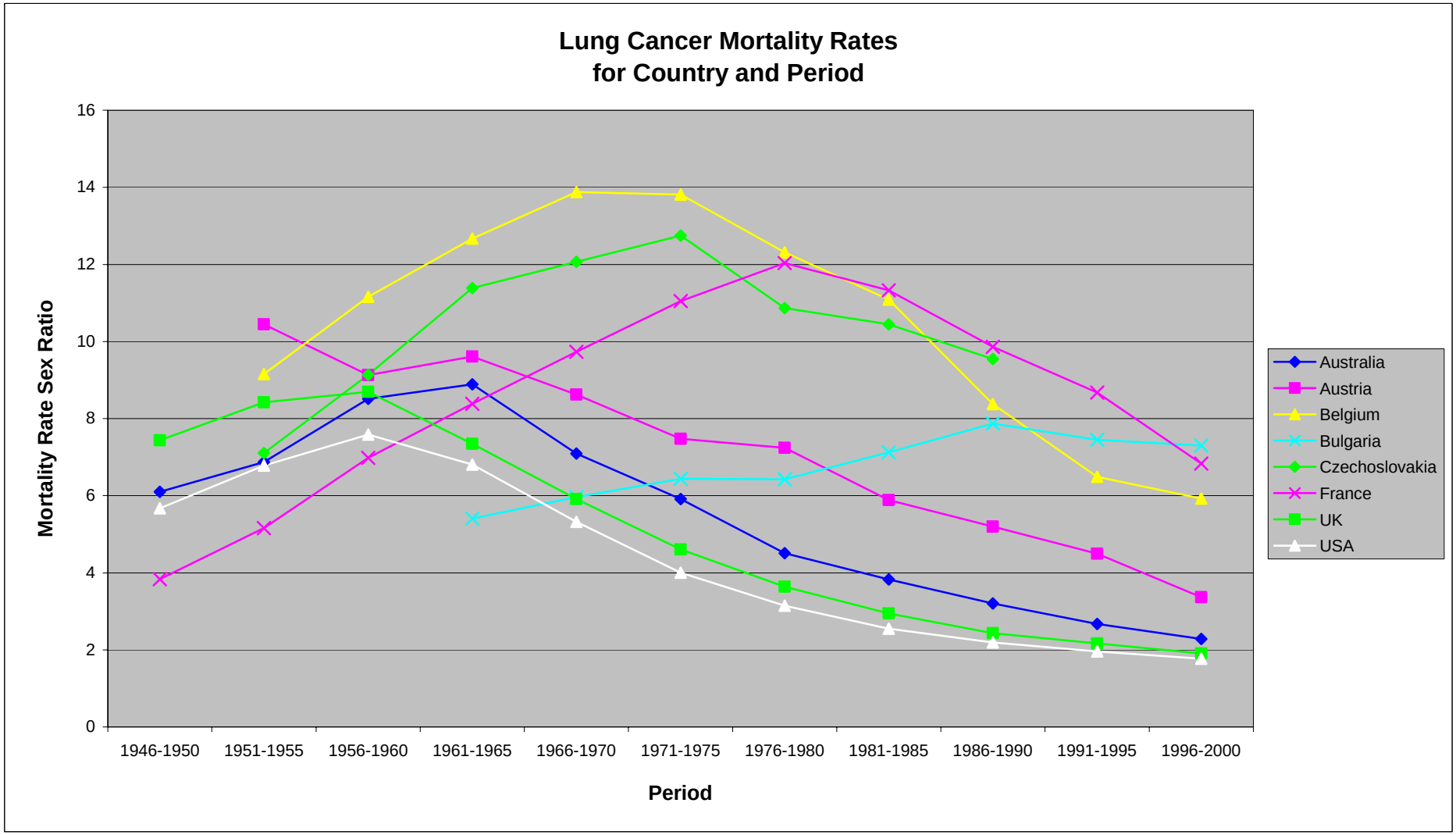
Example 6 Mortality Plots Page 8 (Sex Ratio)

Sex M / F Sex Ratio

Cohort or Age group Combined 40 - 69 [E Std]

