ETIOLOGY

Meta-analysis: Environmental tobacco smoke increases childhood morbidity and mortality


Objective

To evaluate the effect of adult tobacco use (environmental tobacco smoke [ETS]) on the health of children.

Data sources

A literature search was used to identify English-language studies done from 1966 to 1994 on the association between pediatric diseases and ETS.

Study selection

Case-control and cohort studies were selected if sufficient data were included to construct 2x2 contingency tables for ETS exposure and disease status. Diseases and conditions included otitis media; tympanostomy; adenoidectomy; asthma; coughs; lower respiratory tract illness (disease, hospitalisations, and deaths); and fires caused by smoking materials.

Data extraction

Data were extracted on study design, ETS exposure, disease, and number and ages of children studied. For each disease, pooled relative risks (RRs) were calculated for cohort studies, and pooled odds ratios (ORs) were calculated for case-control studies. The proportion of cases that were attributable to ETS exposure was calculated, and estimates were made of the actual number of cases per year in the United States that were attributable to ETS.

Main results

All evaluated diseases and conditions were associated with ETS. Middle-ear disease had an RR of 1.19 (95% CI 1.05 to 1.35) (4 cohort studies) and an OR of 1.58 (CI 1.11 to 2.24) (7 case-control studies); an estimated 354,000 to 2.2 million attributable cases/y occurred. Tympanostomy had an OR of 1.38 (CI 1.02 to 1.85) (4 case-control studies); an estimated 5200 to 165,000 attributable cases/y occurred. Tonsillectomy or adenoidectomy or both had an RR of 1.60 (1 cohort study); an estimated 14,000 to 21,000 attributable cases/y occurred. Asthma had an RR of 1.43 (CI 1.31 to 1.56) (14 cohort studies) and an OR of 1.46 (CI 1.14 to 1.85) (3 case-control studies); an estimated 307,000 to 522,000 attributable cases/y occurred. Cough had an RR of 1.36 (CI 1.26 to 1.46) (6 cohort studies); an estimated 1.3 to 2 million attributable cases/y occurred. Lower respir-atory tract infection in children <5 years old had an RR of 1.46 (CI 1.33 to 1.60) (9 cohort studies) and an OR of 2.50 (CI 1.86 to 3.36) (6 case-control studies); an estimated 375,000 to 626,000 attributable cases/y occurred. Hospitalisation from lower respiratory infection in young children had an RR of 1.55 (CI 1.41 to 1.71) (6 cohort studies) and an OR of 2.41 (CI 1.75 to 3.30) (5 case-control studies); an estimated 136 to 212 attributable deaths/y occurred. An estimated 148 deaths were attributable to fire caused by smoking materials.

Conclusion

The use of tobacco products by adults (environmental tobacco smoke) increases childhood mortality and morbidity (otitis media; tympanostomy; tonsillectomy; adenoidectomy; asthma; coughs; lower respiratory tract illness [disease, hospitalisations, and deaths]; and fire-deaths caused by smoking materials).


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Commentary

Evidence-based policymaking is an important new direction in some jurisdictions of health care (1), and systematic reviews, such as this meta-analysis by DiFranza and Lew, are critical to this venture. Although systematic reviews of observational studies remain controversial (2, 3), several areas of health policy will never have evidence from randomised controlled trials. Smoking exposure and its effect on children is one such example. Despite the potential limitations of meta-analysis of observational studies, the evidence presented in this study is compelling because of the consistency of effect across different study designs (case-control and cohort), the number of diseases and conditions (e.g., upper and lower respiratory disease and fire-deaths); and the methods of ascertaining ETS exposure. DiFranza and Lew have presented evidence suggesting that second-hand smoke causes significant morbidity in children. The question then is, what can be done about this problem? Although community-based smoking cessation efforts may play a supporting role (4), taxation policy will likely have the leading role (5, 6). Legislation to force manufacturers to produce self-extinguishing or fire-safe cigarettes is also imperative. A nagging question remains in this debate: What do we do about parents who insist on smoking despite the obvious deleterious effects on their children’s respiratory health? Is this a subtle form of child abuse and neglect? What type of social policy could be drafted to address this important societal issue? It is hoped that this study will affect policymakers, because neglecting this issue means that more children will incur serious morbidity, and some will die.

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References

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