



The Effects of Secondhand Smoke on Worker Health

Former U.S. Surgeon General Jesse Steinfeld first exposed the health risks of secondhand smoke in 1970.^{1, 2} But it was not until the late 1980s when we learned the extent of the public's secondhand smoke exposure: 91.7 percent of Americans were found to have traceable levels of cotinine* in their bloodstreams³ and only 3 percent of workers nationally reported a "no smoking" policy at their place of employment.⁴ Policymakers began to take steps to minimize the impact of secondhand smoke. Laws prohibiting public smoking were enacted at the local, state, and national levels.

Today, smoke-free policies have effectively reduced the number of people exposed to secondhand smoke in the workplace.⁵ Forty years after the first Surgeon General's report on the health consequences of smoking, the most recent report, *The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General*, unequivocally states that there is no risk-free level of exposure to tobacco smoke.⁶ Unfortunately, not all workers have the same level of protections. The American Cancer Society Cancer Action Network (ACS CAN) believes that all Americans have the right to breathe smoke-free air. No one should have to choose between a job and good health.

Hospitality Workers are at Higher Risk for Secondhand Smoke Exposure

- Food service workers have a 50 percent greater risk than the general public of dying from lung cancer, in part because of their continuous exposure to secondhand smoke in the workplace.⁷
- Although 76 percent of white-collar workers are covered by smoke-free policies, just 52 percent of blue-collar workers and 43 percent of food service workers benefit from these protections.⁸
- Blue collar and service workers continue to report smoke-free coverage rates well below the national average.⁹
- Waiters and waitresses have the highest levels of secondhand smoke exposure.¹⁰
 - Compared to other workers, bartenders, waiters and waitresses are less likely to be protected by smoke-free policies and more likely to breathe secondhand smoke even when smoke-free policies are put into effect.¹¹
 - Levels of secondhand smoke in restaurants are 1.6 to 2 times higher than levels measured at office worksites and 1.5 times higher than levels in homes with at least one smoker.¹²
- Fewer than 15 percent of bartenders nationwide are protected from secondhand smoke exposure.¹³
 - Levels of secondhand smoke in bars are 3.9 to 6.1 times higher than levels measured at office worksites and up to 4.5 times higher than levels in homes with at least one smoker.¹⁴
 - 74 percent of bartenders surveyed in San Francisco, California in 1997 reported respiratory symptoms (e.g., wheezing, cough, etc.) and 77 percent reported sensory irritation symptoms (e.g. red, teary, or irritated eyes, runny nose, sneezing, sore or scratchy throat, etc.).¹⁵
- Casino workers are at higher risk for secondhand smoke related illness.
 - The National Institute for Occupational Safety and Health (NIOSH) conducted a health hazard evaluation at an Atlantic City, New Jersey casino. Workers' cotinine

* Cotinine is a biomarker for secondhand smoke exposure.

- levels were 1.85 nanograms per milliliter (ng/mL). These levels were considered exceptionally high when compared to other surveys.¹⁶
 - Casino workers who staffed non-smoking tables did not have lower levels of secondhand smoke exposure than workers who staffed smoking tables.¹⁷
 - Researchers found generalized exposure to secondhand smoke throughout the entire gaming area, suggesting that casino patrons as well as casino employees who did not participate in the study (e.g. waitresses, cashiers, security personnel) incurred the same levels of exposure to secondhand smoke demonstrated by the dealers and supervisors in the study.¹⁸
 - NIOSH found occupational exposure to secondhand smoke increased workers' risk of lung cancer and other diseases. The agency recommended that workers be protected from involuntary exposure to secondhand smoke.
- Tobacco smoke is a complex mixture.[†] When compared to mainstream smoke, sidestream smoke emits higher amounts of several toxic chemicals.^{19, 20} For each cigarette smoked, a nonsmoking employee inhales:
 - as much benzene as one who has smoked six cigarettes;
 - as much 4-aminobiphenyl as one who has smoked 17 cigarettes; and
 - as much N-nitrosodimethylamine as one who has smoked 75 cigarettes.²¹

