

## Multicenter Case-Control Study of Exposure to Environmental Tobacco Smoke and Lung Cancer in Europe

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**Background:** An association between exposure to environmental tobacco smoke (ETS) and lung cancer risk has been suggested. To evaluate this possible association better, researchers need more precise estimates of risk, the relative contribution of different sources of ETS, and the effect of ETS exposure on different histologic types of lung cancer. To address these issues, we have conducted a case-control study of lung cancer and exposure to ETS in 12 centers from seven European countries. **Methods:** A total of 650 patients with lung cancer and 1542 control subjects up to 74 years of age were interviewed about exposure to ETS. Neither case subjects nor control subjects had smoked more than 400 cigarettes in their lifetime. **Results:** ETS exposure during childhood was not associated with an increased risk of lung cancer (odds ratio [OR] for ever exposure = 0.78; 95% confidence interval [CI] = 0.64–0.96). The OR for ever exposure to spousal ETS was **1.16 (95% CI = 0.93–1.44)**. **No clear dose-response relationship could be demonstrated for cumulative spousal ETS exposure.**

**The OR for ever exposure to workplace ETS was 1.17 (95% CI = 0.94–1.45), with possible evidence of increasing risk for increasing duration of exposure. No increase in risk was detected in subjects whose exposure to spousal or workplace ETS ended more than 15 years earlier. Ever exposure to ETS from other sources was not associated with lung cancer risk. Risks from combined exposure to spousal and workplace ETS were higher for squamous cell carcinoma and small-cell carcinoma than for adenocarcinoma, but the differences were not statistically significant.**

**Conclusions:** Our results indicate no association between childhood exposure to ETS and lung cancer risk. We did find weak evidence of a dose-response relationship between risk of lung cancer and exposure to spousal and workplace ETS. There was no detectable risk after cessation of exposure. [J Natl Cancer Inst 1998;90:1440–50] **During the last 15 years, epidemiologic studies have been conducted on the association between exposure to environmental tobacco smoke (ETS) and lung cancer.**

Several authors and regulatory agencies have concluded that a causal link has been established [e.g., *see (1–3)*], whereas some authors consider that bias and confounding factors constitute a plausible explanation for the observed association

**(Note: a relative risk of 1.16 is not proof of anything. It must be 2.0 or more, the equivalent of a 200 % increase in risk. This study shows less than 20% increase in risk, not valid in an uncontrolled population study.)**

[e.g., *see (4)*]. **The available studies are—in most cases—too small to adequately assess the magnitude of the effect and to address specific aspects, such as the shape of the dose–response relationship, the effect of cessation of exposure, the importance of multiple sources of ETS exposure, and the interaction of ETS exposure with other risk factors of lung cancer. Furthermore, relatively few studies of such ex-posture are available from Europe (5–10). Characteristic of to-bacco smoking in European countries are the mixed consumption of blond and black tobacco cigarettes (11) and the low prevalence—at least in the past—of smoking among women compared with men (12).**

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