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Smoke-free building policies cut indoor exposure: study

Thu, Sep 04 13:56 PM EDT

By Janice Neumann

NEW YORK (Reuters Health) – Apartment dwellers who don't smoke still can't escape second-hand smoke completely, but in smoke-free buildings exposure to the tiny particles in cigarette smoke may be cut by half or more, according to a new study.

Researchers in Boston monitored indoor air at public housing projects transitioning to a smoke-free policy and tracked tobacco smoke as it traveled to adjacent apartments and down common hallways.

"If people ever make an attempt at smoke-free housing, this is sort of the perfect environment to do so," Dr. Elizabeth Russo, lead author of the study, told Reuters Health in a phone interview. "There's just higher asthma rates and (rates of) other health conditions in public housing than non-public housing.

"An argument can be made that smoke-free buildings are protective of these residents, who are even more vulnerable," said Russo, a medical scientist at the Boston Public Health Commission.

Past research has shown many of the tiny particles in secondhand smoke to be toxic. Levels of those particles also average three times higher in homes with smoking than without. But smoke can also travel to nonsmokers' homes through vents or cracks in the walls, and down common hallways.

Exposure to secondhand smoke can exacerbate health problems like asthma, high blood pressure and diabetes, Russo and her coauthors note in the journal Nicotine & Tobacco.

To measure the potential benefit of making residential buildings

smoke-free, the study team measured secondhand smoke in five Boston Housing Authority buildings, ranging from small, low-rise buildings to high-rise towers, from August to December 2012, when a smoke-free policy was being implemented.

They included 32 apartments, 15 with resident smokers and 17 without, including some unoccupied apartments. Aerosol monitors were placed in the apartments for 72 hours to measure concentrations of tiny particles known as PM 2.5 because they are 2.5 microns and smaller, or about a fifth the size of visible dust. Monitors were also placed outside the buildings and in common areas like hallways.

PM 2.5 particles are usually the product of combustion and are found in outdoor air pollution from vehicle exhaust, power plants and wild fires. Indoors, cooking and wood fires, as well as smoking are major contributors.

The U.S. Environmental Protection Agency safe exposure limit for PM 2.5 particles outdoors is an average of 12 micrograms, or 12 millionths of a gram, per cubic meter of air over a 24-hour period. The World Health Organization puts the limit at 20 micrograms.

Overall, the researchers found that apartments in buildings that allowed smoking had a median PM 2.5 concentration of 8.1 micrograms versus 4.8 micrograms in smoke-free buildings. When they compared smokers' apartments to those of non-smokers, they found an overall median level of 14.3 micrograms versus 7 micrograms.

Participants in the study who smoked agreed to log when they lit up and during periods when smoking was taking place in a smoker's apartment, PM 2.5 levels soared to concentrations as high as 230 micrograms in the apartment, with a median of 29.6. During non-smoking periods in the smokers' apartments, median concentrations were 9.2 micrograms.

When researchers looked at adjacent apartments belonging to nonsmokers, they found similar patterns of rise and fall in PM 2.5 levels, with median concentrations of 5.9 micrograms when the neighbor was smoking and 3.3 micrograms when they were not.

Even hallways and apartments not adjacent to the home of a smoker showed small differences during the periods that resident smokers were lighting up. For example, in an apartment not adjacent to a smoker and that was inhabited by a nonsmoker or unoccupied, median PM 2.5 concentrations were 4.4 micrograms during “smoking hours” and 4.0 micrograms during nonsmoking hours.

“Some of it is obvious, but it’s nice to confirm what you suspect,” Russo said. “When it comes to policy work, you really need to be data-driven.”

Russo’s team also installed nicotine monitors to confirm that the particulates they were tracking were indeed coming from cigarette smoke, rather than some other source.

Outdoor PM 2.5 concentrations averaged 8.5 micrograms per cubic meter of air in the study.

Suzaynn Schick, an assistant professor at the University of California, San Francisco School of Medicine, said the current study showed that a person who lives in a building with smokers is exposed to more particulate matter and nicotine. She noted that the study uses a number of useful comparisons to test the secondhand smoke levels.

“It puts them at risk for a higher chance of heart attack and increased risk of asthma and these particles also contain carcinogens, so you’re also increasing your risk of cancer,” said Schick, who studies the toxins in cigarette smoke.

“It’s small increases . . . but with both particles and carcinogens, scientific research has shown there’s really no safe level of exposure,” she told Reuters Health.

Dr. David Warner, a pediatric anesthesiologist at Mayo Clinic in Rochester, Minnesota, who was not involved in the study, said the findings were impressive because they showed the effects of secondhand smoke in a real-life setting.

“I think it confirms what we suspected, but in an important real-world context, that there’s really no way to protect people in buildings from some level of secondhand smoke exposure without simply making those housing structures smoke-free,” said Warner, who studies lung function in children.

“This was done as part of a real implementation by the Boston Housing Authority of a policy so it can be viewed as the fact that the policy itself works,” he said.

Warner added that one of his main concerns is the harmful effects of smoking on kids.

“With increasing frequencies of asthma and allergies, kids who come from environments where they’re exposed to secondhand smoke have even a higher risk of surgical complications. They are from environments that can already be very challenging so to put this additional burden on them is just not right,” he said.

The researchers all pointed out that choices for nonsmokers are limited because they cannot always move out of buildings that allow smoking.

“I think it’s an excellent study and I think it has some important implications that I hope policy makers will take into account,” Warner said.

SOURCE: http://bit.ly/1r0w1pG Nicotine and Tobacco Research, online August 25, 2014.

http://mobile.reuters.com/article/idUSKBN0GZ2C820140904?irpc=932