Review: parental smoking increases risk of recurrent otitis media, middle ear effusion, and tonsillectomy or adenoidectomy in children


Question
Is parental smoking associated with acute and recurrent otitis media, middle ear effusion, and surgery for diseases of the ear, nose, and throat in children?

Data sources
Medline and Embase/Excerpta Medica were searched in April 1997 using the terms (or derivations of the terms) tobacco smoke pollution, passive, second-hand, second hand, involuntary, parent, maternal, mother, paternal, father, or household combined with the terms "smok," tobacco, or cigarette. The search was restricted to children according to textwords in the articles’ titles or abstracts. Bibliographies of relevant overviews or studies were also reviewed.

Study selection
The abstracts of articles that had keywords relating to respiratory or allergic disease were reviewed (n = 1593). From these, 99 papers were identified that included the textwords (or derivations of) “tympanom,” otitis, middle ear, glue ear, or tonsil. The 42 studies included in this review, 14 were cross sectional surveys.

Main results
45 papers relating to 42 studies were identified (13 studies on acute otitis media, 9 on recurrent otitis media, 5 on middle ear effusion, 9 on referrals for middle ear effusion, 4 on adenoidectomy or tonsillectomy, 1 on deafness, and 1 on postoperative natural history). Of the 42 studies included in this review, 12 were cross sectional surveys. This is a weak study design because the data related to parental smoking (exposure) and middle ear disease (outcome) are collected at the same time making it difficult to establish causality. The analysis might have been strengthened by eliminating these studies. Despite the variations in research designs, the analysis shows consistent results that link environmental tobacco exposure to pediatric middle ear conditions. There is limited research on the long term effects of middle ear problems. This is consistent with a previous meta-analysis, if either parent smoked, children had an increased risk of recurrent otitis media, middle ear effusion (based on tympanometry or otoscopy), and adenoidectomy or tonsillectomy (table). They were not at increased risk for referral or surgical intervention for middle ear effusion (table). 1 small study of 87 infants reported that infants who were passively exposed to cigarette smoke were more likely to show signs of hearing loss (p < 0.05).

Conclusion
The children of parents who smoke are at increased risk of recurrent otitis media, middle ear effusion, and adenoidectomy or tonsillectomy.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Number of studies</th>
<th>Pooled OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent otitis media</td>
<td>7 (4 cohort, 2 case control, 1 survey)</td>
<td>1.48*</td>
<td>1.08 to 2.04</td>
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<tr>
<td>Middle ear effusion</td>
<td>4 (3 cohort, 1 survey)</td>
<td>1.38</td>
<td>1.23 to 1.55</td>
</tr>
<tr>
<td>Adenoidectomy and tonsillectomy</td>
<td>4 (2 case control, 2 surveys)</td>
<td>2.07*</td>
<td>1.82 to 2.35</td>
</tr>
<tr>
<td>Outpatient referral</td>
<td>7 (1 cohort, 6 case control)</td>
<td>1.21†</td>
<td>0.95 to 1.53</td>
</tr>
</tbody>
</table>

*Based on a random effects model. All other ORs based on a fixed effects model. †Not significant.

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Commentary
There are increasing public health concerns about the effects of passive tobacco smoke exposure. The meta-analysis by Strachan and Cook clearly confirms the effect of environmental tobacco exposure on young children’s risk of developing middle ear problems. This is consistent with previous meta-analysis which concluded that use of tobacco products by adults increases childhood mortality and morbidity.

The authors chose to include only published studies in their review. This exclusion could affect the conclusions of the review because of the potential for “publication bias” (ie, studies that are published are more likely to report statistically significant findings than are studies that are not accepted or submitted for publication). Of the 42 studies included in this review, only 12 were cross sectional surveys. This is a weak study design because the data related to parental smoking (exposure) and middle ear disease (outcome) are collected at the same time making it difficult to establish causality. The analysis might have been strengthened by eliminating these studies. The conclusion of the study is that parental smoking increases risk of recurrent otitis media, middle ear effusion, and adenoidectomy or tonsillectomy.

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