

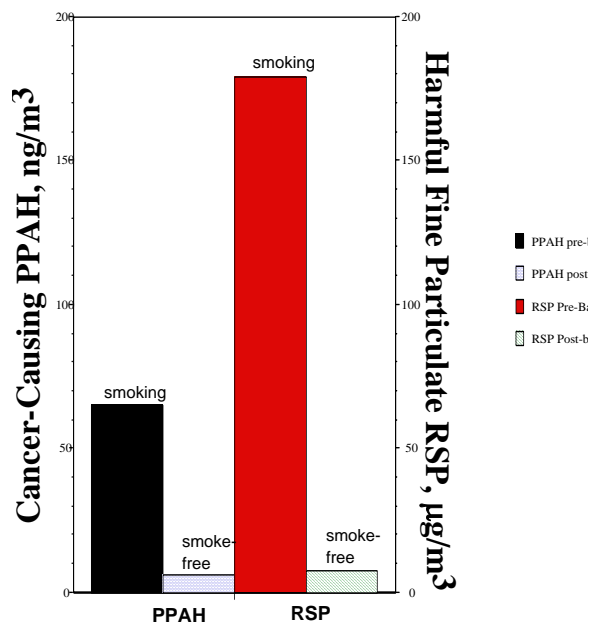
VISUAL SUMMARIES OF IAQ/COTININE STUDIES

October 2005

With the increase in smokefree policies throughout the U.S., researchers have taken the opportunity to investigate the immediate effects of smokefree air on public health and occupational safety. Studies measuring indoor air quality (IAQ) show clear and instant reductions in harmful particulates in the air after the introduction of smokefree air. Studies measuring cotinine (metabolized nicotine) levels in hospitality workers find dramatic reductions in cotinine levels after a smokefree policy takes effect. IAQ and cotinine studies demonstrate that smokefree laws are an effective, expedient way to drastically improve worker health. To learn more about these studies or to learn how to conduct an IAQ/cotinine study in your community, contact ANR at (510) 841-3032 or anr@no-smoke.org.

BOSTON, MA

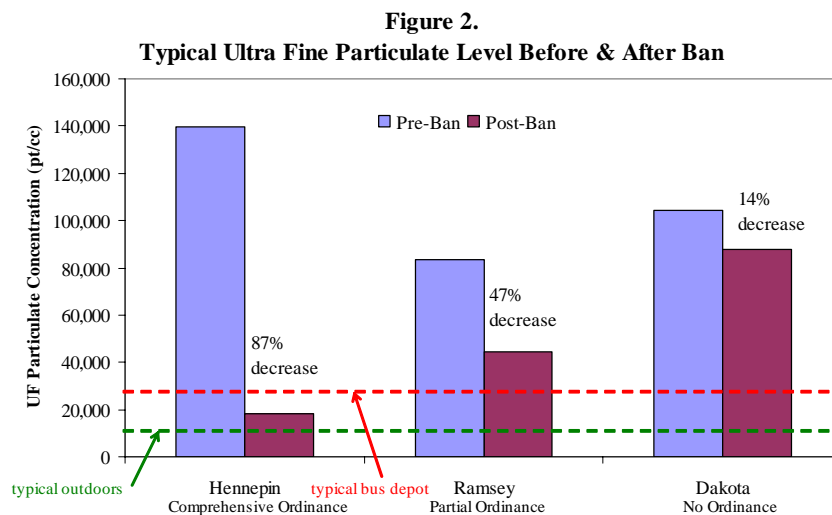
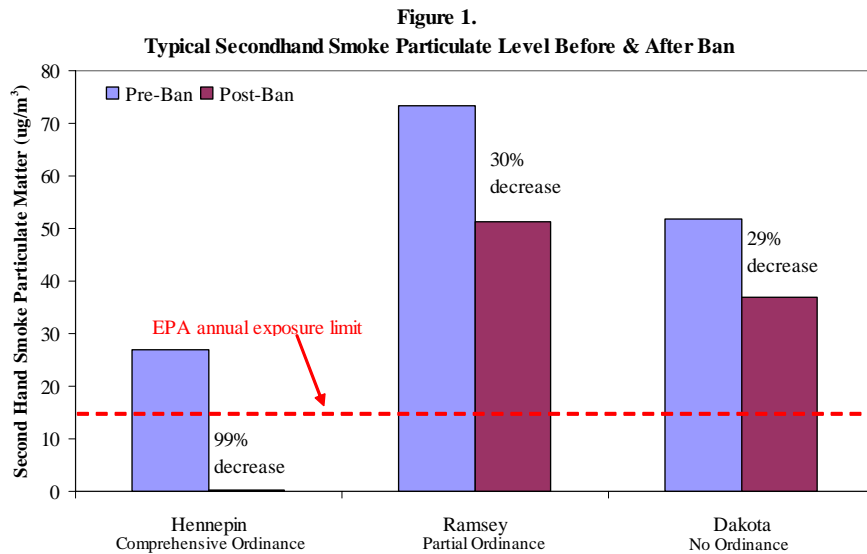
This study was conducted in 7 Boston hospitality venues before and after the city implemented its 100% smokefree law on March 5, 2003. It measured respirable suspended particulate air pollution (RSP) and particulate polycyclic aromatic hydrocarbons (PPAH), pollutants known to increase risk of respiratory disease, cancer, heart disease, and stroke. Before the smokefree law, pub RSP levels were *23 times higher than pollutant levels after the law, violating the annual National Ambient Air Quality Standard (NAAQS) for fine particle pollution by nearly 4-fold; and indoor PPAH before the smokefree law averaged nearly 12 times higher than levels after the law, quadrupling workers' daily carcinogenic PPAH exposure.* By contrast, after the smokefree law, indoor air quality levels for both pollutants were, except for RSP in one venue, indistinguishable from outdoors, and in compliance with the NAAQS.



