At the present time the noxious effect of tobacco on health and its role in the aetiology of the diseases that constitute the most important causes of deaths in the developed countries are clearly established.

Spain is still a country with a high level of tobacco smoking. The proportion of regular smokers in 2001, 34.4%, and the number of cigarettes consumed per person per year (2271.2 cig. person/year) in the population older than 15 years is above the European average (29.3% and 1652.9 cig. person/year) in the population older than 15 years is above the number of cigarettes consumed per person per year (2271.2 cig. person/year).

The proportion of smokers in 1978 was 16% and since then it has intensified, specially in women. In the period studied, 1992–1998, relative risks of the Cancer Prevention Study II were used. To compare the two periods of study, a Poisson regression analysis adjusted by age was applied. Results: In 1998, 15.9% of total mortality in the population older than 34 years was attributable to smoking. Lung cancer and chronic obstructive pulmonary disease are the main causes of death in both genders. In the period studied, 1992–1998, the adjusted rates diminished in men in both age groups, while in women they increased in the age group 35 to 64 years. The mortality from lung cancer remained stable in men, increasing in women by 12%. The years of potential life lost decreased by 14% in men and increased by 42% in women. Conclusions: One in four deaths in men and one in 36 deaths in women are attributed to cigarette smoking. The smoking attributable mortality in males has tended to stabilize, while in women premature mortality is increasing.

Key points
- Smoking attributable mortality was estimated for 1998 and for changes since 1992 to evaluate the impact of smoking in the population older than 34 years.

MAIN RESULTS
- In the period studied, 1992–1998, the adjusted mortality rates attributable to smoking diminished in men, while in women they increased in the age group 35 to 64 years.
- The main causes of Smoking attributable mortality are Lung cancer and chronic obstructive pulmonary disease in both genders. The mortality from lung cancer remained stable in men, increasing in women by 12%.

IMPLICATIONS FOR PUBLIC HEALTH
- In the Community of Madrid, health promotion programmes to reduce cigarette smoking need to be intensified, specially in women

Keywords: attributable mortality, tobacco, trends
at national level, with a prevalence of regular smokers in the population older than 17 years of 39.8% in males and 30.6% in females in 2000.11

According to current estimates, half of the smoking population will die due to this habit, half of them will be middle aged. In 1995 smoking caused 1.2 million deaths (14% of total number of deaths) in the countries of the European Region.12

In Spain, during the period 1978–1992, 14% of the annual mortality rate was attributed to cigarette smoking with a 24% increase in the period. A third of these were premature deaths (among population 35 to 64 years), with a rising loss in potential years of life (between 10 and 20 years). Most of the deaths happened in men, but it is necessary to highlight that mortality in women experienced a considerable increase (a mean annual increment of 6.7%).13 If the current trends of smoking prevalence continue, smoking attributable deaths will increase dramatically in women during the first part of the 21st century. It has been estimated that in spite of the measures taken for its control it will cause 20% of the total deaths by 2020.12

To evaluate the impact of smoking on the Community of Madrid’s public health we used attributable mortality as an indicator for establishing the relative importance of smoking in the population’s mortality.

Methodology
To estimate smoking attributable mortality (SAM) and years of potential life lost (YPLL), calculations were made through the population attributable fraction (PAF).

The attributable mortality and the YPLL were calculated using the Smoking-Attributable Mortality, Morbidity and Economic Costs software (SAMMEC 3.0)14 developed by the Office of Tobacco and Health of the Centre for Diseases Control (USA). It estimates the number of deaths related with smoking for tumours, cardiovascular and respiratory diseases using the attributable risk formula.14

It calculates the population attributable fraction (PAF) for each cause of death stratifying by four gender and age groups: 35 to 64 and older than 65 years. The smoking attributable deaths are obtained by applying this proportion to the number of deaths in the period of study.

For calculation of the smoking attributable YPLL, the program uses standard methodology based on life expectancy to the age of the death. We have assumed life expectancy as 70 years for both genders for 1992 and 1998.15

To compare the two periods of study, the attributable mortality and YPLL rates ratio for 1992–1998 adjusted by age were calculated through a Poisson regression.

