# Appendix 7

## Review of papers since 2000 relating ETS exposure at home to the potential confounding variables

1. Introduction

The objective is to obtain data relating ETS exposure to fruit, vegetable and dietary fat consumption and to education to add to the information presented in Tables 4, 5 and 6 of our 2001 paper [1]. Eleven papers were identified as potentially relevant. Not considered here is information directly available from accessible databases.

2. The studies

2.1 Curtin *et al* 1999 [2]

This is a population survey in Geneva, Switzerland involving 914 female never smokers aged 35-74. Data relating to education (from Table 1), and to diet (from Tables 2 and 3) are summarized below.

| | Unexposed to ETS (n=698) | Exposed to ETS | | | |
|---|---|---|---|---|---|
| | | At home (n=81) | At work (n=83) | During leisure (n=52) | p |
| Education (%) | | | | | |
| Tertiary | 33.1 | 33.3 | 34.9 | 28.9 | |
| Secondary | 54.6 | 49.4 | 51.8 | 69.2 | |
| Primary | 12.3 | 17.3 | 13.3 | 1.9 | 0.16 |
| % of total energy from | | | | | |
| Vegetable proteins | 4.7 | 4.8 | 4.6 | 4.8 | 0.69 |
| Animal proteins | 10.2 | 10.5 | 10.5 | 10.7 | 0.76 |
| Total fat | 35.1 | 34.5 | 35.3 | 35.7 | 0.82 |
| Saturated fat | 12.9 | 12.2 | 13.0 | 13.2 | 0.46 |
| Daily intake (g) | | | | | |
| Fried food | 14.1 | 13.8 | 16.1 | 15.4 | 0.72 |
| Fruits | 182 | 171 | 184 | 188 | 0.95 |
| Vegetables | 225 | 221 | 186 | 236 | 0.04 |
| Fat meat | 17.5 | 16.7 | 15.8 | 17.2 | 0.76 |

Note that ETS exposure is defined "as an exposure of at least 1 hr per day for at least 1 year exclusively either at home, at work or during leisure time that was still on-going during the year preceding the interview." The "at home," "at work" and "during leisure" groups are mutually independent, 14 women who would have qualified under more than one exposure heading being excluded from the analysis. p values are based on an unadjusted 3x4 chisquared analysis for education and on an analysis of covariance adjusted for BMI, age and social class for diet.

Unfortunately, the data on diet included no information from which we could estimate standard errors of the means, and thus that data could not be included in our database. For education we took the following numeric values for the education categories – Tertiary =15 years; Secondary = 11 years and Primary = 7 years.

## 2.2 Dietrich *et al* [3]

This paper describes an experimental study of the effects of Vitamin C supplementation on biomarkers of oxidative stress in the plasma of ETS exposed non-smokers and is not relevant.

## 2.3 Enstrom and Kabat 2003 [4]

This paper describes follow-up from 1959 to 1998 of those 35561 never smokers in the California part of the well known CPS I study who had a spouse in the study with known smoking habits. Table 2 (males) and Table 3 (females) give unadjusted data relating education and diet to the smoking status of the spouse.

| | Smoking status of wife, 1959 | | | | | |
|---|---|---|---|---|---|---|
| | | | Current cigarettes/day | | | |
| | Never | Former | 1-19 | 20-39 | 40+ | Total |
| Males | | | | | | |
| Participants in 1959 | 7458 | 624 | 905 | 587 | 45 | 9619 |
| Education 12+ years (%) | 67.3 | 80.6 | 71.3 | 74.2 | 84.5 | 69.0 |
| (number) | (5017) | (403) | (645) | (436) | (38) | (6639) |
| Eat green salads | 4.8 | 4.9 | 5.0 | 5.0 | 4.9 | 4.8 |
| (mean days/wk) | (7201) | (617) | (887) | 5(73) | (45) | (9323) |
| Eat fruits or drink fruit | 6.0 | 6.0 | 5.9 | 5.5 | 5.3 | 5.9 |
| juice (mean days/wk) | (7226) | (614) | (886) | (574) | (43) | (9343) |

| | Smoking status of husband, 1959 | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | Current cigarettes/day | | | |
| | Never | Former | Pipe/cigs | 1-19 | 20-39 | 40+ | Total |
| Females | | | | | | | |
| Participants in 1959 | 7339 | 6858 | 2691 | 3219 | 4934 | 841 | 25942 |
| Education 12+ years (%) | 73.7 | 68.2 | 68.9 | 65.6 | 70.4 | 77.2 | 70.2 |
| (number) | (5452) | (4685) | (1853) | (2109) | (3476) | (650) | (18225) |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Eat green salads (mean days/wk) | 5.1 (7219) | 5.0 (6701) | 5.1 (2618) | 4.9 (3122) | 5.1 (4835) | 5.1 (825) | 5.0 (25320) |
| Eat fruits or drink fruit juice (mean days/wk) | 6.4 (7227) | 6.3 (6727) | 6.3 (2621) | 6.1 (3132) | 6.0 (4846) | 6.0 (826) | 6.2 (25379) |

Unfortunately, the data on diet included no information from which we could estimate standard errors of the means, and thus that data could not be included in our database.