Repace, J., "An Air Quality Survey of Respirable Particles and Particulate Carcinogens in Boston Pubs Before and After a Smoking Ban," *Repace Associates*, [n.d.].

HENNEPIN vs RAMSEY and DAKOTA COUNTIES, MN

Hennepin County’s comprehensive 100% smokefree law, making all workplaces, restaurants, and bars entirely smokefree indoors, *reduced harmful air pollution from secondhand smoke in bars and restaurants by 99 percent*. Researchers compared improved air quality in smokefree Hennepin with smoke-filled Ramsey County, whose law only covers restaurants without attached bars (bar areas are separately ventilated), and smoke-filled Dakota County, which has no ordinance to protect against secondhand smoke in indoor areas. Of the three, only Hennepin County’s comprehensive smokefree law reduced air pollution to levels below the annual exposure limits set by the U.S. Environmental Protection Agency. Under its partial smokefree ordinance, Ramsey County bars and restaurants still showed harmful air pollution at levels more than three times the recommended EPA annual exposure limits.

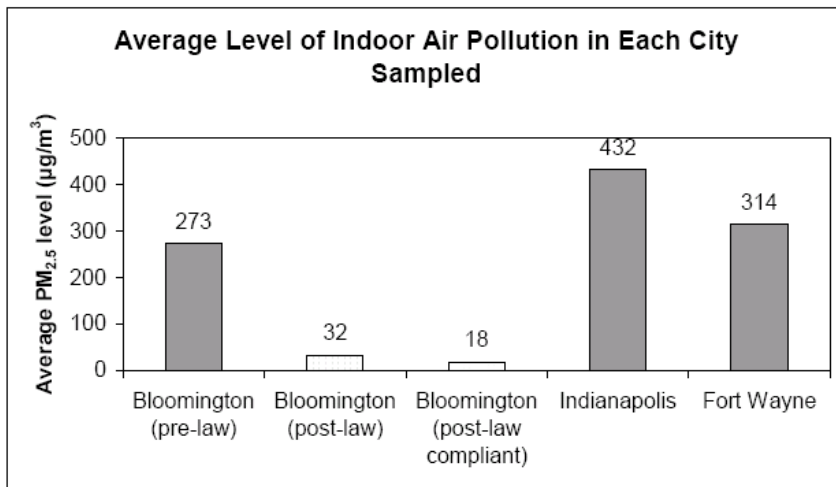
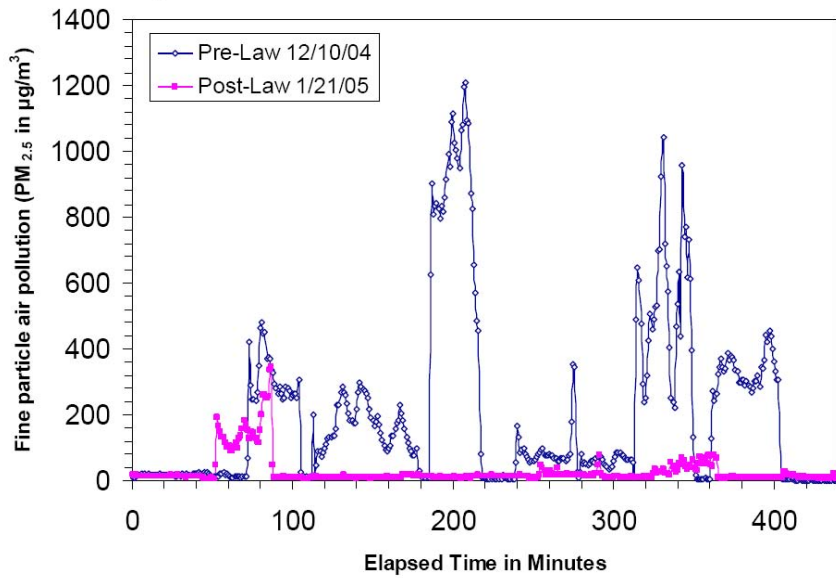


