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## Q / How does smoking in the home affect children with asthma?

### EVIDENCE-BASED ANSWER

**A** / CHILDREN WITH ASTHMA who are exposed to smoking in the home are likely to have more severe asthma symptoms, more asthma-related doctor visits (strength of recommendation

[SOR]: **B**, a preponderance of evidence from heterogeneous cohort studies), and a poorer response to asthma therapy (SOR: **B**, 1 small cohort study) than unexposed children.

### Evidence summary

A systematic review from the US Surgeon General's office of studies addressing the relationship between secondhand smoke exposure and asthma severity in children from 0 to 18 years of age found that children with asthma who were exposed to secondhand smoke had "greater disease severity" than unexposed children.<sup>1</sup> The studies—including 8 prospective and retrospective cohort studies (N=6095), one case-control study (N=149), and 11 uncontrolled case series (N=2932)—were performed in the United States, Canada, the United Kingdom, Sweden, Singapore, South Africa, Kenya, and Nigeria.

Investigators found a significant worsening of asthma caused by secondhand smoke in 6 of 11 clinic-based studies and 2 of 9 population-based studies. Children with asthma who were exposed to secondhand smoke had more doctor visits, more frequent flares, and higher disease severity scores than children who weren't exposed. Heterogeneity among the studies prevented a meta-analysis of data on severity of asthma.

### Where there's smoke, there are worse health outcomes

Three of 4 subsequent cohort studies found poorer health outcomes among children with asthma who were exposed to smoking than children who weren't. The first study, of 523

children 4 to 16 years of age with physician-diagnosed asthma, correlated smoke exposure, as indicated by serum cotinine levels, with pulmonary function tests and clinical outcomes.<sup>2</sup> Children with high serum cotinine levels (>0.63 mg/mL) were more likely to have asthma symptoms monthly or more often, as reported by the family (adjusted odds ratio [OR]=2.7; 95% confidence interval [CI], 1.1-6.5), than children with low cotinine levels (<0.116 ng/mL). High cotinine levels weren't associated with significant changes in forced expiratory volume in one second, decreased school attendance, or increased physician visits.

Another study of 438 children ages 2 to 12 years with physician-diagnosed asthma and at least one parent who smoked, correlated salivary cotinine levels with the likelihood of contacting a physician for asthma symptoms.<sup>3</sup> Children with high salivary cotinine levels (>4.5 ng/mL) had higher asthma-related physician contact rates than children with low cotinine levels (≤2 ng/mL) (incidence rate ratio=1.2; 95% CI, 1.1-1.4).

A third study evaluated asthma treatment response in 167 children from families throughout France who were 6 to 12 years of age and recently diagnosed with mild or moderate persistent asthma.<sup>4</sup> Investigators performed pulmonary function tests and collected data on symptoms every 4 months for 3 years. Children

who lived with someone who smoked were less likely to have controlled asthma symptoms (OR=0.34; 95% CI, 0.13–0.91).

The fourth study, of 126 urban children ages 6 to 12 years with physician-diagnosed asthma and in-home smoke exposure, correlated urinary cotinine levels and rates of clinical illness. It found no significant differences in parent-reported illness between children with higher urinary cotinine levels and children with lower levels.<sup>5</sup>

## Recommendations

The National Asthma Education and Prevention Program Expert Panel recommends that physicians ask patients about their smoking status and refer adults who have children with asthma to smoking cessation programs.<sup>6</sup> The panel further recommends that clinicians advise people with asthma to avoid smoking and limit exposure to environmental tobacco smoke.

JFP

### References

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