Smoke-free Policies Improve Workers' Health

- The evidence shows that implementing smoke-free policies has immediate benefits on restaurant and bar workers' health. Hospitality workers experienced an 89 percent decline in secondhand smoke exposure just 5 months after New York state passed its Clean Indoor Air Act.²²
- The percentage of hospitality workers exposed to secondhand smoke declined from 91 percent to 14 percent one year after New York's smoke-free law went into effect. The amount of time that hospitality workers were exposed to secondhand smoke on the job decreased 98 percent (12.1 hours to 0.2 hours).²³
- Restricting or banning public smoking reduces nicotine concentration levels in office and non-office worksites.²⁴
- Cotinine concentrations among New York City hospitality workers decreased significantly (from 4.7 ng/ml to 0.8 ng/ml) one year after the city went smoke-free. In addition, reports of one or more sensory symptoms (eyes, nose, throat) declined from 88 percent to 38 percent one year after the smoking ban.²⁵
- A 2008 study of Minnesota hospitality workers showed that after implementation of a smoke-free law, cotinine concentrations decreased by over 80%.²⁶
- 78 percent of bartenders with prior sensory irritation symptoms (eye, nose, or throat irritation) reported no symptoms approximately one month after California's bars were required to go smoke-free. 59 percent with prior respiratory symptoms (wheezing, dyspnea, cough, and phlegm production) reported no symptoms within a month after California's bars were required to go smoke-free. Pulmonary function also improved after smoking was prohibited in bars.²⁷
- More importantly, smoking policies may reduce workers' long-term risk of lung cancer and cardiovascular disease.^{28, 29, 30, 31, 32}

Smoke-Free Policies Improve the Bottom Line

- Smoke-free policies are associated with reduced cigarette consumption.^{33, 34} Policies that encourage smokers to quit or to cut back their tobacco consumption ultimately save employers money.

[†] For more information on the composition of secondhand smoke, please see the American Cancer Society's factsheet "The Facts About Secondhand Smoke."

- Smoking increases both employer and employee medical care costs.
 - Employers bear a large share of the health care costs for tobacco users through employer-provided health insurance.
 - After analyzing the number and type of paid claims from a large group indemnity health plan, researchers found that tobacco users had more admissions to the hospital, longer hospital stays, higher average outpatient payments, and higher average insured payments.³⁵
- Smoking employees have significantly higher absentee, injury, accident, and disciplinary rates than their nonsmoking colleagues.^{36, 37, 38, 39}
- Other costs associated with smoking in the workplace are increased housekeeping and maintenance costs. The Environmental Protection Agency (EPA) found that if most businesses nationwide implemented smoking restrictions, the savings in operating and maintenance costs would total between \$4 billion and \$8 billion a year.⁴⁰
- In 1994, the EPA estimated that eliminating secondhand smoke in all indoor workplaces would reduce premature deaths and tobacco-related illness enough to save between \$35 billion and \$66 billion a year.⁴¹
- The tobacco industry has aggressively campaigned for ventilation alternatives.⁴² But the evidence is clear: ventilation is ineffective and costly.
 - No U.S. science agency has found that ventilation systems reduce occupational exposure to secondhand smoke to an acceptable level.^{43, 44}
 - In a recent position statement, the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) said “the only means of effectively eliminating health risk associated with indoor exposure is to ban smoking activity.” ASHRAE acknowledges that no current engineering approaches can control health risks from secondhand smoke exposure.⁴⁵
 - The U.S. Surgeon General determined that cost-effective technologies for filtrating tobacco smoke from the air are currently unavailable.⁴⁶
- By allowing smoking in the workplace, business owners increase their costs of doing business. Employers pay increased health, life, and fire insurance premiums, make higher workers’ compensation payments, incur higher worker absenteeism, and settle for lower worker productivity.^{47,48,49,50, 51, 52, 53, 54}

Conclusion

Secondhand smoke has become an occupational hazard for many workers, including casino, restaurant, bar, and hotel employees. Job-related exposure to secondhand smoke may be a significant, but entirely preventable, cause of premature death among U.S. workers.^{55, 56, 57} “Smoke-free workplaces policies are common sense public health measures that cost virtually nothing to implement, are largely self-enforcing—especially when accompanied by public education efforts—and have no negative economic consequences while making places of employment healthier and safer places to work and visit.”⁵⁸ ACS CAN urges policymakers and community leaders to support smoke-free efforts, so we can save the lives of those most vulnerable to secondhand smoke.

September 2008

¹ U.S. Department of Health and Human Services (HHS). Public Health Service (PHS). National Institutes of Health (NIH). National Cancer Institute (NCI). (2000). Population Based Smoking Cessation: Proceedings of a Conference on What Works to Influence Cessation in the General Population. *Smoking and Tobacco Control Monograph No. 12*. Bethesda, MD: NCI.

² Gerlach, K.K., Shopland, D.R., Hartman, A.M., Gibson, J.T., and Pechacek, T.F. (1997). Workplace Smoking Policies in the United States: Results from a National Survey of more than 100,000 Workers. *Tobacco Control* 6:199-206.

³ Pirkle, J.L., Flegal, K.M., Bernert, J.T., Brody, D.J., Etzel, R.A., and Maurer, K.R. (1996). Exposure of the U.S. Population to Environmental Tobacco Smoke: The Third National Health and Nutrition Examination Survey, 1988 to 1991. *Journal of the American Medical Association (JAMA)* 275(16): 1233-1240.