The relative risks used are those from the Cancer Prevention Study II of the American Cancer Society (ACS CPS-II), carried out in the period 1982–1986.16

The prevalence of smokers, former smokers and non-smokers for gender and age older than 34 years, was obtained from the sample fraction for the Community of Madrid of the National Health Survey, years 1987 and 1993. The National Health Survey is a face to face survey, including a representative sample by gender and age (n = 3,300 and 2,600 in 1987 and 1993, respectively) of the Madrid population older than 15 years. The response rate is not available.17,18

The total number of deaths for age, gender and cause of death was obtained from the Mortality Register of the Community of Madrid, provided by the Institute of Statistic of the Community of Madrid. The underlying cause of death has been regarded as the cause of death.

We considered as causes of death those included in SAMMEC (table 1). These are the causes presented in the United States Surgeon General Report, 1989,19 a review summarizing the epidemiological evidence linking cigarette smoking to several cancers, cardiovascular and respiratory diseases. For all of them there is sufficient evidence of tobacco smoking causality. No cause of death, at the moment, is entirely attributable to smoking. To be conservative, no deaths before age 35 and none from non-medical causes were attributed to smoking.

Estimates for the year 1998 are presented for the total population by gender. Given that changes in the smoking pattern for men and women have followed opposite directions between 1987 and 1993, with an increase in women aged 35–64 years and a decrease in the older group, while in men there has been a decrease in the younger age group and an increase in those older than 64 years, the estimates for changes between the two periods of study in the smoking attributable mortality are presented by gender and age group.

Results
Smoking attributable mortality and years of potential life lost 1998
During 1998, in the Community of Madrid, 5,783 deaths are attributed to smoking, with a rate of 444.7/100,000 in men and 34.8/100,000 in women older than 35 years. This represents 15.9% of all deaths in that year. 28.4% of the total mortality in women and 2.8% in men are attributable to cigarette smoking.

Globally, malignant neoplasms originate the higher number of attributable deaths (43.2%), followed by cardiovascular diseases (35.1%) and respiratory diseases (21.7%). Cancer of the trachea, bronchus and lung is the main specific cause with a total of 1,701 deaths, 29.4% of total SAM. Chronic Obstructive Pulmonary Disease (COPD) constitutes the second cause, with 1,030 deaths (17.9%) (table 1).

The distribution is similar in men, with tumours producing 44.2% of SAM, cardiovascular diseases 34.3% and respiratory diseases 21.5%. In women, cardiovascular diseases originate the larger number of deaths (43.1%), followed by malignant neoplasm (32.5%) and respiratory diseases (24.4%).

Lung cancer, in men, is the primary cause of smoking attributable deaths (30.2% of all combined causes), COPD and ischemic heart disease being the second and third causes. In women also, lung cancer is the primary cause, originating 20.6% of the attributable mortality, followed by COPD and other heart diseases (table 1).

In the population between 35 and 64 years of age, smoking was responsible for 92.7% and 75% of the lung cancer mortality in men and women respectively, 86% and 73.7% of COPD mortality and 52.1 and 34.7% of ischemic heart disease mortality. The population attributable fraction is much higher for men for all studied causes. In figures 1 and 2, the crude mortality rates in the general population and the fraction due to smoking are represented by causes, age group and gender.

With regard to premature mortality, in 1998 cigarette smoking resulted in 25,980.5 YPLL before age 70 (22,728 in men and 3,252.5 in women). Lung cancer is the cause of death that generates most YPLL, both in men and women. The second major cause is ischemic heart disease in men and cerebrovascular disease in women (table 2).

Recent changes in smoking attributable mortality: 1992–1998
Globally in the year 1998 the number of smoking attributable deaths increased by 8.2% over 1992. This increment is partly due to the population aging in the studied period. Controlling for the effects of age, the attributable mortality rate in men diminishes by 6% and in women there are no significant changes.