Disease Lung Cancer

Relative Scaling Period None



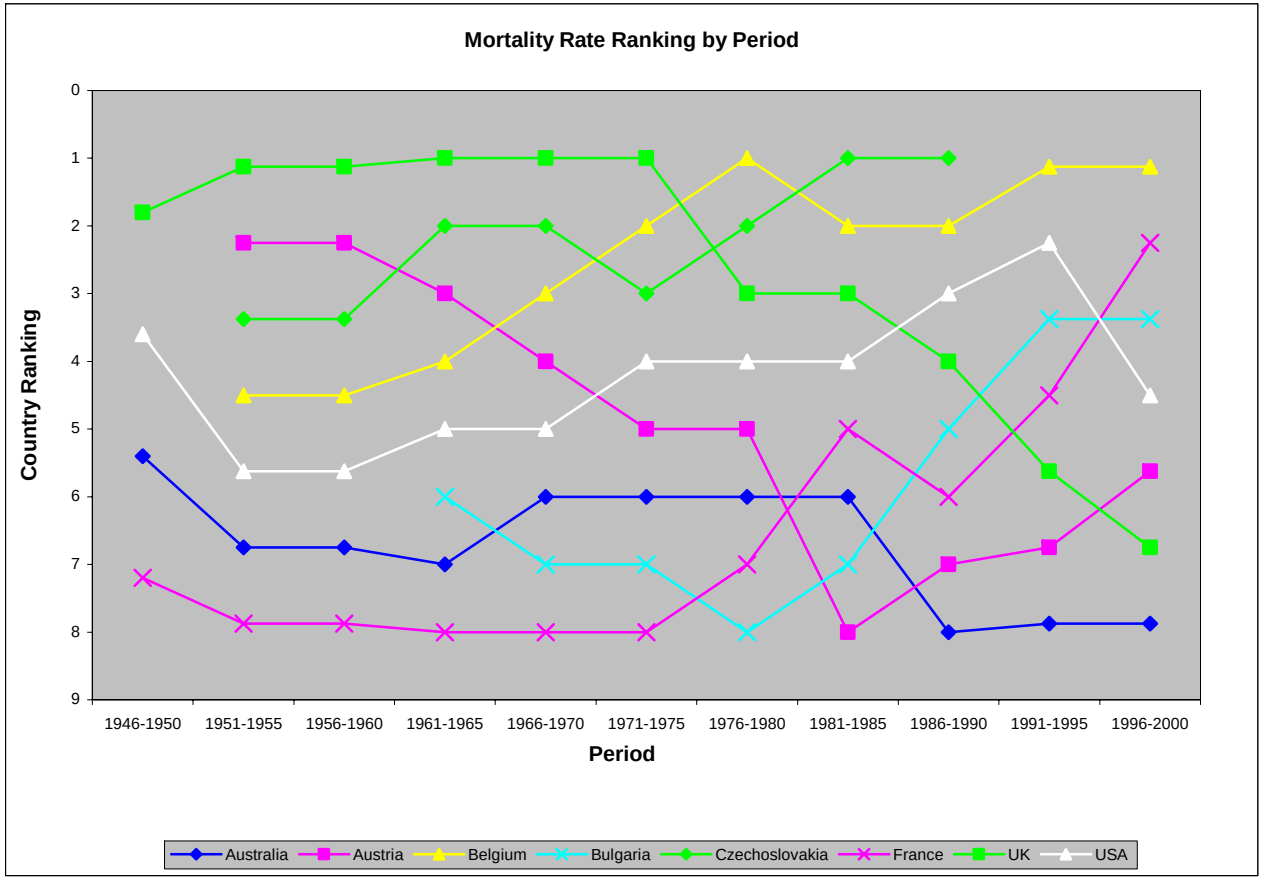
Example 7 Mortality Rank Plots Page 8

Sex : Males **Disease : Lung Cancer**

Combined 40 - 69 [E Std] **Relative Scale Period : None**

Rank Adjustment

Normalised

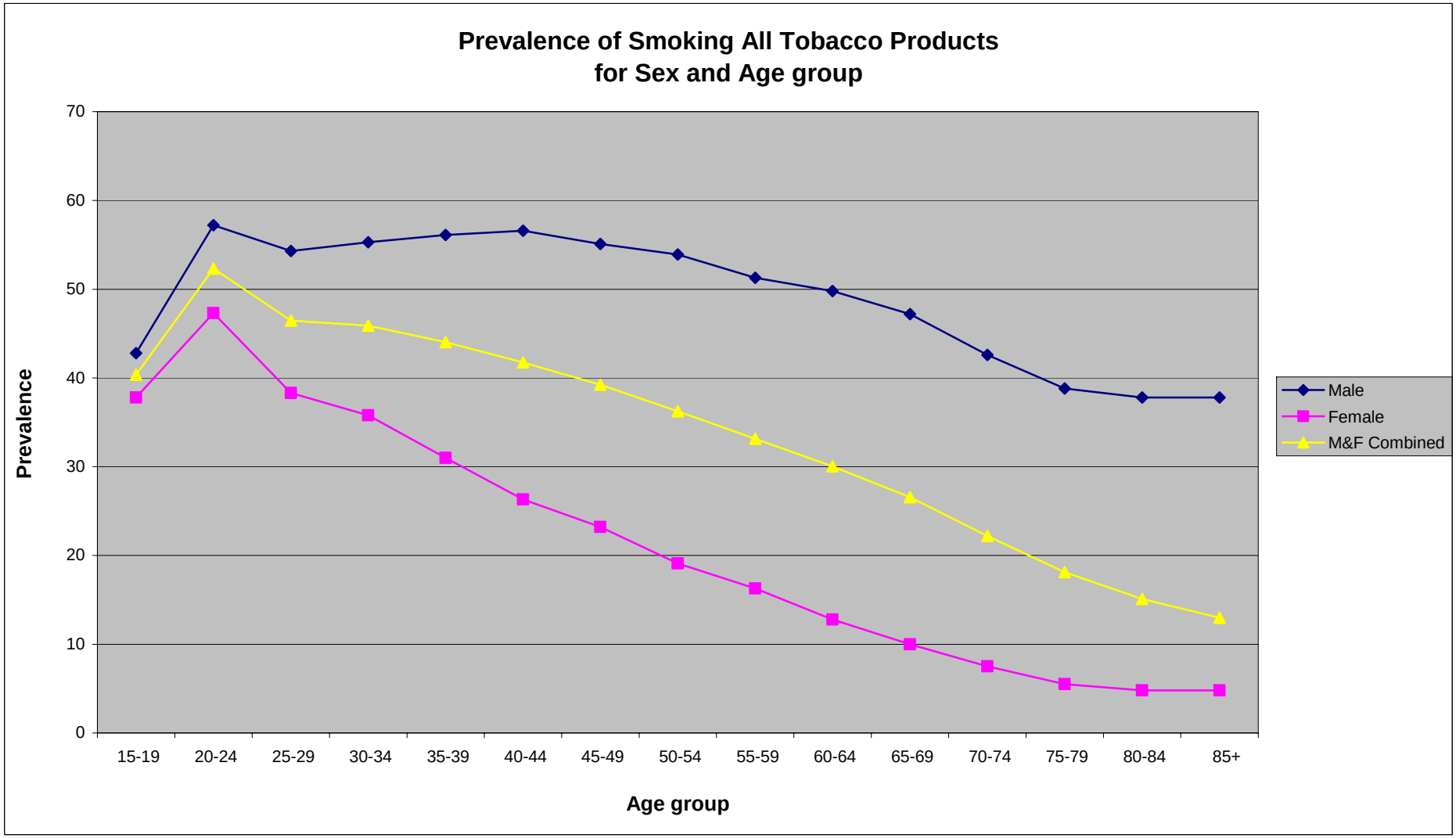


Example 8 Prevalence Plots Page 4

Country	Period or Cohort	Tobacco Type	---------- Period for Lagging or Averaging ---------- Start (Youngest)	End (Oldest)
France	1976-1980	All tobacco products (A)	0 (Current)	0 (Current)