[n.a.], “Indoor Air Quality in Bars and Restaurants Before and After Implementation of Smoke-free Ordinances in Hennepin and Ramsey Counties,” *Minnesota Partnership for Action Against Tobacco*, September 15, 2005. Available at <http://mpaat.nonprofitoffice.com/vertical/Sites/{54941340-5892-4A14-8F5F-FF621D207BF2}/uploads/{A2567BD0-EE65-437A-9916-2154C1092B70}.DOC>.

BLOOMINGTON vs INDIANAPOLIS & FORT WAYNE, IN

Indoor air quality was measured in 30 Indiana bars and restaurants between December 10, 2004 and January 22, 2005. The measurements were taken in Bloomington before and after its 100% smokefree law went into effect, and in Indianapolis and Fort Wayne, neither of which have smokefree protections. The average level of particulate matter (PM) in all smokefree venues was 94% less than the pollution levels measured in smoke-filled venues. After Bloomington went smokefree, PM levels in formerly smoke-filled establishments decreased by 89%. In contrast, indoor air pollution levels were 14 times higher in smoke-filled Indianapolis venues and 10 times higher in smoke-filled Fort Wayne venues than in smokefree Bloomington venues. The study also found that restaurant and bar employees who worked full-time in smoke-filled establishments were exposed to seven times the annual limit of particulate matter levels recommended by the U.S. Environmental Protection Agency.

Bloomington, IN Before and After Clean Indoor Air Law



Travers, M., Hyland, A., “Indiana Air Monitoring Study, December 2004 – January 2005,” *Department of Health Behavior, Roswell Park Cancer Institute*, April 2005.

LEXINGTON vs LOUISVILLE, KY

Indoor air pollution in Lexington *dropped by 91 percent after its smokefree law went into effect* on April 27, 2004. This study measured levels of secondhand smoke particulate matter (PM) in nine Lexington locations (three restaurants, three bars, a music venue, a coffee house, and a bowling alley) before and after the implementation of the city’s smokefree law, which makes all public businesses, restaurants, bars, bowling alleys, and bingo halls 100% smokefree. Researchers tested PM concentration levels in the same nine locations, on the same day of the week and hours of the day, and found that average PM concentrations were 11 times lower than before the smokefree law went into effect. In addition, this study compared Lexington’s indoor air quality with Louisville’s, a smoke-filled Kentucky community, before and after Lexington’s smokefree law. *PM levels were 17 times higher in smoke-filled Louisville than in smokefree Lexington.*

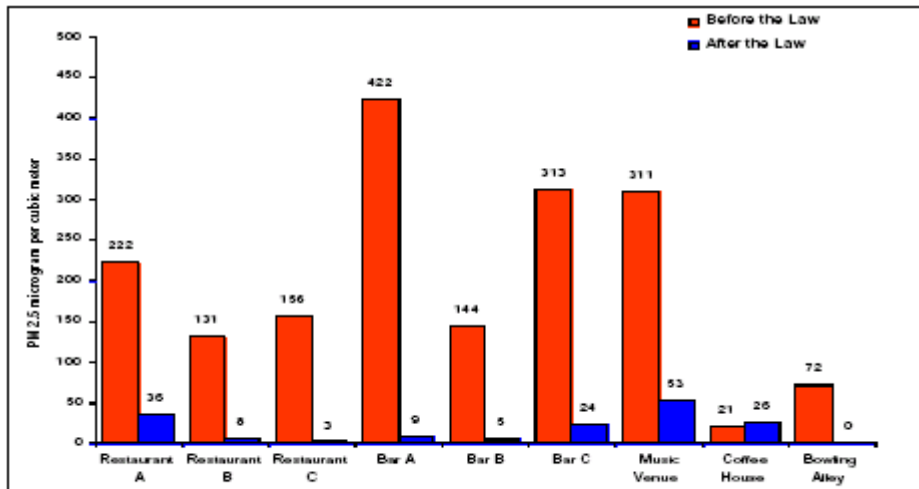


Figure 1. Indoor air quality in nine Lexington venues before and after implementation of the smoke-free law