The changes are different for men and women. In men the adjusted rates reduced mainly in the age group below 65 years, while in women the adjusted mortality rates rose in the group
<table>
<thead>
<tr>
<th>Cause of death</th>
<th>ICD-9a</th>
<th>Men</th>
<th></th>
<th>Women</th>
<th></th>
<th>Total</th>
<th></th>
<th>Men</th>
<th></th>
<th>Women</th>
<th></th>
<th>Total</th>
<th></th>
<th>All causes deaths</th>
<th></th>
<th>Attributable mortality</th>
</tr>
</thead>
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<td>(58.0)</td>
<td>1492</td>
<td>(39.0)</td>
<td>2338</td>
<td>(44.2)</td>
<td>101</td>
<td>(48.6)</td>
<td>60</td>
<td>(20.9)</td>
<td>161</td>
<td>(32.5)</td>
<td>2499 (43.2)</td>
<td></td>
<td>32.7%</td>
</tr>
<tr>
<td>Lip, oral cavity, pharynx</td>
<td>140–149</td>
<td>95</td>
<td>(6.5)</td>
<td>73</td>
<td>(1.9)</td>
<td>168</td>
<td>(3.2)</td>
<td>4</td>
<td>(1.9)</td>
<td>5</td>
<td>(1.7)</td>
<td>9</td>
<td>(1.8)</td>
<td>177 (3.1)</td>
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<td>63</td>
<td>(4.3)</td>
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<td>(1.8)</td>
<td>131</td>
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<td>37</td>
<td>(1.0)</td>
<td>62</td>
<td>(1.2)</td>
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<td>(7.7)</td>
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<td>(2.1)</td>
<td>22</td>
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<td>84 (1.5)</td>
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<tr>
<td>Larynx</td>
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<td>62</td>
<td>(4.2)</td>
<td>74</td>
<td>(1.9)</td>
<td>136</td>
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<td>(1.9)</td>
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<td>548</td>
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<td>(27.4)</td>
<td>1599</td>
<td>(30.2)</td>
<td>60</td>
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<td>(14.6)</td>
<td>102</td>
<td>(20.6)</td>
<td>1701 (29.4)</td>
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<td></td>
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<td>364</td>
<td>(9.5)</td>
<td>491</td>
<td>(9.3)</td>
<td>23</td>
<td>(11.1)</td>
<td>48</td>
<td>(16.7)</td>
<td>71</td>
<td>(14.3)</td>
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<td>(10.0)</td>
<td>639</td>
<td>(12.1)</td>
<td>23</td>
<td>(11.1)</td>
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<td>54</td>
<td>(10.9)</td>
<td>693 (12.0)</td>
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<td>(0.2)</td>
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<td>42</td>
<td>(0.8)</td>
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<td>(7.6)</td>
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<td>Aortic aneurysm</td>
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<td>22</td>
<td>(1.5)</td>
<td>93</td>
<td>(2.4)</td>
<td>115</td>
<td>(2.2)</td>
<td>4</td>
<td>(1.9)</td>
<td>2</td>
<td>(0.7)</td>
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<td>(1.2)</td>
<td>121 (2.1)</td>
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<td>Other arterial diseases</td>
<td>442–448</td>
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<td>(0.8)</td>
<td>48</td>
<td>(1.2)</td>
<td>60</td>
<td>(1.1)</td>
<td>2</td>
<td>(1.0)</td>
<td>4</td>
<td>(1.4)</td>
<td>6</td>
<td>(1.2)</td>
<td>66 (1.1)</td>
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<tr>
<td>Respiratory Disease</td>
<td>95 (6.5)</td>
<td>1043</td>
<td>(27.2)</td>
<td>1138</td>
<td>(21.5)</td>
<td>16</td>
<td>(7.7)</td>
<td>105</td>
<td>(36.6)</td>
<td>121</td>
<td>(44.4)</td>
<td>1259</td>
<td>(21.8)</td>
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<td>Pneumonia, influenza</td>
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<td>194</td>
<td>(3.7)</td>
<td>3</td>
<td>(1.4)</td>
<td>17</td>
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<td>(4.0)</td>
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<td>COPD&lt;sup&gt;b&lt;/sup&gt;</td>
<td>491–492, 496</td>
<td>72</td>
<td>(4.9)</td>
<td>858</td>
<td>(22.4)</td>
<td>930</td>
<td>(17.6)</td>
<td>2</td>
<td>(5.8)</td>
<td>80</td>
<td>(20.7)</td>
<td>100</td>
<td>(20.2)</td>
<td>1030 (17.8)</td>
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<td>14</td>
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<sup>a</sup> ICD-9 International Classification of Diseases, Ninth Revision  
<sup>b</sup> Chronic obstructive pulmonary disease  
Numbers in parenthesis are percentages
Figure 1 Crude mortality rates and smoking population attributable fraction (PAF). Men, Community of Madrid, 1998