Country Ratio (denominator)

None (Single Country)

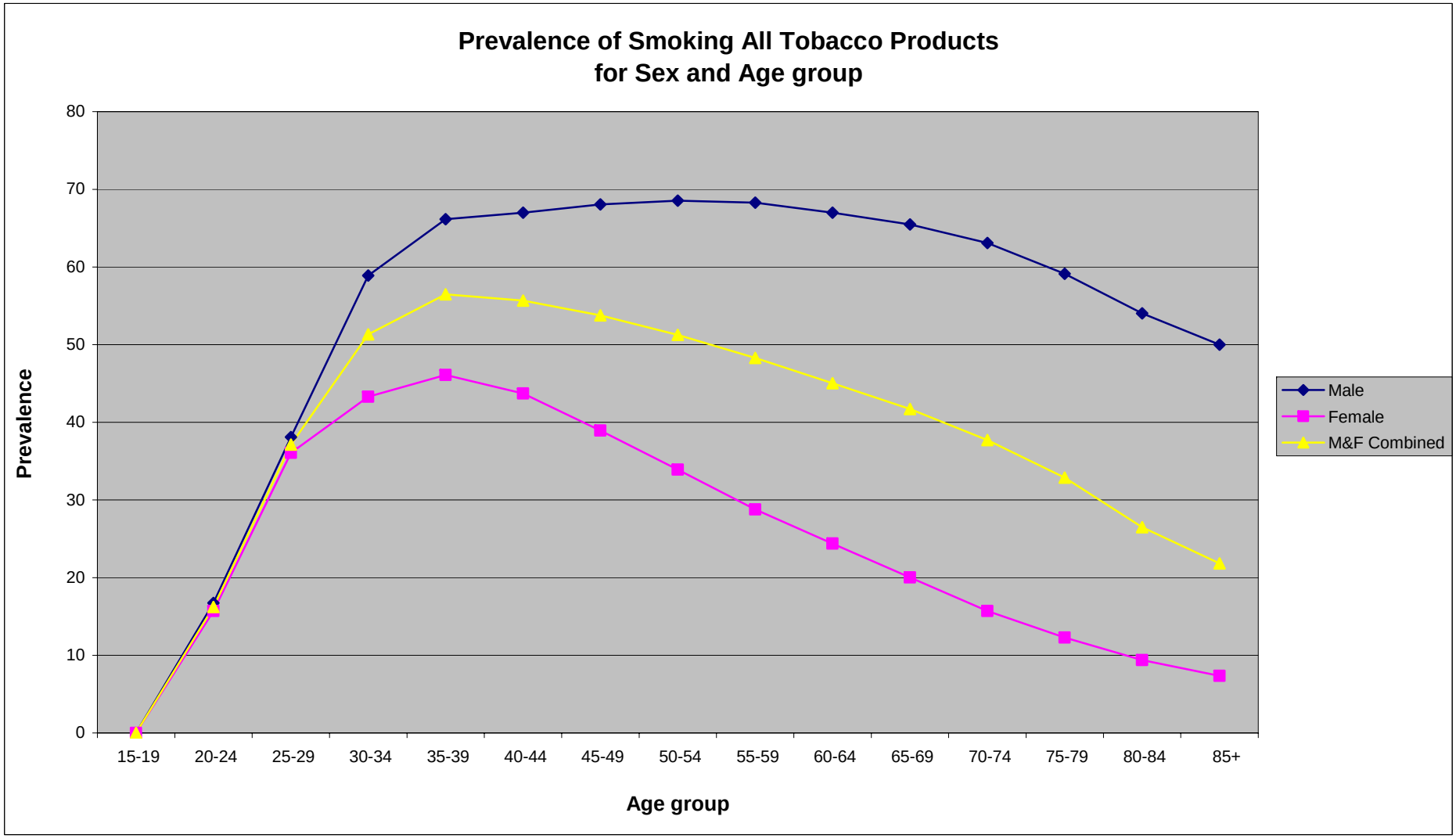


Example 9 Mortality Plots Page 4 (Averaged 15 to 5 years previous)

Country	Period or Cohort	Tobacco Type	---------- Period for Lagging or Averaging ---------- Start (Youngest)	End (Oldest)
France	Period 1976-1980	All tobacco products (A)	15 Years previous	5 Years previous

Country Ratio (denominator)