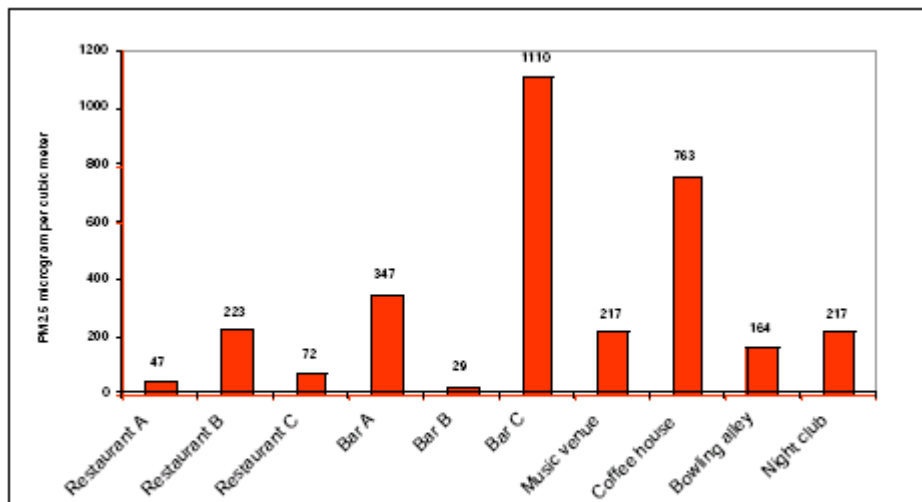


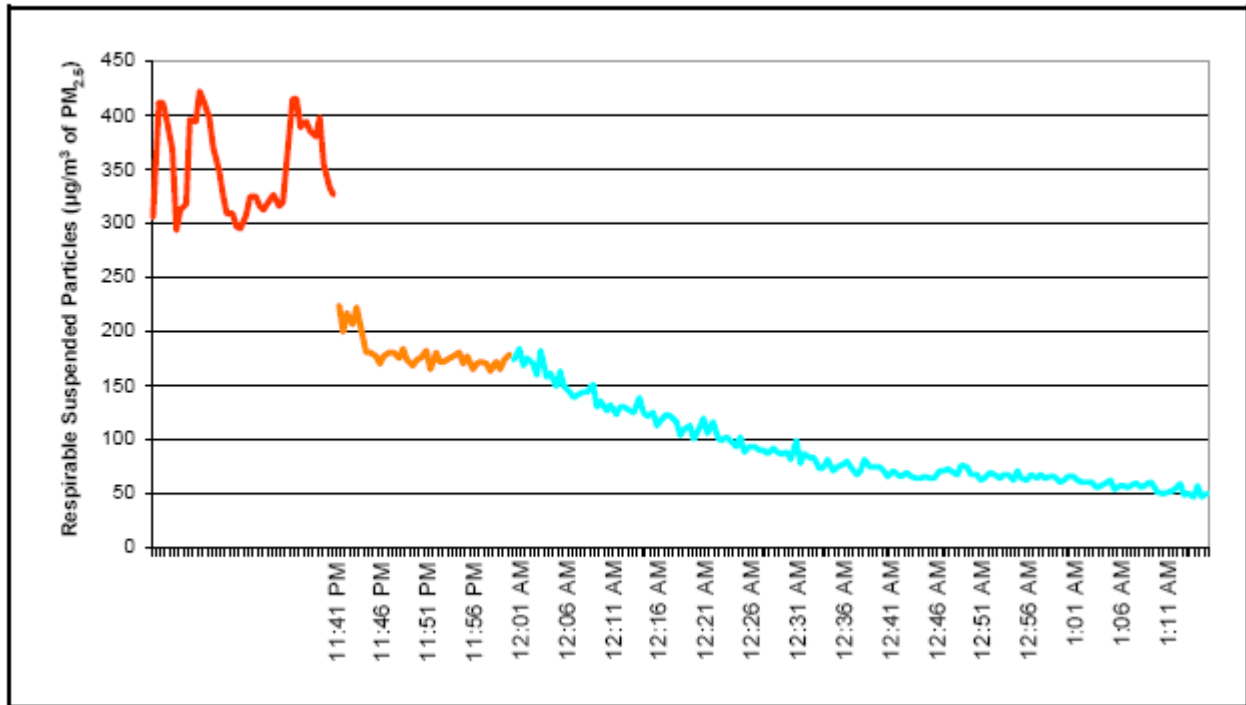
Figure 2. Indoor particulate levels in 10 Louisville venues, September 2004

Hahn, E., et al., “Smoke-free Laws and Indoor Air Pollution in Lexington and Louisville,” *Louisville Medicine*, Vol. 52(10): 391-397, March 2005. Download at <http://www.jcms.org/files/public/0305LM.pdf>.