Figure 2 Crude mortality rates and smoking population attributable fraction (PAF). Women, Community of Madrid, 1998

Table 2 Years of potential life lost attributable to smoking by cause of death and gender. Population older than 34 years. Community of Madrid, 1998

<table>
<thead>
<tr>
<th>Cause of death</th>
<th>Men (%)</th>
<th>Women (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neoplasms</td>
<td>12928 (56.9)</td>
<td>1737.5 (53.4)</td>
<td>14665.5 (56.3)</td>
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<tr>
<td>Trachea, lung, bronchus</td>
<td>8277.5 (36.4)</td>
<td>1087.5 (33.4)</td>
<td>9365 (36.0)</td>
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<tr>
<td>Other neoplasms</td>
<td>4650.5 (20.5)</td>
<td>650 (20.0)</td>
<td>5300.5 (20.3)</td>
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<tr>
<td>Cardiovascular diseases</td>
<td>8432.5 (37.1)</td>
<td>1347.5 (41.4)</td>
<td>9780 (37.6)</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>3925 (17.3)</td>
<td>335 (10.3)</td>
<td>4260 (16.4)</td>
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<tr>
<td>Cerebrovascular disease</td>
<td>1647.5 (7.2)</td>
<td>565 (17.3)</td>
<td>2212.5 (8.5)</td>
</tr>
<tr>
<td>Other cardiovascular diseases</td>
<td>2860 (12.6)</td>
<td>447.5 (13.8)</td>
<td>3307.5 (12.7)</td>
</tr>
<tr>
<td>Respiratory diseases</td>
<td>1367.5 (6.0)</td>
<td>167.5 (5.1)</td>
<td>1535 (6.0)</td>
</tr>
<tr>
<td>COPD†</td>
<td>985 (4.3)</td>
<td>122.5 (3.8)</td>
<td>1107.5 (4.3)</td>
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<tr>
<td>Other respiratory diseases</td>
<td>382.5 (1.7)</td>
<td>45 (1.3)</td>
<td>427.5 (1.6)</td>
</tr>
<tr>
<td>Total</td>
<td>22728 (87.5)</td>
<td>3252.5 (12.5)</td>
<td>25980.5 (100)</td>
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</table>