-
- ⁴ Gerlach et al. (1997).
- ⁵ Wortley, P.M., Caraballo, R.S., Pederson, L.L., and Pechacek, T.F. (2002). Exposure to Secondhand Smoke in the Workplace: Serum Cotinine by Occupation. *Journal of Occupational and Environmental Medicine (JOEM)* 44(6): 503-509.
- ⁶ U.S. Department of Health and Human Services. *The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2006. <http://www.surgeongeneral.gov/library/secondhandsmoke/report/>.
- ⁷ Siegel, Michael (1993). Involuntary Smoking in the Restaurant Workplace: A Review of Employee Exposure and Health Effects. *JAMA* 270(4): 490-493.
- ⁸ Shopland, D.R., Anderson, C.M., Burns, D.M., and Gerlach, K.K. (2004). Disparities in smoke-free workplaces among food service workers. *JOEM* 46(4): 347-356.
- ⁹ Gerlach et al. (1997).
- ¹⁰ Wortley, P.M., Caraballo, R.S., Pederson, L.L., and Pechacek, T.F. (2002). Exposure to Secondhand Smoke in the Workplace: Serum Cotinine by Occupation. *JOEM* 44(6): 503-509.
- ¹¹ Shopland, et al. (2004).
- ¹² Siegel (1993).
- ¹³ Ibid.
- ¹⁴ Ibid.
- ¹⁵ Eisner, M.D., Smith, A.K., and Blanc, P.D. (1998). Bartenders' Respiratory Health After Establishment of Smoke-Free Bars and Taverns. *JAMA* 280(22): 1909-1914.
- ¹⁶ Trout, D., Decker, J., Mueller, C., Bernert, J.T., and Pirkle J. (1998). Exposure of Casino Employees to Environmental Tobacco Smoke. *JOEM* 40(3): 270-276.
- ¹⁷ Ibid.
- ¹⁸ Ibid.
- ¹⁹ Hammond, K.S., Sorensen, G., Youngstrom, R., and Ockene, J.K. (1995). Occupational Exposure to Environmental Tobacco Smoke. *JAMA* 274(12): 956-960.
- ²⁰ Schick, S. and Glantz, S. (2005). Philip Morris Toxicological Experiments with Fresh Sidestream Smoke: More Toxic than Mainstream Smoke. *Tobacco Control* 14: 396-404.
- ²¹ Hammond, et al. (1995).
- ²² Abrams, S.M., Mahoney, M.C., Hyland A., Cummings, K.M., Davis, W., and Song, L. (2006). Early Evidence on the Effectiveness of Clean Indoor Air Legislation in New York State. *American Journal of Public Health* 96(2): 296-298.
- ²³ Farrelly, M.C., Nonnemaker, J.M., Chou, R., Hyland, A., Peterson, K.K., and Bauer, U.E. (2005). Changes in Hospitality Workers' Exposure to Secondhand Smoke Following the Implementation of New York's Smoke-Free Law. *Tobacco Control* 14:236-241.
- ²⁴ Hammond, et al. (1995).
- ²⁵ Farrelly et al. (2005).
- ²⁶ Hatsukami, D., Jensen, J., Hecht, S., Murphy, S., and Lindgren, B. Carcinogen and nicotine exposure in hospitality workers before and after the state comprehensive smoking ban. University of Minnesota, Transdisciplinary Tobacco Use Research Center (TTURC), March 27, 2008.
- ²⁷ Eisner, et al. (1998).
- ²⁸ National Cancer Institute (NCI) (1999). *Health Effects of Exposure to Environmental Tobacco Smoke: The Report of the California Environmental Protection Agency. Smoking and Tobacco Control Monograph 10*. Bethesda, MD: NCI.
- ²⁹ Sargent, R.P., Shepard, R.M., Glantz, S.A. (2004). Reduced incidence of admissions for myocardial infarction associated with public smoking ban: before and after study. *British Medical Journal* 328: 977-980.
- ³⁰ Bartecchi, C., Alsever, R.N., Nevin-Woods, C., Thomas, W.M., Estacio, R.O., Bucher-Bartelson, B., and Krantz, M.J. (2005, November 14). *A Reduction in the Incidence of Acute Myocardial Infarction Associated with a Citywide Smoking Ordinance*. Paper presented at the 2005 American Heart Association Scientific Session.
- ³¹ Stefanadis, C., Vlachopoulos, C., Tsiamis, E., Diamantopoulos, L., Toutouzas, K., Giatrakos, N., et al. (1998). Unfavorable Effects of Passive Smoking on Aortic Function in Men. *Annals of Internal Medicine* 128 (6): 426-434.
- ³² Davis, R.M. (1998). Exposure to Environmental Tobacco Smoke: Identifying and Protecting Those at Risk. *JAMA* 280(22): 1947-1949.
- ³³ HHS et al., (2000).
- ³⁴ Hopkins, D.P., Briss, P.A., Ricard, C.J., Husten, C.G., Carande-Kulis, V.G., Fielding, J.E., Alao, M.O., McKenna, J.W., Sharp, D.J., Harris, J.R., Woollery, T.A., and Harris, K.W. (2001). Reviews of Evidence Regarding Interventions to Reduce Tobacco Use and Exposure to Environmental Tobacco Smoke. *American Journal of Preventive Medicine* 20(2S): 16-66.
- ³⁵ Penner, M. and Penner, S. (1990). Excess Insured Health Care Costs from Tobacco-Using Employees in a Large Group Plan. *Journal of Occupational Medicine* 32(6): 521-523.
- ³⁶ Halpern, M.T., Shikhar, R., Rentz, A.M., and Khan, Z.M. (2001). Impact of Smoking Status on Workplace Absenteeism and Productivity. *Tobacco Control* 10:233-238.
- ³⁷ Ryan, J., Zwerling, C., and Orav, E.D. (1992). *American Journal of Public Health* 82(1): 29-32.

