Appendix 9

Estimation of the standard deviation for years of education

1. Introduction

In our original work [1], we found seven studies which gave information on the SD for years of education among never smokers. As the results were quite consistent, we have not attempted to update this estimate based on more recent data. Nor, as the results were so similar by sex, have we attempted to re-estimate the SD specifically for females.

2. The studies

2.1 Cardenas *et al* [2]

The publication provides a breakdown of the number of never smokers by sex, ETS exposure and four levels of education. Based on the combined data by ETS exposure, and using assumed midpoints for each level of education, one can estimate the following:

SD (years) :	males	2.0189
	females	2.1207
	sexes combined	2.0795

2.2 Whitlock *et al* [3]

Based on the published percentage breakdown of never smokers by education, together with assumed midpoints in years for each level, one can estimate the following:

SD (years) :	sexes combined	2.7410

2.3 HALS (UK Health and Lifestyle Survey)

Data were available on the population distribution of education classified by 14 levels as: other, work related, degree, professional, nursing, teacher training, RSA etc., HNC/HND, ONC/OND, overseas, A Level, O Level, CSE grades 2-5 and none. Assigning relative year scores of, respectively, 5, 5, 8, 9, 7, 8, 5, 7, 5, 5, 5, 3, 3 and 1, gave:

SD (years) :	males	2.6454
	females	2.4790
	sexes combined	2.5528

2.4 HALS 2 (UK Health and Lifestyle Survey Follow Up

There were now 15 levels, the same as for HALS but, with the addition of apprenticeship, scored as 5. This gave:

SD (years) :	males	2.8063
	females	2.6198
	sexes combined	2.7213

2.5 HSE 93 (Health Survey of England 1993)

Here education levels and assigned relative scores were:
degree or equivalent (8), professional (9), A level or equivalent (5), O level or equivalent (3), CSE or equivalent (3), other (5) and no qualifications (1). This gave:

SD (years) :	males	2.7863
	females	2.7210
	sexes combined	2.7883

2.6 HSE 94 (Health Survey of England 1994)

Here education levels and assigned relative scores were:
degree or equivalent (8), higher below degree (7), A level or equivalent (5), GCSE or equivalent (3), foreign/other (5) and no qualifications (1). This gave:

SD (years) :	males	2.5179
	females	2.4014
	sexes combined	2.5033

2.7 HGPS (Hungarian General Practitioners Study)

Here education levels and assigned relative scores were: university (8), college (7), grammar school (5), vocational school (5) and elementary school (1). This gave:

SD (years) :	males	2.1349
	females	2.2689
	sexes combined	2.2698

3. Combined estimate

Averaging the seven values of SD for sexes combined gives a value of 2.522 years. The six values for females give a slightly lower mean of 2.435 years.

References

1. Fry JS, Lee PN. Revisiting the association between environmental tobacco smoke exposure and lung cancer risk. II. Adjustment for the potential confounding effects of fruit, vegetables, dietary fat and education. *Indoor Built Environ* 2001;**10**:20-39.

2. Cardenas VM, Thun MJ, Austin H, Lally CA, Clark WS, Greenberg RS, *et al*. Environmental tobacco smoke and lung cancer mortality in the American Cancer Society's Cancer Prevention Study II. *Cancer Causes Control* 1997;**8**:57-64.

3. Whitlock G, MacMahon S, Vander Hoorn S, Davis P, Jackson R, Norton R. Association of environmental tobacco smoke exposure with socioeconomic status in a population of 7725 New Zealanders. *Tob Control* 1998;**7**:276-80.