a: Chronic obstructive pulmonary disease
<table>
<thead>
<tr>
<th>Cause of death</th>
<th>Men</th>
<th>Women</th>
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<th>Women</th>
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<tr>
<td></td>
<td>35–64</td>
<td>&gt; 64</td>
<td>Total</td>
<td>35–64</td>
<td>&gt; 64</td>
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<tr>
<td>Neoplasms</td>
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<td></td>
</tr>
<tr>
<td>Trachea, lung, bronchus</td>
<td>0.94 (0.83–1.05)</td>
<td>1.06 (0.97–1.16)</td>
<td>1.01 (0.94–1.09)</td>
<td>1.51 (1.01–2.27)*</td>
<td>0.80 (0.52–1.21)</td>
</tr>
<tr>
<td>Other neoplasms</td>
<td>0.91 (0.77–1.06)</td>
<td>0.88 (0.77–1.01)</td>
<td>0.89 (0.81–0.99)</td>
<td>1.86 (1.11–3.19)*</td>
<td>0.56 (0.31–1.02)</td>
</tr>
<tr>
<td>Total</td>
<td>0.93 (0.84–1.02)</td>
<td>1.00 (0.93–1.08)*</td>
<td>0.97 (0.92–1.03)</td>
<td>1.65 (1.19–2.27)*</td>
<td>0.71 (0.50–1.00)</td>
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<td>Cardiovascular diseases</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>0.82 (0.69–0.96)*</td>
<td>0.98 (0.85–1.14)</td>
<td>0.91 (0.81–1.01)</td>
<td>1.00 (0.56–1.78)</td>
<td>0.69 (0.43–1.11)</td>
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<tr>
<td>Cerebrovascular disease</td>
<td>0.74 (0.57–0.97)*</td>
<td>0.80 (0.68–0.94)*</td>
<td>0.78 (0.68–0.90)*</td>
<td>1.23 (0.77–1.97)</td>
<td>0.40 (0.23–0.69)*</td>
</tr>
<tr>
<td>Other cardiovascular diseases</td>
<td>0.81 (0.66–0.99)</td>
<td>0.74 (0.66–0.83)*</td>
<td>0.76 (0.68–0.83)*</td>
<td>1.34 (0.77–2.32)</td>
<td>0.63 (0.46–0.85)*</td>
</tr>
<tr>
<td>Total</td>
<td>0.80 (0.71–0.90)*</td>
<td>0.82 (0.75–0.88)*</td>
<td>0.81 (0.76–0.86)*</td>
<td>1.19 (0.88–1.61)</td>
<td>0.59 (0.46–0.74)*</td>
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<tr>
<td>Respiratory diseases</td>
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</tr>
<tr>
<td>COPD</td>
<td>1.01 (0.73–1.40)</td>
<td>1.39 (1.29–1.55)*</td>
<td>1.35 (1.22–1.50)*</td>
<td>1.01 (0.74–1.29)</td>
<td>1.13 (0.82–1.52)</td>
</tr>
<tr>
<td>Other respiratory diseases</td>
<td>0.43 (0.27–0.71)*</td>
<td>0.88 (0.71–1.08)</td>
<td>0.78 (0.65–0.95)*</td>
<td>1.01 (0.25–4.04)</td>
<td>0.41 (0.23–0.74)*</td>
</tr>
<tr>
<td>Total</td>
<td>0.77 (0.59–1.00)</td>
<td>1.26 (1.15–1.39)*</td>
<td>1.19 (1.09–1.31)*</td>
<td>2.35 (0.97–5.71)</td>
<td>0.82 (0.63–1.08)</td>
</tr>
<tr>
<td>Total</td>
<td>0.87 (0.81–0.93)*</td>
<td>0.98 (0.94–1.03)</td>
<td>0.94 (0.91–0.98)*</td>
<td>1.44 (1.16–1.78)*</td>
<td>0.68 (0.58–0.79)*</td>
</tr>
</tbody>
</table>

a: p < 0.05
b: Chronic obstructive pulmonary disease
c: Insufficient number of cases
Numbers in parentheses: 95% confidence interval
between 35 and 64 years of age and reduced above this age (table 3).

With reference to cause-specific attributable mortality, in males, SAM for neoplasm and lung cancer remained stable. Cardiovascular diseases declined by 19% (CI: 14–24). This change affects in a similar way all cardiovascular diseases analysed and the two age groups studied. For respiratory diseases, there was an increase of 19% (CI: 9–31); this rise is a consequence of the important increase in mortality from COPD suffered in those older than 64 years (35% (CI: 50–78)), with no changes in the younger group.

In women the trend is in opposite directions in the two age groups studied. In those older than 64 years, the total attributable mortality reduced by 32% (CI: 21–42) as a consequence of the drop in all the causes studied, and fundamentally of cardiovascular cases (59% (CI: 36–64)). In women aged between 35 and 64 years the attributable mortality increased by 44% (CI: 16–72). Malignant tumours increased, while cardiovascular and respiratory diseases remained stable. Lung cancer increased by 51% (CI: 0.1–127) while ischemic heart disease and cerebrovascular disease remained stable.