STATE OF NEW YORK

In less than two hours after New York's 100% smokefree law went into effect, the level of respirable particulate matter (PM) dropped to 15 percent of the level on a smoking night in restaurants and bars. *Three months after the law became effective, the level of PM dropped by 90 percent in these venues.* Prior to the smokefree law's implementation, New York hospitality employees working an eight hour shift, 250 days a year, were exposed to particulate matter levels seven times greater than the maximum level deemed acceptable by the U.S. Environmental Protection Agency. In addition, *PM dropped an average of 77 percent after the law went into effect in bowling alleys, pool halls, and bingo halls.*

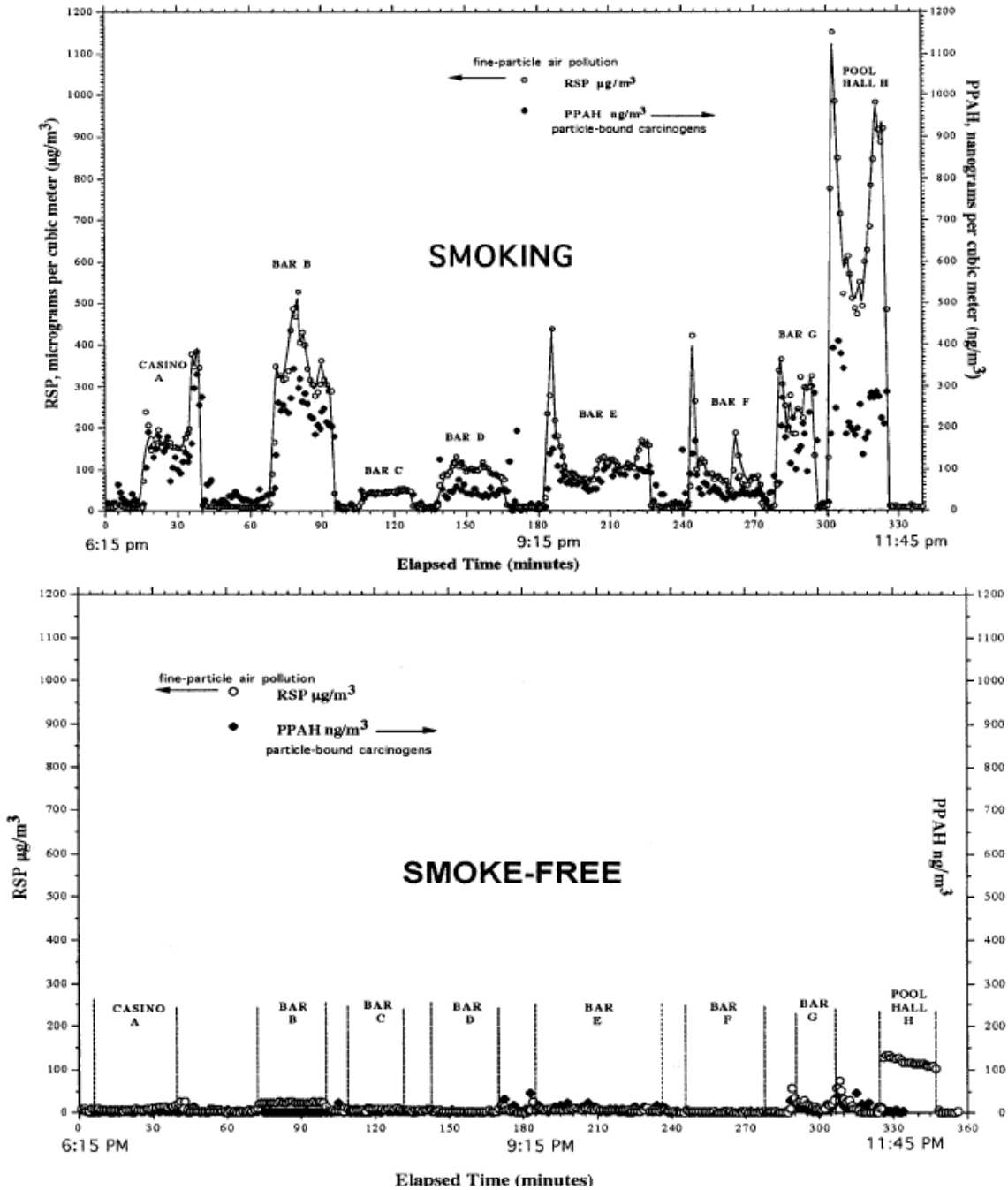
Exhibit 6-13. Air Quality Over Time in a Western New York Bar



RTI International, "First Annual Independent Evaluation of New York's Tobacco Control Program," *New York State Department of Health*, November 2004.