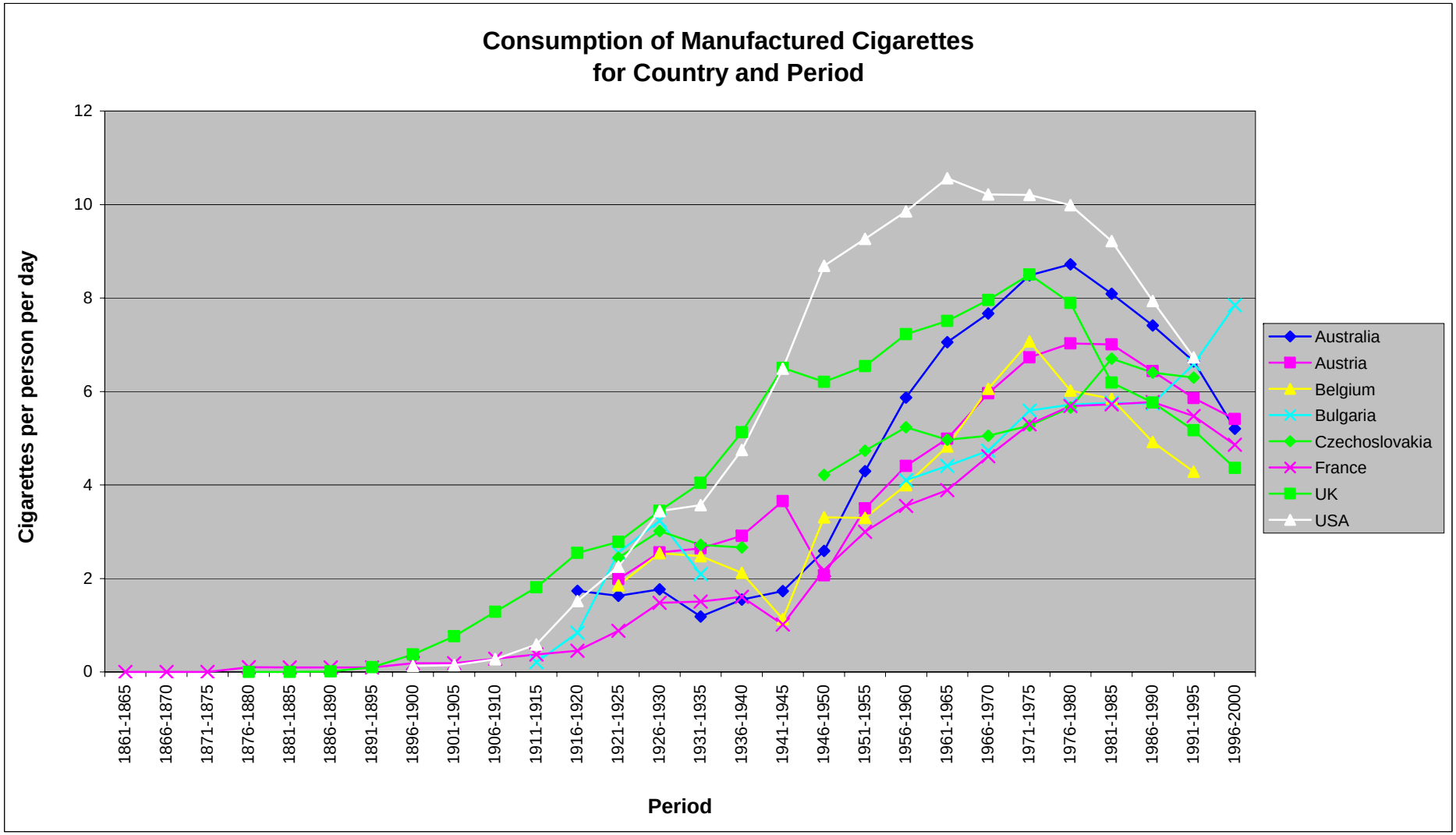
None (Single Country)



Example 10 Consumption Plots Page 8

Sex & Source	Cohort or Age group	Tobacco Type	Period for Lagging or Averaging — Start (Youngest)	Period for Lagging or Averaging — End (Oldest)
Males & Females (Sales)	Age group 70-74	Manufactured Cigarettes (MC)	0 (Current)	0 (Current)

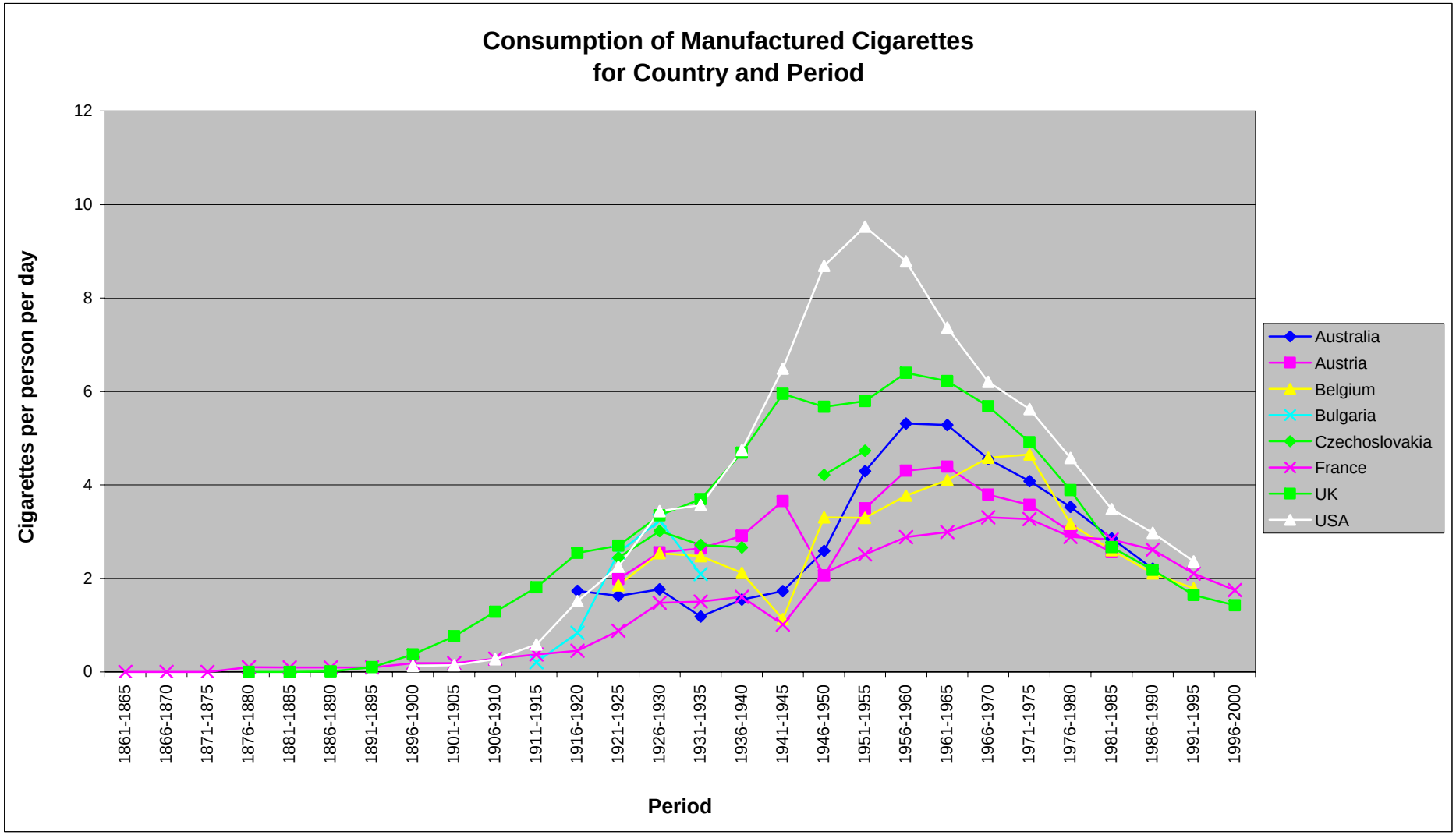
Tar Adjustment	Relative Scaling Period
Unadjusted	None