The smoking attributable YPLL to cigarettes adjusted by age dropped by 9% (CI: 7–11). This drop is mainly due to the fall of 14% (CI: 12–15) in the YPLL in men. Nevertheless, there is an increase of 42% (CI: 35–50) in women, reflecting the previously commented increases in smoking rates of the youngest age group.

**Discussion**

Tobacco was responsible for 15.9% of mortality in the population older than 34 years of the Community of Madrid in 1998. This estimate is similar to those obtained in other studies carried out in Spain in recent years. 20–22

One in four deaths in men and one in 36 in women are attributable to cigarette smoking. The estimate for men is comparable to that for Spain20,21 and Cataluña.24 For women the attributable mortality is similar to studies that stratify into at least two age groups22,23 but smaller than that estimated through an alternative methodology.22–23

With reference to studies in other countries (UK,26 the European Union,26 USA, and Canada27–29) there are differences in smoking attributable mortality mainly for women, their estimates being higher than ours. This is mostly due to the delay in development of the smoking epidemic in Spanish women with respect to women in other European countries and North America previously noted.4,6,9,9

With regard to the changes in SAM in 1998 from 1992, the downward trend of the adjusted rate in men is similar to that described by different authors for Spain20 and other European countries, including the UK, Denmark, Norway and Italy27 and it is mainly a consequence of the drop in smoking prevalence and the decline in mortality from cardiovascular diseases. In women, the decrease is a consequence of the reduced smoking rate in the older age group, while there is an increase of 44% in the age group between 35 and 64 years.

The decline in smoking attributable mortality in women older than 64 should be interpreted with caution. The low smoking prevalence in this group, together with the resulting sample size of the National Health Survey for this age group at the Community of Madrid level, results in great uncertainty in the estimate of the prevalence rate. For the Community of Madrid the smoking prevalence in 1987 was 4.5% (CI: 1.8–9.9) and in 1993 was 2.3% (CI: 1.5–6.1). In fact, at the national level, the estimate remains stable between the two years studied. In spite of this, and given the important differences in exposure by age category (2.3% in older than 64 vs. 24.6% in the group between 35 and 64 years in 1993), it is necessary to stratify since using average estimates of smoking prevalence for all the age groups will result in an important overestimation of smoking attributable mortality.

From the Public Health point of view, the increase of SAM in women younger than 65 years, with an increase in the adjusted YPLL of 42%, is the most outstanding result of the present study.

With regard to the evolution of the main causes of death, the attributable mortality for cardiovascular diseases decreased both in men and women, in accordance with other studies at the national and international level.20,21,24,28,31 This trend is related to the decline in mortality for these diseases and in particular to the decrease in the mortality for ischemic heart disease and cerebrovascular diseases, in the region.32,33 In both diseases, the causes of the decrease are a consequence of a decline in the incidence, conditioned by a better control of their risk factors, e.g. hypertension, hypercholesterolemia, etc., and the improvements in medical interventions that have resulted in an increased survival rate. There is much debate regarding the proportion that each one of these measures contributes to the decrease of mortality for these pathologies.34–36 It is equally difficult to interpret the role that cigarette smoking has in these changes, given its complex interrelations with the multiple risk factors that intervene in the genesis of this group of diseases.2

The attributable mortality for lung cancer in men remains stable and there is an important increase in the mortality for COPD. There are the two causes of death most closely bound to cigarette smoking. As a consequence of the long latency period and the slow decline of risk in former smokers27–40 they reflect the consequences of cigarette smoking prevalence in the two or three previous decades. Our estimates do not yet reflect, for these pathologies, the decrease in smoking prevalence in men. In the UK the decline in smoking prevalence began in the 1950s, while the rate of lung cancer in males did not begin to decrease until the beginning of the 1970s, although the rates were still high.30 Similar delays between decreases in smoking and declines in the rates of lung cancer mortality have been described for other northern and western European countries and the USA.31,38