STATE OF DELAWARE

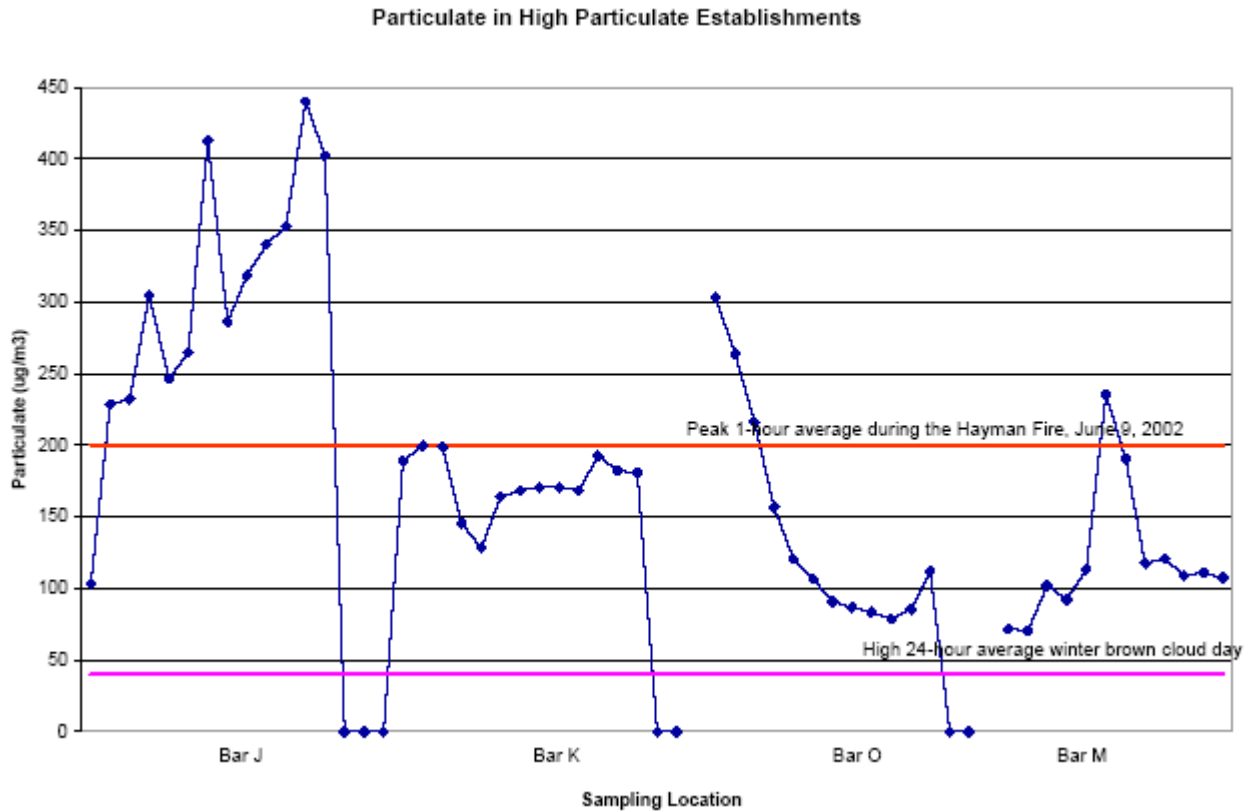
All Delaware workplaces – including restaurants, bars, billiard and bingo halls, and casinos – are 100% smokefree. Biophysicist James Repace conducted a series of tests to measure improvements in eight different hospitality venues' indoor air quality before and after Delaware's Clean Indoor Air Law took effect on November 27, 2002. After going smokefree, the air in hospitality venues was 90% cleaner. The study also found that *secondhand smoke was the source of 90-95% of the respirable particulate air pollution.*



Repac, J., "Respirable Particles and Carcinogens in the Air of Delaware Hospitality Venues Before and After a Smoking Ban," *JOEM*, 46(9): 887-905, September 2004.

