

## **Appendix 5 of ‘An Atlas of Tobacco Smoking Scotland’, NHS Health Scotland**

### **Description of method applied to calculate smoking attributable mortality**

*Adapted from ‘Mortality from tobacco in developed countries: indirect estimation from national vital statistics.’ Peto R, Lopez AD, Boreham J, Thun M and Heath Jr C. Lancet 1992; 339:1268-78*

#### **General description**

The method applied is based on the premise that in developed countries, the absolute age-sex-specific lung cancer mortality rates can be used to indicate the approximate proportions of deaths due to tobacco, not only from lung cancer itself, but also, indirectly, from vascular disease and from various other categories of disease. Thus, in the absence of direct information on smoking histories, national mortality from tobacco can be estimated approximately just from disease mortality. This means that for a particular country in a particular year, the national mortality rates from various categories of disease are taken and certain proportions of deaths from those disease categories are attributed to tobacco. These attributable proportions vary from one category to another, being largest for lung cancer, upper aerodigestive cancer and chronic obstructive pulmonary disease (COPD), intermediate for vascular disease, and zero for cirrhosis, accidents, and violence. They also vary with age, sex, and country, being largest in populations where lung cancer is common. The relation between the absolute excess of lung cancer and the proportional excess of other diseases can only be approximate, and, so as not to overestimate the effect of tobacco on diseases other than lung cancer, it has been taken to be only half that suggested by a large prospective study of smoking and death among one million Americans.

#### **Data used in Scottish calculation**

This calculation used three sets of data: smoking status and mortality data from the ACS CPSII study<sup>1</sup>; Scottish mortality data for 2004 split by sex, by 5-year age group, and by nine major cause-of-death categories: lung cancer, upper aerodigestive cancer (mouth, pharynx, larynx, oesophagus), other cancer, COPD, other respiratory disease, vascular disease, cirrhosis, other medical causes, and non-medical causes; and Scottish population data for 2004 split by sex and by 5-year age group.

In the calculation at NHS Board level, Scottish mortality data for 2000-2004 were used along with population data for 2002 (as an approximation for the average population over the period 2000-2004).

#### **Description of calculation**

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<sup>1</sup> The American Cancer Society's second Cancer Prevention Study (ACS CPS-II) is a prospective study of smoking and death among more than one million Americans aged 30 or older when they completed a questionnaire in 1982.

All calculations are done age- and sex-specifically

1. For lung cancer, directly compare the Scottish death rate with the rate in CPSII non-smokers, and attribute the excess to tobacco.
2. The ratio of the absolute excess lung cancer in Scotland (from 1.) to the absolute excess in CPSII smokers can be regarded as an indication of the proportion of smokers in the Scottish population.
3. Apply the ratio from 2. to the CPSII smoker excess mortality ratios for six separate disease categories (upper aerodigestive cancer, other cancer, COPD, other pulmonary disease, vascular disease and other medical causes) to estimate the excess mortality ratio for these diseases in Scotland as a whole (smokers plus non-smokers). Then halve these excess mortality ratios to obtain a conservative estimate of the proportions of such deaths to attribute to tobacco.
4. Due to uncertainties over the extent to which deaths from external causes (including fires, suicides, and accidents), neonatal deaths (including stillbirths), all other deaths under 35 years and deaths from cirrhosis of the liver could be associated with smoking, none of these deaths were attributed to tobacco, even though some of these deaths would have been due to smoking.