Example 11 Consumption Plots Page 8 (Tar Adjusted)

Sex & Source	Cohort or Age group	Tobacco Type	Period for Lagging or Averaging — Start (Youngest)	Period for Lagging or Averaging — End (Oldest)
Males & Females (Sales)	Age group 70-74	Manufactured Cigarettes (MC)	0 (Current)	0 (Current)

Tar Adjustment	Relative Scaling Period
Standard	None



Example 12 Scatter Plots Page 2

Sex (Prevalence): Females

Period or Cohort: Period

1986-1990

Tobacco Type (Prevalence): All tobacco products (A)

------- Period for Lagging or Averaging (Prevalence) -------

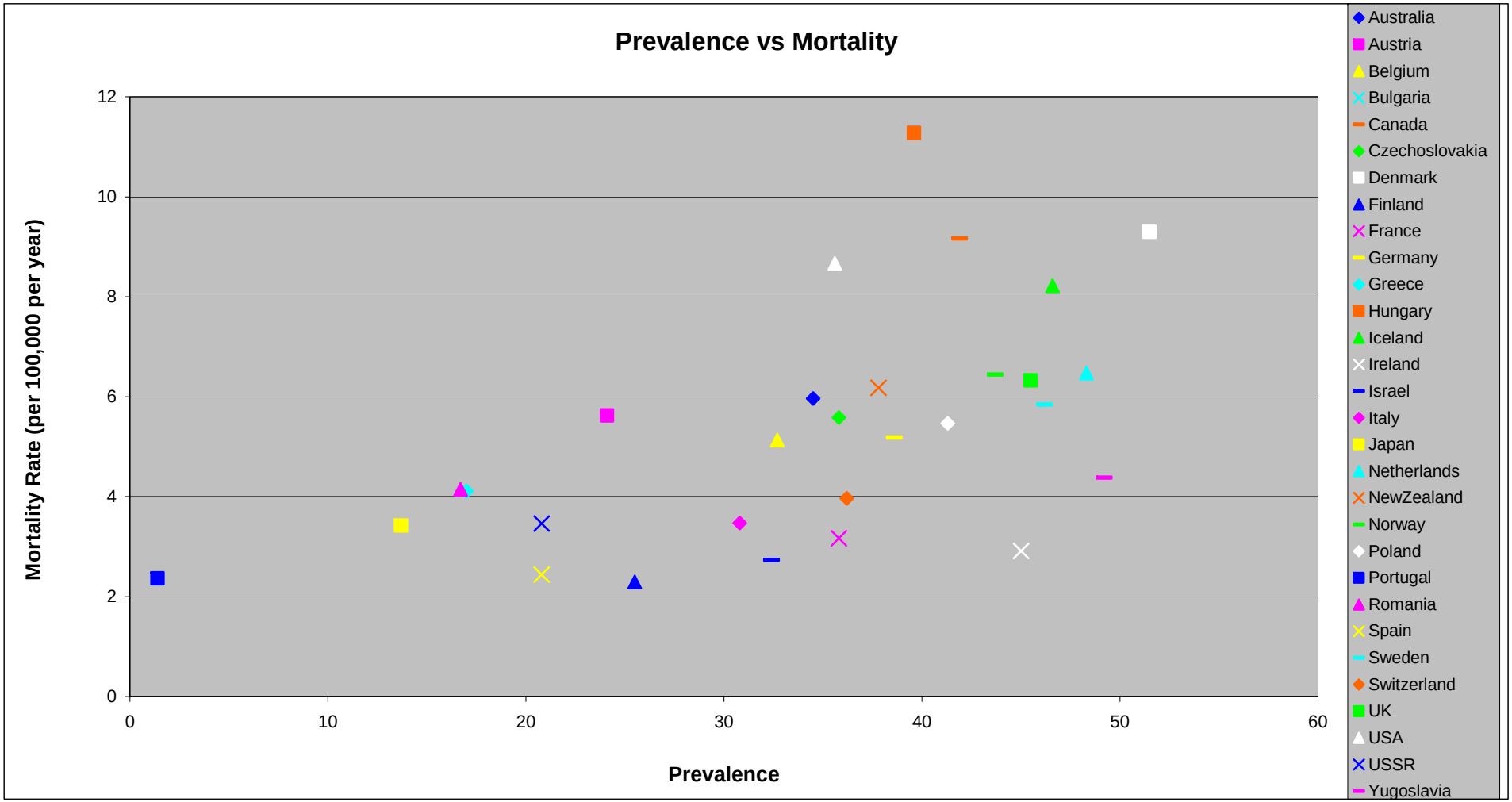
Start (Youngest): 10 Years previous

End (Oldest): 10 Years previous

Sex (Mortality): Females

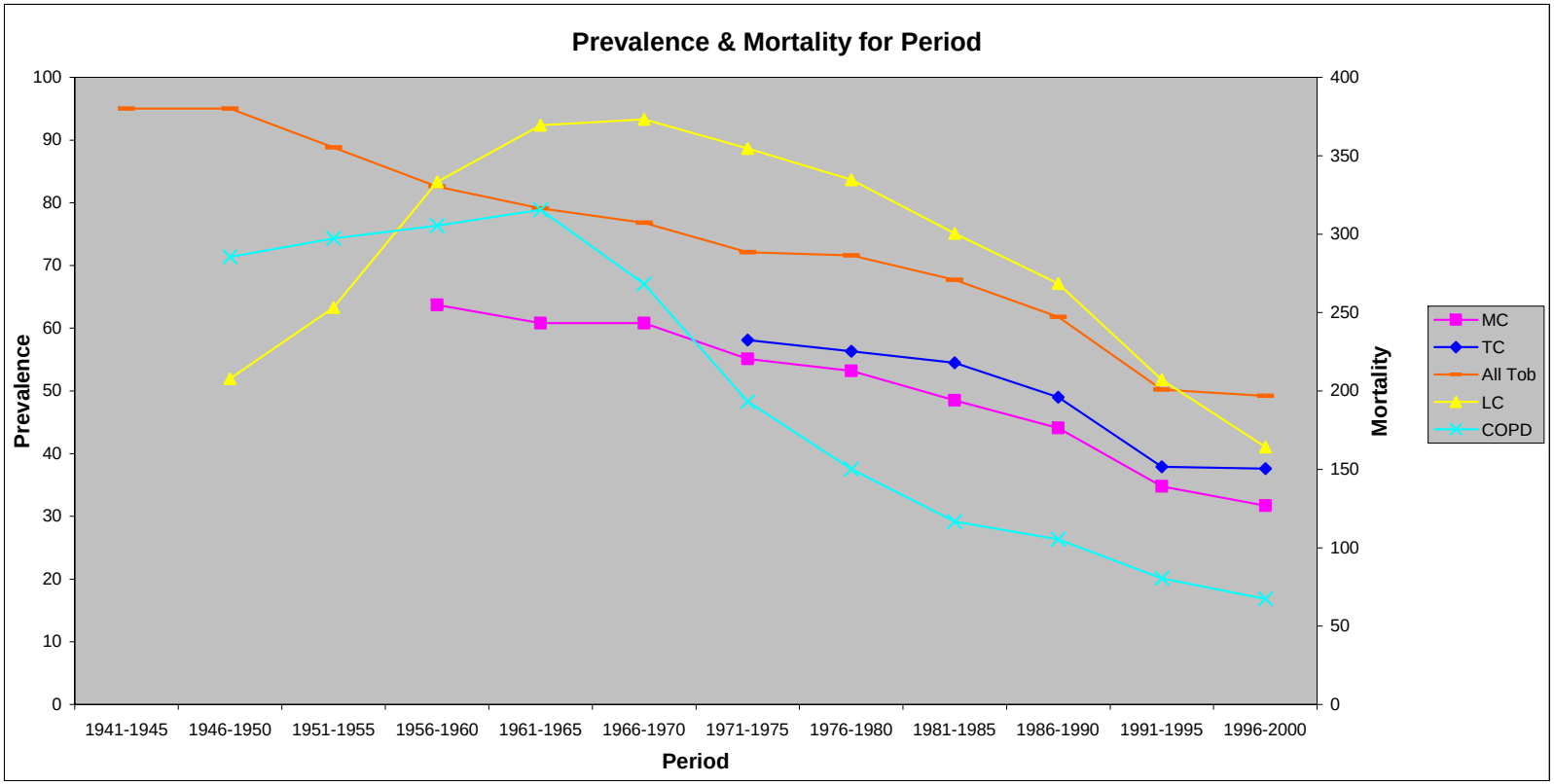
Age Group: Age group 40-44

Disease (Mortality): Lung Cancer



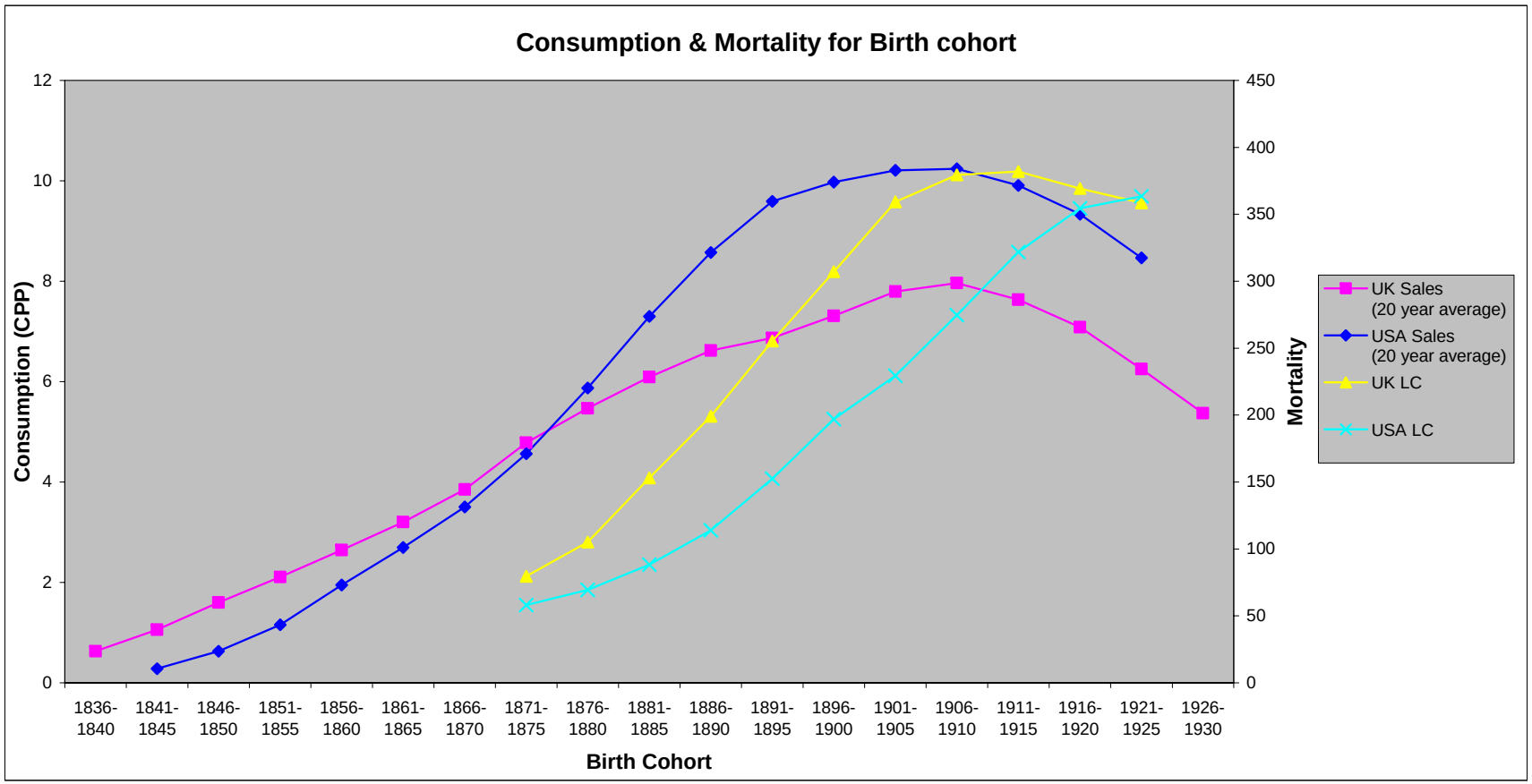
Example 13 Combination Plots Page 5 (10 year lag)

	Country	Country Ratio	Sex	Age group or Cohort	Tobacco Type	Lagging or Averaging Start (Youngest) / End (Oldest)
(Prev 1) **MC**	UK	None (Single Country)	Males	Age group 60-64	Manufactured Cigarettes (MC)	10 Years previous
