

# Secondhand smoke: Ventilation systems are not the answer, says new study

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By Lee Phillion

In a scientific study of secondhand smoke exposure in St. Louis bars and restaurants, researchers at Washington University in St. Louis found that ventilation systems and “voluntary” smoke-free policies do not protect employees and customers from exposure to nicotine in the air.

Exposure to secondhand smoke is an established cause of cancer, heart disease and serious lung ailments, according to the U.S. surgeon general.

Researchers from the Center for Tobacco Policy Research at Washington University’s George Warren Brown School of Social Work and at the Alvin J. Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine analyzed nicotine levels in randomly selected bars and restaurants in the City of St. Louis and St. Louis County, and in hair samples from employees of the monitored venues.

Ten bars and 10 restaurants participated in the study. Sixteen of the venues allowed smoking indoors, and four were smoke-free. Seventy-eight employees at the bars and restaurants provided hair samples and answered survey questions.

Passive sampling devices collected nicotine in each venue for seven working days during June, July and August 2009. The Johns Hopkins Bloomberg School of Public Health, which has expertise in this type of monitoring, analyzed the samples using gas chromatography with nitrogen-selective detection. Concentration of airborne nicotine was calculated by dividing the amount of nicotine collected by the sampling device by the effective volume of air sampled.

Since airborne nicotine can only come from cigarette smoke, it is a reliable, scientifically accepted marker for assessing secondhand smoke exposure. While concentrations do not directly translate to health risk, a finding of nicotine indicates the presence of a carcinogenic and toxic mixture.

Although none of the restaurant or bar venues in the study were below level of detection, median airborne nicotine levels were 31 times higher in venues where smoking is allowed, compared with those that are voluntarily smoke-free. And, not surprisingly, as the percentage of smoking clients rose, so did the nicotine concentrations.

An interesting finding was that ventilation systems, a topic of debate in St. Louis, were not only ineffective, but restaurants and bars that had them actually had higher nicotine concentrations in the air than restaurants that didn’t have them, but where the number of patrons who smoked was similar.

This confirms the U.S. surgeon general’s statement that “cleaning the air and ventilating buildings cannot eliminate exposures of nonsmokers to secondhand smoke.”

Hair nicotine was found in all bar and restaurant employees tested, both nonsmokers and smokers alike, although the concentration was higher for employees who smoke.

Employees in both smoke and smoke-free venues, however, reported smoking-related symptoms despite their smoking status, including coughing, shortness of breath and excess phlegm. Sensory health concerns for both smoking and non-smoking employees included red or irritated eyes, scratchy throat and runny nose.

Study author Joaquin Barnoya, MD, research assistant professor in the Department of Surgery at Washington University School of Medicine, says that the cardiovascular system is very sensitive to even low doses of tobacco smoke.

“Some of the effects of secondhand smoke on the cardiovascular system in nonsmokers are comparable to the effects of active smoking,” Barnoya says. “These effects occur within a half hour of exposure.”

In response to a questionnaire given to employees as part of the study, 62 percent of respondents stated a preference for working in a smoke-free environment. More than half of non-smoking employees questioned said that all restaurants, bars and nightclubs should be smoke-free, with a third of smoking employees in agreement.

Of employee responders who smoke, more than half said that smoke-free legislation would help them quit, while 70 percent of former smokers said that smoke-free workplace legislation would help them remain nonsmokers.

Results of the study were presented Sept. 8 at a conference held at the Alvin J. Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine.

The study, conducted by Barnoya along with Sarah Moreland-Russell, research manager for the Center for Tobacco Policy Research at the Brown School, was funded by the Barnes-Jewish Hospital Foundation.

The Institute for Global Tobacco Control at the Johns Hopkins Bloomberg School of Public Health collaborated on the study.

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Washington University School of Medicine’s 2,100 employed and volunteer faculty physicians also are the medical staff of Barnes-Jewish and St. Louis Children’s hospitals. The School of Medicine is one of the leading medical research, teaching and patient care institutions in the nation, currently ranked fourth in the nation by *U.S. News & World Report*. Through its affiliations with Barnes-Jewish and St. Louis Children’s hospitals, the School of Medicine is linked to BJC HealthCare.

The Siteman Cancer Center is the only cancer center in Missouri to hold the Comprehensive Cancer Center designation from the National Cancer Institute and membership in the National Comprehensive Cancer Network. Siteman is composed of the combined cancer research and treatment programs of Barnes-Jewish Hospital and Washington University School of Medicine. The center has satellite locations in west St. Louis County and St. Charles County, in addition to its full-service facility at Washington University Medical Center in the Central West End of St. Louis.

The Center for Tobacco Policy Research is a nationally recognized research and evaluation center focusing on tobacco control policy and systems. The Center is a part of Washington University’s Brown School, an international community of faculty, students and graduates working throughout St. Louis, across the country and worldwide to apply new knowledge and use the best available evidence to impact policy, practice and service delivery. The School offers doctoral, Master of Social

Work and Master of Public Health degrees. The School also is home to 11 research centers and applied programs.



Some of the effects of secondhand smoke on the cardiovascular system in nonsmokers are comparable to the effects of active smoking and occur within a half hour of exposure, says Joaquin Barnoya, MD, a research assistant professor in the Department of Surgery at Washington University School of Medicine.