-
- ³⁸ Ryan, J. Zwerling, C., and Jones, M. (1996) Cigarette Smoking at Hire as a Predictor of Employment Outcome. *JOEM* 38(9): 928-933.
- ³⁹ Penner & Penner (1990).
- ⁴⁰ United States Environmental Protection Agency (EPA) (1994). The Costs and Benefits of Smoking Restrictions: An Assessment of the Smoke-Free Environmental Act of 1993 (H.R. 3434). Office of Air and Radiation. Washington, D.C.: U.S. EPA.
- ⁴¹ United States Environmental Protection Agency (EPA) (1994). The Costs and Benefits of Smoking Restrictions: An Assessment of the Smoke-Free Environmental Act of 1993 (H.R. 3434). Office of Air and Radiation. Washington, D.C.: U.S. EPA.
- ⁴² Drope, J. Bialous, S.A., and Glantz, S.A. (2004). Tobacco Industry Efforts to Present Ventilation as an Alternative to Smoke-Free Environments in North America. *Tobacco Control* 13(Suppl 1): i41-i47.
- ⁴³ Department of Labor (DOL), Occupational Safety and Health Administration (OSHA) (1994). Federal Register Notice of Proposed Rulemaking, "Indoor Air Quality," FR 59:15968-16039. Available online at www.osha-slc.gov/FedReg_osh_data/FED19940405.html.
- ⁴⁴ Repace, James (2000). "Can Ventilation Control Secondhand Smoke in the Hospitality Industry?" Available online at <http://www.dhs.ca.gov/ps/cdic/tcs/documents/pubs/FedOHSHAets.pdf>.
- ⁴⁵ Environmental Tobacco Smoke Position Document (2005, June 30). American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
- ⁴⁶ U.S. Department of Health and Human Services (HHS), Public Health Service (PHS), Centers for Disease Control (CDC) (1986). *The Health Consequences of Involuntary Smoking: A Report of the Surgeon General*. Washington D.C.: Government Printing Office (GPO).
- ⁴⁷ Kristein, M.M. (1983). How Much Can Business Expect to Profit from Smoking Cessation? *Preventive Medicine*. 12:358-381.
- ⁴⁸ Marion Merrell Dow, Inc. (1991). The Economic Impact of Smoking: In the Workplace; On Cardiovascular Health; On Wound Health and Recovery from Surgery; On Infants and Children; On Pulmonary Health; On Dental and Oral Health. Medical Information Services, Inc.
- ⁴⁹ U.S. Department of Health and Human Services, CDC, Office of Smoking and Health (OSH), Wellness Councils of America, American Cancer Society (1996). Making Your Workplace Smokefree: A Decision Maker's Guide. Available online at http://www.cdc.gov/tobacco/research_data/environmental/fullguide.pdf.
- ⁵⁰ Musich, S., D. Napier, and D.W. Edington (2001). The Association of Health Risks With Workers' Compensation Costs. *Journal of Occupational and Environmental Medicine* 43(6): 534-541.
- ⁵¹ Halpern et al. (2001).
- ⁵² Ryan et al. (1992).
- ⁵³ Ryan et al. (1996).
- ⁵⁴ Penner & Penner (1990).
- ⁵⁵ NCI (1999).
- ⁵⁶ HHS (1986).
- ⁵⁷ Shopland et al. (2004).
- ⁵⁸ Ibid.