In women, the increase in smoking prevalence in recent years1 has resulted in an important increase in mortality from lung cancer, which was the primary cause of SAM in the year 1998. This increase has been described previously in Spain,22,23 although this is the first study in Spain in which the highest percentage of attributable mortality in women is due to lung cancer. Lung cancer was the primary cause in women in the USA in 199027,28 and in Canada in 1991.21,22 In countries where the epidemic developed more than 20 years earlier than in Spain, the rates of lung cancer in women, initially similar to our actual rates (8/100000), reached mortality rates between 35.9 (UK) and 40 (USA) per 100000 have begin to stabilize recently.30,42

In contrast with what has happened with cardiovascular diseases, smoking has been consistently established as the main etiological factor for lung cancer and, in general, the contribution of risk factors other than tobacco smoke (such as asbestos, radon and ionising radiation and air pollution) to the number of cases of lung cancer in the general population is small.19,30,43 At the same time, no major treatment advances have occurred in recent decades that could have affected trends in lung cancer mortality by improvements in survival.35,44 This may explain the different change pattern in SAM for cardiovascular diseases and lung cancer in our region.

According to the epidemic pattern described by López et al.,2 the Community of Madrid is at this time in the third phase of the global epidemic, in which a rise in lung cancer begins to develop in women. Therefore, if we follow the same evolution described by Lopez et al., the prospective impact will be enormous in the short and medium term if no measures are taken.
The discussion on the general aspects of this type of study, reported in previous work\(^4,44–46\), focuses, on the one hand, on the appropriateness or not, of applying relative risks estimated in prospective studies in USA (CPS-II) to other populations (Community of Madrid), since possible differences in important aspects of the smoking pattern (such as the length of time exposure, quantity and cigarette type and the lapsed time since former smokers abandoned the habit) are not taken into account. For most of the causes of death considered, we do not know of risk estimates that could be considered more representative for our region. Therefore, it was decided to use the estimates of CPS-II as it is the largest prospective study published.

This could result in an overestimation, mainly for women, since North American women, as we have previously discussed, had been exposed for a longer time and to a higher level of smoking. This would not affect the changes described between 1992 and 1998.

On the other hand, the method does not take into account other variables associated with cigarette smoking and with mortality, such as educational and socio-economic level.\(^46,47\) There may be differences in this respect between the population studied and the population included in CPS-II, but it is difficult to value the effect in our estimates. Studies carried out in the USA on the effect of the control of these variables in attributable mortality, resulted in an overestimation of only 1%–2.5%.\(^44,46\)

Of other possible factors that we should have taken into account for their interaction with risk of tobacco and with possible exposure differences among both populations, the most important would be asbestos for lung cancer and alcohol intake for some types of cancer. We cannot value the role of asbestos since we have no exposure data. As for alcohol intake, it is well established that tobacco and alcohol interact synergistically and have a multiplicative effect on risk of cancer of the oral cavity, pharynx, larynx and oesophagus.\(^49,50\) As alcohol intake has always been high in the Spanish population\(^51\) it is probable that applying CPS II risks in our population results in an underestimation of the tobacco impact on these cancer sites.

Our estimates are conservative in other ways. We have not taken into account deaths before age 35 and external causes of death (including fires and accidents) even though some of these deaths are due to smoking. There is also recent evidence on the causal relationship between smoking and other cancers not considered here\(^52\) (stomach and liver cancer and myeloid leukaemia). Moreover, only the underlying cause of death has been selected as cause of death and contributory causes have not been taken into account, which will also result in an under-estimation of smoking attributable mortality.\(^53\)

Conclusions

Every year 5000 deaths in males in Madrid are attributable to cigarette smoking; 92.6% of the deaths from lung cancer in men, and 75.0% in women are due to smoking. Lung cancer is the primary cause of death among men 35–64 years old in our community and the primary cause of smoking attributable deaths in women 35–64 years old. In the period 1992–1998 smoking attributable deaths tend to stabilize in men, while it suffered an important increase in women aged 35 and 64 years. These results describe the importance that cigarette smoking has in the mortality of the population of the Community of Madrid. This is only a part of the consequences of smoking in the health of the population. To have a complete view of its impact it would be necessary to carry out other studies on the morbidity, disability and costs that this habit generates in the population.

References

27. Centers for Diseases Control and Prevention. Cigarette-smoking-attributable...


