

Topic: Passive smoking

Title: Association of secondhand smoke exposure with pediatric invasive bacterial disease and bacterial carriage: a systematic review and meta-analysis.

Conclusion: Secondhand smoke exposure may be associated with invasive meningococcal disease among children.

Authors: Lee CC, Middaugh NA Howie SR Ezzati M.

Citation: PLoS medicine. 2010;7(12):e1000374

Abstract: BACKGROUND: A number of epidemiologic studies have observed an association between secondhand smoke (SHS) exposure and pediatric invasive bacterial disease (IBD) but the evidence has not been systematically reviewed. We carried out a systematic review and meta-analysis of SHS exposure and two outcomes, IBD and pharyngeal carriage of bacteria, for *Neisseria meningitidis* (*N. meningitidis*), *Haemophilus influenzae* type B (Hib), and *Streptococcus pneumoniae* (*S. pneumoniae*).

METHODS AND FINDINGS: Two independent reviewers searched Medline, EMBASE, and selected other databases, and screened articles for inclusion and exclusion criteria. We identified 30 case-control studies on SHS and IBD, and 12 cross-sectional studies on SHS and bacterial carriage. Weighted summary odd ratios (ORs) were calculated for each outcome and for studies with specific design and quality characteristics. Tests for heterogeneity and publication bias were performed. Compared with those unexposed to SHS, summary OR for SHS exposure was 2.02 (95% confidence interval [CI] 1.52-2.69) for invasive meningococcal disease, 1.21 (95% CI 0.69-2.14) for invasive pneumococcal disease, and 1.22 (95% CI 0.93-1.62) for invasive Hib disease. For pharyngeal carriage, summary OR was 1.68 (95% CI, 1.19-2.36) for *N. meningitidis*, 1.66 (95% CI 1.33-2.07) for *S. pneumoniae*, and 0.96 (95% CI 0.48-1.95) for Hib. The association between SHS exposure and invasive meningococcal and Hib diseases was consistent regardless of outcome definitions, age groups, study designs, and publication year. The effect estimates were larger in studies among children younger than 6 years of age for all three IBDs, and in studies with the more rigorous laboratory-confirmed diagnosis for invasive meningococcal disease

(summary OR 3.24; 95% CI 1.72-6.13).

CONCLUSIONS: When considered together with evidence from direct smoking and biological mechanisms, our systematic review and meta-analysis indicates that SHS exposure may be associated with invasive meningococcal disease. The epidemiologic evidence is currently insufficient to show an association between SHS and invasive Hib disease or pneumococcal disease. Because the burden of IBD is highest in developing countries where SHS is increasing, there is a need for high-quality studies to confirm these results, and for interventions to reduce exposure of children to SHS.

Policy Implications: children's exposure to secondhand smoke should be eliminated.

Keywords: tobacco, infection