

## Effects of Tobacco Smoke Exposure on Asthma Prevalence and Medical Care Use in North Carolina Middle School Children

CHAPEL HILL -- One of the largest surveys ever done among North Carolina school children shows that those who sometimes smoke or are exposed to tobacco smoke at home or elsewhere suffer more asthma than their classmates.

The massive University of North Carolina at Chapel Hill survey showed that childhood smoking and exposure to environmental tobacco smoke -- "passive smoking" -- were responsible for about 15 percent of asthma cases in the youngsters surveyed and resulted in an estimated \$1.34 million in excess medical costs.

A report on the findings appears in the February issue of the American Journal of Public Health. Authors are Drs. Jesse J. Sturm, who earned his master's degree at the UNC School of Public Health in 2003 and now is a pediatrics resident at Johns Hopkins Hospital, and Karin Yeatts and Dana Loomis, research assistant professor and professor of epidemiology at UNC, respectively.

"Asthma is the most common chronic childhood illness," Sturm said. "The incidence of asthma among 4- to 15-year-olds increased 74 percent between 1980 and 1994. Similar increases have been reported worldwide with no clear cause, despite extensive research."

While environmental tobacco smoke is known to be a risk factor for asthma, along with dust mites, cockroach droppings, pet dander, household molds and other allergens, researchers have paid little attention to cigarette smoking among school-age children, he said.

The physician and his UNC mentors surveyed 192,248 N.C. seventh- and eighth-graders participating in the N.C. School Asthma Survey during the 1999-2000 school year. Of eligible children, 128,568 in 99 N.C. counties returned the questionnaires for a 66.8 percent response rate.

Middle schoolers were asked if they had ever smoked and, if so, how many cigarettes they smoked over the past 30 days. They also were asked, among other things, how many people in their homes smoked, how many days in a month they smelled cigarette smoke and if they had ever been diagnosed with asthma or suffered wheezing or other symptoms portrayed in a short standardized videotape.

Controlling for numerous factors such as other allergies and having gas stoves at home, the researchers' analysis showed that more than 17 percent of the children reported wheezing symptoms, and almost 10 percent reported physician-diagnosed asthma. They found a strong correlation between estimated exposure to tobacco smoke and symptoms the children said they suffered. Significant separate associations were found between asthma symptoms and both childhood cigarette smoking and environmental tobacco smoke.

The correlation between children smoking and asthma had never been demonstrated before.

"Statewide, there are an estimated 2,659 cases of asthma attributable to environmental tobacco smoke and 198 cases attributable to current childhood cigarette use in the age group we examined," Sturm said.

Those numbers correspond to 15 percent of overall, active asthma cases among the state's seventh- and eighth-graders, he said. Since the annual cost of treating a single active asthma case in North Carolina in that age group is \$471 (in 2001 dollars), parents and others spend \$1.34 million a year to provide care for the excess asthma cases resulting from tobacco exposures.

"From a public health standpoint, given the total morbidity burden of asthma among children, concerted smoking prevention and cessation strategies aimed at parents, women of childbearing age and children are vital," the study authors wrote. "Not only do sources of environmental tobacco smoke have to be reduced, but prevention of cigarette smoking by children must be targeted as well.

"Health professionals, public health experts, parents and children must understand that any exposure to tobacco smoke should be considered a risk factor for asthmatic symptoms," they wrote. "Tobacco control efforts that promote maintenance of a smoke-free lifestyle among children of all ages must continue to be implemented and improved."

Partial funding for the project came from the N.C. Tobacco Prevention and Control Board. The N.C. Department of Health and Human Services' public health division supported the UNC research through a grant from its women and children's health section.

Strengths of the research were its large size and high response rate, its population-based rather than clinic-based sample and an internationally standardized and validated survey, Yeatts said.

A possible limitation was that the information used was self-reported by adolescents, a small percentage of whom might have mistaken colds and related symptoms for asthma or exaggerated them, she said. That possibility was reduced since researchers played for their subjects the videotape specially produced for the International Study of Asthma and Allergies in Childhood.

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