						10 Years previous
(Prev 2) **TC**	UK	None (Single Country)	Males	Age group 60-64	Total Cigarettes (TC)	10 Years previous
						10 Years previous
(Prev 3) **All Tob**	UK	None (Single Country)	Males	Age group 60-64	All tobacco products (A)	10 Years previous
						10 Years previous
(Mort 1) **LC**	UK	None (Single Country)	Males	Age group 60-64	Lung Cancer	**Relative Scaling Period**
(Mort 2) **COPD**	UK	None (Single Country)	Males	Age group 60-64	COPD	None



Example 14 Combination Plots Page 3 (20 year average)

	Country	Country Ratio	Sex & Source	Period or Age group	Tobacco Type / Tar Adjustment	Lagging or Averaging Start (Youngest) / End (Oldest)
(CPP 1) /ear average)	UK	None (Single Country)	Males & Females (Sales)	Age group 75-79	Manufactured Cigarettes (MC)	20 Years previous
					Unadjusted	5 Years previous
(CPP 2) /ear average)	USA	None (Single Country)	Males & Females (Sales)	Age group 75-79	Manufactured Cigarettes (MC)	20 Years previous
					Unadjusted	5 Years previous
(Mort 1) UK LC	UK	None (Single Country)	Males & Females	Age group 75-79	Lung Cancer	