DENVER, CO

When outdoor air quality is poor in Denver, Colorado, health officials call it a “brown cloud” day. Officials recommend that people stay indoors, do not drive, and minimize physical activity to avoid health risks caused by inhaling larger than normal amounts of particulate matter. This report by Denver Public Health shows that during a normal shift, *Denver bar workers inhale particulate matter far worse than the already dangerous levels found on these “brown cloud” days. Even worse, many workers experience even more dangerous indoor air quality than found outdoors during severe forest fires.*



Anderson, L.G., “Measurements of Environmental Tobacco Smoke in Restaurants and Bars in Denver Phase II: Prepared for Denver Health and Hospital Authority Contract Number E0900,” *Littleton, CO: Anderson & Associates*, June 17, 2004.

HARTFORD, CT

This study assessed indoor air quality in nine bars and restaurants in Hartford, Connecticut before and after the implementation of a statewide smokefree air law on April 1, 2004. The law makes business, restaurants, and bars 100% smokefree. The study found a 76% reduction in particulate matter levels after the smokefree law went into effect.

Figure 4.

Real-Time Air Monitoring: Hartford, CT March 25th, 2004

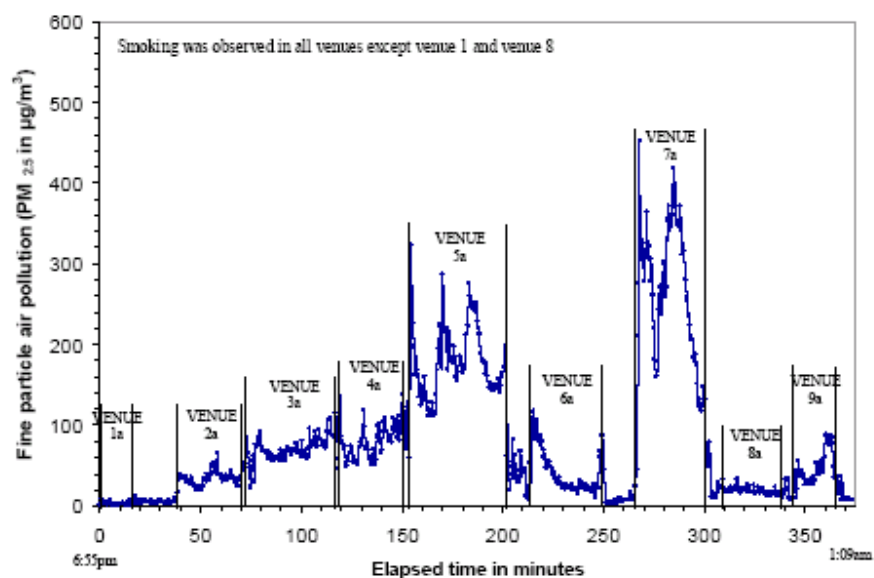
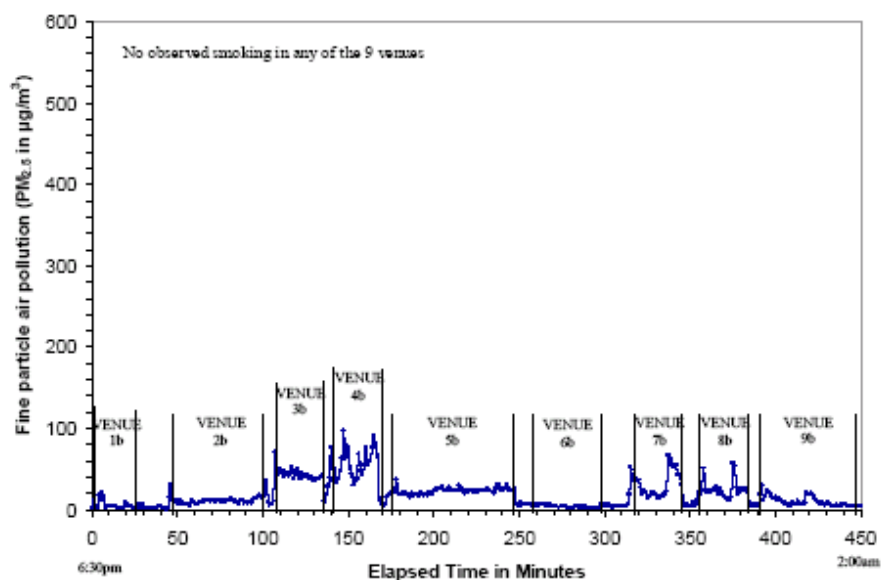


Figure 5.