## 2.4 Farchi *et al* 2001 [5]

This paper gives further results from the study by Forastiere *et al* [6] relating to antioxidant vitamins. It provides no additional data of use to us.

## 2.5 Forastiere *et al* [6]

This cross-sectional study in four areas of Italy involved 1938 married women aged 25-74 who had reported never being cigarette smokers and who provided data on husband's smoking. Table 1 of the paper provides data relating ever exposure to husband's smoking with the education of the women.

| | Husbands' smoking | | | |
|---|---|---|---|---|
| Variable | Unexposed n | Exposed n | OR[a] | 95% CI |
| Womens' education (years) | | | | |
| >13 | 92 | 120 | 1.00 | - |
| 9-13 | 252 | 362 | 1.24 | (0.89-1.71) |
| 6-8 | 187 | 314 | 1.44 | (1.02-2.04) |
| <6 | 193 | 413 | 1.54 | (1.04-2.28) |
| Total | 724 | 1209 | | |

[a]Odds ratios adjusted for center, age, and center x age.

Table 1 also includes data showing husband's smoking is similarly associated with husband's education. We took the following numeric values for the education categories – >13 =15 years; 9-13 = 11 years, 6-8 = 7 years and <6 = 5 years.

Table 4 includes data relating husband's smoking to various foods. Results for meat in general, cooked and fresh vegetables and fruit in general are given below.

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| Variable | Husbands' smoking Unexposed n | Exposed n | OR[a] | OR[b] | 95% CI |
|---|---|---|---|---|---|
| Meat in general | | | | | |
| Never | 13 | 25 | | | |
| <1/day | 387 | 688 | 1.00 | 1.00 | - |
| 1/day | 263 | 406 | 0.89 | 0.87 | (0.71-1.07) |
| >1/day | 58 | 81 | 0.85 | 0.80 | (0.56-1.15) |
| Total | 721 | 1200 | | | |
| Cooked vegetables | | | | | |
| <1/day | 311 | 557 | 1.00 | 1.00 | - |
| 1/day | 248 | 450 | 1.01 | 1.03 | (0.83-1.28) |
| >1/day | 163 | 194 | 0.72 | 0.72 | (0.55-0.93) |
| Total | 722 | 1201 | | | |
| Fresh vegetables | | | | | |
| <1/day | 163 | 346 | 1.00 | 1.00 | - |
| 1/day | 306 | 543 | 0.86 | 0.86 | (0.67-1.09) |
| >1/day | 256 | 319 | 0.64 | 0.63 | (0.49-0.82) |
| Total | 725 | 1208 | | | |
| Fruit in general | | | | | |
| <1/day | 122 | 174 | 1.00 | 1.00 | - |
| 1-2/day | 330 | 545 | 1.11 | 1.12 | (0.85-1.48) |
| >2/day | 270 | 490 | 1.08 | 1.09 | (0.82-1.45) |
| Total | 722 | 1229 | | | |

Totals may vary because of missing values.
[a]Odds ratios adjusted for center, age, and center x age.
[b]Odds ratios adjusted for center, age, center x age, and woman's education

2.6 Iribarren *et al* 2001 [7]

This paper describes a cross sectional study in Northern California, USA using data from multiphasic health checkups between 1979 and 1985. 16524 men aged 15-89 and 26197 women aged 15-105 had never smoked. There are no data on diet. The data on education (in Table 3) are only in relation to hours/wk total exposure (home, small spaces other than home and large indoor areas) and not to spouse or household exposure which we insisted upon in our original work [1]. The authors note (p724) that "among those with the heaviest ETS exposure (≥40 weeks), and regardless of gender, there was a larger proportion of participants who were black, with no college or partial college education …". The study is not useful for our purposes.

2.7 Moussa *et al* [8]

The paper describes a study of a Swedish working population sample of 8270 individuals conducted in 2000. The study is not useful for various reasons – it only considers studies ETS at work, does not provide results for non-smokers, and gives no data on diet or education.