(Mort 2) USA LC	USA	None (Single Country)	Males & Females	Age group 75-79	Lung Cancer	



Example 14T Combination Plots Page 3 (20 year average, associated data table)

Consumption & Mortality vs Birth Cohort

	Country	Country Ratio	Sex & Source	Period or Age group	Tobacco Type / Tar Adjustment	Period for Lagging or Averaging Start (Youngest) / End (Oldest)
(CPP 1) **year average)**	UK	None (Single Country)	Males & Females (Sales)	Age group 75-79	Manufactured Cigarettes (MC) Unadjusted	20 Years previous 5 Years previous
(CPP 2) **year average)**	USA	None (Single Country)	Males & Females (Sales)	Age group 75-79	Manufactured Cigarettes (MC) Unadjusted	20 Years previous 5 Years previous
(CPP 3) **Not Used**	UK	None (Single Country)	Males & Females (Survey)	Age group 70-74	Manufactured Cigarettes (MC) Unadjusted	0 (Current) 0 (Current)
(Mort 1) **UK LC**	UK	None (Single Country)	Males & Females	Age group 75-79	Lung Cancer	
(Mort 2) **USA LC**	USA	None (Single Country)	Males & Females	Age group 75-79	Lung Cancer	
(Mort 3) **Not Used**	UK	None (Single Country)	Males & Females	Age group 70-74	Lung Cancer	