Real-Time Air Monitoring: Hartford, CT April 23rd, 2004

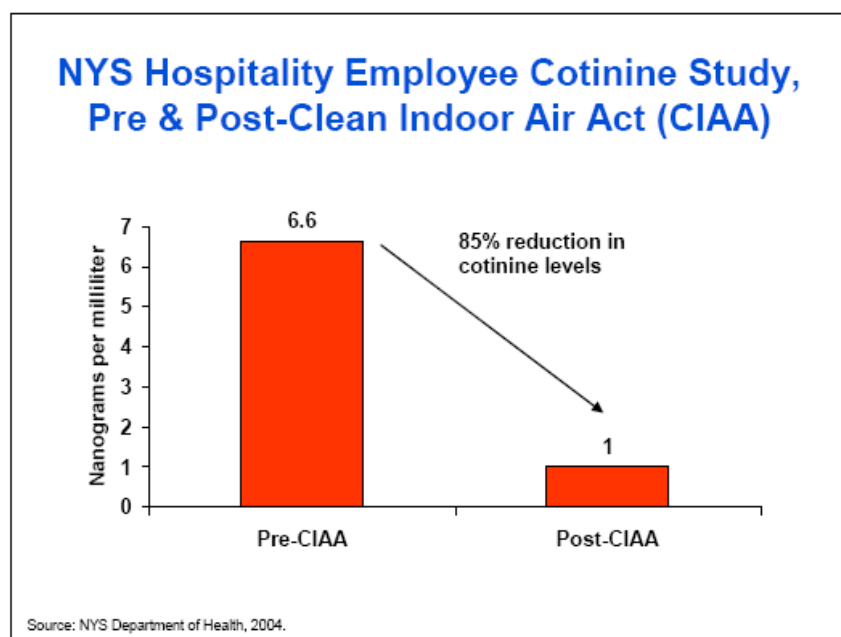
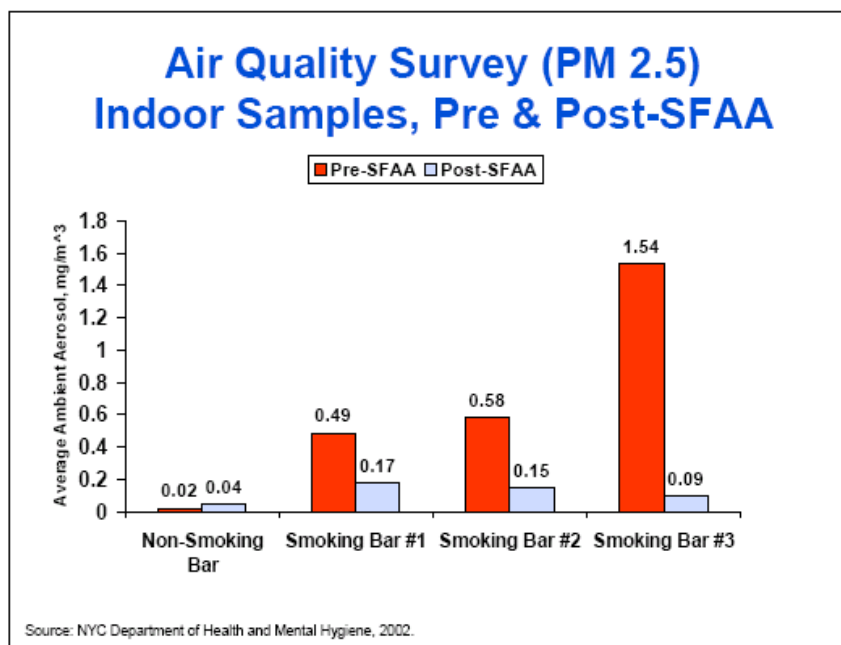


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Hyland, A., Travers, M., Repace, J., "Hartford Air Monitoring Study, March-April 2004," *Roswell Park Cancer Institute*, May 2004.

NEW YORK CITY, NY

New York City's Smoke-Free Air Act went into effect on March 30, 2003. After New York City went smokefree, the air quality in bars and restaurants showed a six-fold reduction in indoor respirable particulate pollution; levels of cotinine (metabolized nicotine) decreased by 85% in nonsmoking bar and restaurant employees; and 150,000 fewer New Yorkers are exposed to secondhand smoke on the job.



[n.a.], "The State of Smoke-Free New York City: A One-Year Review," *New York City Department of Health & Mental Hygiene*, March 2004.