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Home exposure to tobacco carcinogens high in children of smokers

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Ninety percent of children who lived in a house where an adult smoked had evidence of tobacco-related carcinogens in their urine, according to research presented at the Ninth AACR Frontiers in Cancer Prevention Research Conference, held here from Nov 7-10, 2010.

The average amount of tobacco metabolites in children aged one month to 10 years old was 8 percent of what is found in a smoker, said the lead researcher Janet L. Thomas, Ph.D., assistant professor of behavioral medicine at the University of Minnesota.

"This finding is striking, because while all of the researchers involved in this study expected some level of exposure to carcinogens, the average levels were higher than what we anticipated," she said. For comparison, carcinogens found in the urine of adult non-smokers exposed to secondhand smoke are about 1 percent to 5 percent that of smokers.

"No one knows the long-term impact of cumulative exposure to these chemicals. It could prime the body in some way that leads to DNA changes in cells that might contribute to lung damage, and potentially lung cancer," Thomas said.

The researchers also found a direct correlation between the number of cigarettes one or more adults smoked in the house each day and tobacco metabolites in the children who lived there. There was also an association between childhood exposure to secondhand smoke and lower socioeconomic status, employment and parental education.

Additionally, black children had the highest levels of tobacco-related metabolites in their urine, even if their parent or parents smoked comparatively less.

"This suggests, as other researchers have found, that African-Americans metabolize tobacco-related chemicals differently," she said.

The researchers conducted this study to quantify tobacco-related carcinogens in children, with the hope that the children's parents might be open to banning smoking inside the home.

"Almost one third of young children in the United States live in a house with at least one smoker," Thomas said. "My concern is that parents and family members may not truly understand the risk they pose to these children."

The researchers took urine samples from 79 children who lived in a home where at least one parent smoked. They quantified total NNAL (a biomarker of NNK, which is a nitrosamine produced during tobacco curing and is a known carcinogen), as well as nicotine and cotinine, a metabolite of nicotine that stays longer in the body.

Ninety percent of the children had detectable levels of NNAL and nicotine in their urine; 95 percent had evidence of cotinine.

In addition, the researchers measured carbon monoxide levels in parents and asked about the number of cigarettes smoked per day and smoking restrictions in the home. NNAL levels were significantly lower in homes that had complete smoking restrictions and there was a correlation between cigarettes smoked per day and NNAL in their children.

"Based on these results, there is little doubt that total NNAL in the urine of children could be substantially reduced by home smoking

restrictions," said Thomas. "We need to act now to ensure that all parents have the facts they need to make informed decisions to protect their families from this completely preventable health hazard."

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