

Smoking out sources of in-home air pollution

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An ambitious study led by San Diego State University researchers has investigated various factors that contribute to air pollution inside the house. Not surprisingly, cigarette smoke emerged as a major source of airborne particles in homes with smokers, but cleaning products, candles, frying food and marijuana smoking also jumped out as in-home air pollutants. The findings are especially relevant to families with children living in low-income households; these kids are at greater risk of health problems resulting from poor air quality.

"Our primary goal was to figure out what's happening in houses that leads to higher air particle levels and, in turn, to unhealthy environments for kids," said study coauthor John Bellettiere, a graduate student in the SDSU-UCSD Joint Doctoral Program in Public Health.

A research team led by SDSU environmental [health](#) scientist and lead author Neil Klepeis, behavioral health researcher and principal investigator Melbourne Hovell, and co-investigator Suzanne Hughes recruited into the study nearly 300 families living in San Diego with at least one child aged 14 and younger and one smoker. They installed a pair of air particle monitors in each of the homes, one in the area of the house closest to where smoking usually occurs and one in the child's bedroom.

The monitors continuously scan the air for fine particles between 0.5 and 2.5 micrometers in size—a range that includes dust, fungal spores, auto emissions and combustion byproducts. It's an important size range to human health, as these particles are of a size that can reach deep into the

lungs, where they can influence a variety of health complications including breathing and cardiovascular problems.

Over the course of three months, the monitors transmitted air quality data from the homes back to the researchers. On two occasions, the team conducted interviews to ask about what activities were occurring in the house at various times, such as cooking, cleaning and smoking. Finally, the scientists correlated the households' activities with their respective air quality monitor data and a clear picture emerged.

Homes that reported cigarette smoking indoors had a median particle level that was close to double that of homes without indoor smoking. These [particles](#) contain nicotine and combustion byproducts well known to be dangerous to people's health, especially children's. Interestingly, marijuana smoking contributed to in-home air pollution about as much as tobacco smoking—the first time such a finding has been reported. Finally, burning candles and incense, frying food in oil and spraying cleaning products also increased the number of [fine particles](#) in the air. The researchers reported their findings today in journal *PLOS ONE*.

"The aim of our research is, ultimately, to find effective ways to promote smoke-free homes and also to find good strategies, in general, for reducing exposure to household pollution," Klepeis said. "The findings from our work will allow for better education and feedback to families."

Bellettiere says the team will follow up on its marijuana findings to find out whether the elevated air pollution that results from [smoking](#) marijuana translates into increased exposure to [combustion byproducts](#) and cannabinoids in nonsmokers living in the house.

Klepeis added: "Our research team is continuing to develop novel monitoring devices and approaches that consumers can use to understand

their [air quality](#), and to explore ways that work for them and their families to reduce unhealthy pollutant exposures, especially for kids."

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