2.8 Reynolds *et al* [9]

This paper was based on 128,174 women aged 21+ in the California Teachers Study, for whom the data collected in 1995 included complete and usable information on tobacco. There were 85,114 never smokers, 60,343 of whom had passive smoking exposure, defined as ever living with a smoker during either childhood or adulthood, and 24,771 of which had none. The dietary analyses are restricted to 122,544 women with a daily intake of 600 to 5000 calories.

No results are given for education.

As shown in Table 5, after adjustment for age, race and caloric intake, results for fruit, vegetables and fat were as follows:

| | | Exposed vs not exposed to ETS | |
|---|---|---|---|
| | | OR (95% CI) | Trend p |
| Fruit | 3+ servings/day | 0.84 (0.80-0.88) | n/a |
| | ≤2 servings/day | 1.00 | |
| Vegetables | 3+ servings/day | 0.89 (0.84-0.93) | n/a |
| | ≤2 servings/day | 1.00 | |
| Fat intake | Quartile 1 | 1.00 | |
| | Quartile 2 | 1.03 (0.98-1.08) | |
| | Quartile 3 | 1.04 (0.99-1.10) | |
| | Quartile 4 | 1.07 (1.00-1.13) | |
| | Quartile 5 | 1.14 (1.06-1.24) | 0.003 |

It is unclear why there are five quartiles! Numbers of cases exposed and unexposed to ETS were estimated by the RRest procedure and these values were entered into the database to use in the weighted regression analyses.

2.9 Scarinci *et al* 2000 [10]

This study, presumably (from the authors' affiliations) conducted in Memphis, USA involved 404 never smoking females aged 18-39 recruited in the community. The study related number of days per week exposed to ETS in the past year to various indicators of SES. Although there was a significant ($p<0.02$) tendency for post-college education to be associated with reduced ETS exposure, the results do not relate to spousal or household exposure so do not qualify for inclusion.

2.10 Stamatakis *et al* 2002 [11]

This study involved a nationally representative sample of 2326 nonsmoking US women aged 40 and older. Nonsmoking was defined as including former smokers as well as never smokers. As shown in Table 2, low education and low fruit/vegetable consumption was associated with an increased probability of ETS exposure at home.

| | | Odds ratio (95% CI) | |
|---|---|---|---|
| | % | Unadjusted | Adjusted* |
| Education | | | |
| ≤8th grade | 22.4 | 1.8 (1.2-2.8) | 2.1 (1.3-3.6) |
| Some high school | 18.6 | 1.4 (0.9-2.2) | 1.3 (0.8-2.2) |
| High school graduate | 24.7 | 2.0 (1.4-2.9) | 2.2 (1.4-3.3) |
| Some college | 14.3 | 1.0 (0.7-1.6) | 1.1 (0.7-1.7) |
| College graduate + | 13.9 | 1.0 | 1.0 |
| Fruit/vegetables | | | |
| <5/day | 20.5 | 1.6 (1.2-2.2) | 1.5 (1.0-2.1) |
| ≥5/day | 13.8 | 1.0 | 1.0 |

*Adjusted for race, age, location and having children in the home.

2.11 Trobs *et al* 2002 [12]

This paper describes a study in Nuremberg, Germany involving 817 adults aged 27-66. The study involved 545 non-smokers, 149 living with a smoker, and 272 smokers. Nonsmoking status was confirmed by plasma cotinine, 21 self-reported non-smokers with a level ≥15 ng/ml being excluded from the evaluation. The definition of non-smokers does not exclude exsmokers (Dr W-D. Heller, personal communication).

The level of education was assessed by a standardized questionnaire taking into account the quality of school and degree of qualification. The scores ranged from 1 (no qualifications) to 5 (university degree). As shown in Table 3, level of education in non-smokers was lower in those living with a smoker.

| | Score (SDev) | |
|---|---|---|
| Not living with a smoker | 5.5 ± 2.7 | |
| Living with a smoker | 4.5 ± 2.6 | $p<0.05$ |

Although 557 of the participants provided 7 day dietary data, no results for fruits, vegetables or dietary fat are given.

3. Summary

Of the 11 papers considered, one [3] was not an epidemiological study at all, and two gave no data on diet or education [5,8]. Two further studies [7,10] gave data on education, but only for total ETS exposure, not for spousal or household exposure. One study [11] gave results for education and for a combined index of fruit and vegetable consumption, but only for never plus former smokers combined. Another study [12] gave results for education, but apparently their definition of non-smokers also included former smokers.

This leaves four studies. Two [2,6] give some results for all four risk factors of interest, though the results for diet could not be used as noted above. One [4] gives results for all except dietary fat and one [9] gives results for all except education.

References

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