Birth Cohort

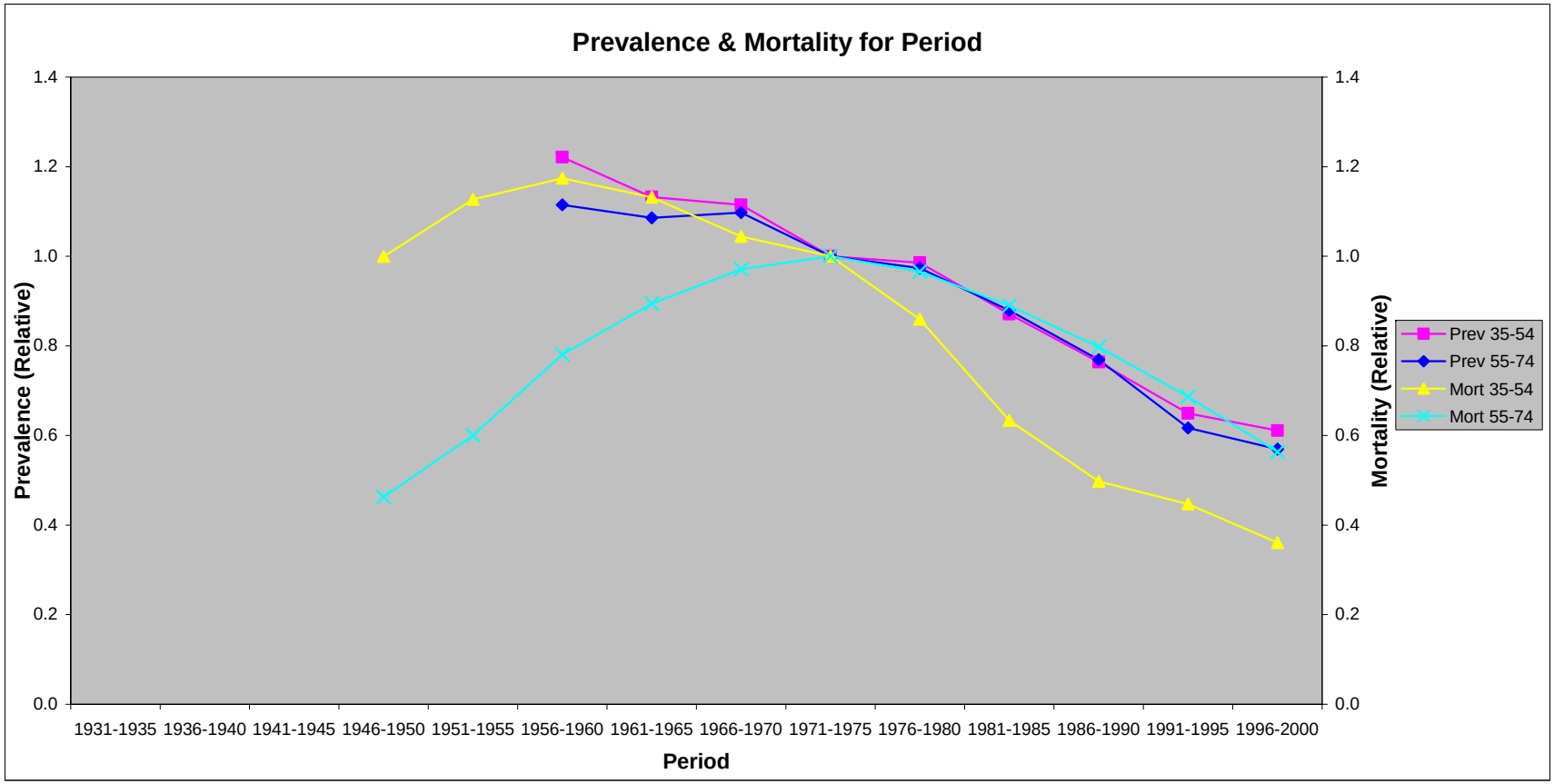
	1836-1840	1841-1845	1846-1850	1851-1855	1856-1860	1861-1865	1866-1870	1871-1875	1876-1880	1881-1885	1886-1890	1891-1895	1896-1900	1901-1905	1906-1910	1911-1915	1916-1920
UK Sales (20	0.63	1.06	1.60	2.11	2.65	3.20	3.85	4.78	5.47	6.09	6.62	6.87	7.31	7.80	7.96	7.63	7.09
USA Sales (2		0.28	0.63	1.16	1.95	2.70	3.50	4.56	5.87	7.30	8.57	9.59	9.97	10.21	10.24	9.91	9.34
UK LC								79.55	105.20	153.08	199.17	255.32	307.19	359.31	379.50	381.89	369.23
USA LC								58.21	69.48	88.19	113.90	152.48	196.95	229.50	274.74	321.95	354.55

Birth Cohort (continued)

	1921-1925	1926-1930	1931-1935	1936-1940	1941-1945	1946-1950	1951-1955	1956-1960	1961-1965	1966-1970	1971-1975	1976-1980	1981-1985	1986-1990	1991-1995	1996-2000	2001-2005
			Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
UK Sales (20	6.25	5.37															
USA Sales (2	8.47																
UK LC	358.44																
USA LC	363.45																

Example 15 Combination Plots Page 5 (10 year lag, relative scaling)

	Country	Country Ratio	Sex	Age group or Cohort	Tobacco Type	Lagging or Averaging Start (Youngest) / End (Oldest)
(Prev 1) **Prev 35-54**	UK	None (Single Country)	Males	Combined 35 - 54	Manufactured Cigarettes (MC)	10 Years previous / 10 Years previous
(Prev 2) **Prev 55-74**	UK	None (Single Country)	Males	Combined 55 - 74	Manufactured Cigarettes (MC)	10 Years previous / 10 Years previous
(Mort 1) **Mort 35-54**	UK	None (Single Country)	Males	Combined 35 - 54	Lung Cancer	**Relative Scaling Period**
(Mort 2) **Mort 55-74**	UK	None (Single Country)	Males	Combined 55 - 74	Lung Cancer	1971-1975



Example 16 Prevalence Plots Page 3

Country	Sex	Tobacco Type	---------- Period for Lagging or Averaging ---------- Start (Youngest)	End (Oldest)
UK [HALS]	Males	Total Cigarettes (TC)	0 (Current)	0 (Current)

Country Ratio (denominator)

None (Single Country)