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Third-hand Smoke: Another Reason to Quit Smoking
Adults who recognize dangers of third-hand smoke more likely to ban smoking at home

BOSTON – Need another reason to add “Quit Smoking” to your New Year’s resolutions list? How about the fact that even if you choose to smoke outside of your home or only smoke in your home when your children are not there – thinking that you’re keeping them away from second-hand smoke – you’re still exposing them to toxins? In the January issue of *Pediatrics*, researchers at MassGeneral Hospital for Children (MGHfC) and colleagues across the country describe how tobacco smoke contamination lingers even after a cigarette is extinguished – a phenomenon they define as “third-hand” smoke. Their study is the first to examine adult attitudes about the health risks to children of third-hand smoke and how those beliefs may relate to rules about smoking in their homes.

“When you smoke – anyplace – toxic particulate matter from tobacco smoke gets into your hair and clothing,” says lead study author, Jonathan Winickoff, MD, MPH, assistant director of the MGHfC Center for Child and Adolescent Health Policy. “When you come into contact with your baby, even if you’re not smoking at the time, she comes in contact with those toxins. And if you breastfeed, the toxins will transfer to your baby in your breastmilk.” Winickoff notes that nursing a baby if you’re a smoker is still preferable to bottle-feeding, however.

Particulate matter from tobacco smoke has been proven toxic. According to the National Toxicology Program, these 250 poisonous gases, chemicals, and metals include hydrogen cyanide, carbon monoxide, butane, ammonia, toluene (found in paint thinners), arsenic, lead, chromium (used to make steel), cadmium (used to make batteries), and polonium-210 (highly radioactive carcinogen). Eleven of the compounds are classified as Group 1 carcinogens, the most dangerous.

Small children are especially susceptible to third-hand smoke exposure because they can inhale near, crawl and play on, or touch and mouth contaminated surfaces. Third-hand smoke can remain indoors even long after the smoking has stopped. Similar to low-level lead exposure, low levels of tobacco particulates have been associated with cognitive deficits among children, and the higher the exposure level, the lower the reading score. These findings underscore the possibility that even extremely low levels of these compounds may be neurotoxic and, according to the researchers, justify restricting all smoking in indoor areas inhabited by children.

“The dangers of third-hand smoke are very real,” says Winickoff, who is a professor of Pediatrics at Harvard Medical School and a member of the American Academy of Pediatrics’ Richmond Center. “Our goal was to find out if people who were aware of these harmful effects were less likely to smoke inside of their home.”

Winickoff’s team found that this was the case. In a survey of more than 1,500 households, 95.4 percent of nonsmokers versus 84.1 percent of smokers agreed that second-hand smoke harms the health of children, and 65.2 percent of nonsmokers versus 43.3 percent of smokers believed that third-hand smoke harms children. Strict rules prohibiting smoke in the home were more prevalent among nonsmokers – 88.4 percent versus 26.7 percent – but among both smokers and non-smokers, participants who agreed that environmental smoke was harmful to children’s health were more likely to have restrictions on smoking in their homes.

Winickoff’s study shows that increasing awareness of how third-hand smoke harms the health of children may encourage home smoking bans. It also will be important to incorporate knowledge about third-hand smoke contamination into current tobacco control campaigns, programs, and routine clinical practice.

For more information on increasing awareness of the hazards of second- and third-hand smoke to prevent smoking and encourage smoking bans in the home, visit www.ceasetobacco.org, a website founded by Winickoff.

Co-authors of the *Pediatrics* article are Joan Friebely, EdD, and Cheryl Sherrod, MGH/C Center for Child and Adolescent Health Policy; Susanne Tanski, MD, Dartmouth Medical School; Georg Matt, PhD, and Melbourne Hovel, PhD, MPH, San Diego State University; and Robert McMillen, PhD, Mississippi State University. Support for the study includes grants from the Flight Attendant Medical Research Institute and the National Cancer Institute.

Massachusetts General Hospital, established in 1811, is the original and largest teaching hospital of Harvard Medical School. The MGH conducts the largest hospital-based research program in the United States, with an annual research budget of more than \$500 million and major research centers in AIDS, cardiovascular research, cancer, computational and integrative biology, cutaneous biology, human genetics, medical imaging, neurodegenerative disorders, regenerative medicine, systems biology, transplantation biology and photomedicine. MGH and Brigham and Women's Hospital are founding members of Partners HealthCare HealthCare System, a Boston-based integrated health care delivery system.

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