



SENSOR

Occupational Lung Disease Bulletin

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Dear Healthcare Provider,

This issue examines on-the-job exposure to environmental tobacco smoke among Massachusetts workers using data from the Behavioral Risk Factor Surveillance System. We assessed whether exposure among employed adults has declined in recent years and whether it differs by occupation group. Findings are discussed in the context of the Massachusetts Smoke-Free Workplace Law.

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On-the-job exposure to environmental tobacco smoke (ETS) in Massachusetts

Health effects of ETS exposure

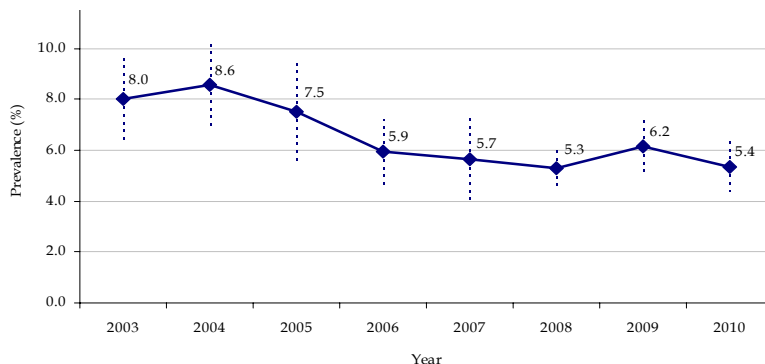
The U.S. Surgeon General reported in 2006 that there is no safe level of exposure to environmental tobacco smoke (ETS), also known as secondhand smoke (USDHHS 2006). ETS causes lung cancer and heart disease, and is also linked to respiratory diseases. For adults with asthma, significant decreases in quality of life scores as well as increased use of medication and healthcare utilization were found among individuals exposed to ETS as compared to those not exposed (Comhair 2011). Not only does ETS worsen asthma but it also increases the likelihood of developing asthma. A case-control study of incident asthma among working-age adults in South Finland showed that both cumulative lifetime and recent ETS exposures increased the risk of new-onset asthma (Jaakkola 2003).

Massachusetts law and ETS exposure

In the U.S., as it became increasingly evident that workplaces, restaurants and bars were significant sources of ETS exposure for adults, states began passing comprehensive smoking bans to protect non-smokers. In 2004, Massachusetts became the third state, behind Delaware (2002) and New York (2003), to enact such a law (MMWR 2011). The Massachusetts Smoke-Free Workplace Law (M.G.L. Ch. 270, § 22) requires all enclosed workplaces with one or more employees to be smoke-free.

Since the regulation was enacted, ETS exposure in the workplace has declined (Figure). The prevalence of

Figure. Prevalence of environmental tobacco smoke exposure at work among non-smoking adults aged 18+, MA, 2003-2010



Note: Error bars are 95% confidence intervals

Source: MA Behavioral Risk Factor Surveillance System, MDPH

exposure to ETS at work among non-smoking adults in 2010 (5.4%, 95%CI: 4.4-6.3%) was significantly lower than in 2003 (8.0%, 95%CI: 6.3-9.8%), the year before the law was passed.

Despite this decline, some Massachusetts workers continue to be exposed to ETS on the job. Exposure prevalence varies by occupation group (Table). In 2010, prevalence of ETS exposure among non-smoking workers by occupation group ranged from 3.0% to 37.4%. Three occupation groups reported significantly higher than average prevalence: *Installation repair and maintenance* (37.4%), *Construction and extraction* (22.6%), and *Transportation and material moving* (19.8%). (See Table for example occupations in each group).

These three groups together employed just under 12% of the 2010 Massachusetts workforce (4.3, 2.7 and 4.6%, respectively). Demographically, they were overwhelmingly male and white, but *Transportation and material moving* had a higher proportion of non-white workers (33%) compared to the workforce as a whole (22%).*

Discussion

Overall, our findings show that occupational exposure to ETS has declined since the passage of the Massachusetts Smoke-Free Workplace Law. Yet, seven years later, prevalence among certain occupation groups was four to seven times higher than average. Further research is needed to better understand these differences, but here we propose a few potential explanations.

*Current Population Survey, 2010, <http://dataferrett.census.gov>

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Table. Prevalence of environmental tobacco smoke exposure at work among non-smoking adults aged 18+, by occupation, MA, 2010

Occupation Group (COC) ¹	Example Occupations	Sample N	Prevalence (%)	95% CI
Installation, repair, & maintenance (7000-7620)	locksmith, auto body worker, HVAC mechanic, cable TV installer, vending machine servicer	81	37.4	(17.9 - 57.0)
Construction & extraction (6200-6940)	carpenter, stonemason, roofer, electrician, insulation worker, asphalt worker, construction laborer	152	22.6	(11.9 - 33.3)
Transportation & material moving (9000-9760)	bus driver, taxi driver, air traffic controller, pumping station operator, parking lot attendant, waste collector	178	19.8	(10.2 - 29.4)
Service (3600-4650)	home health aide, police officer, firefighter, cook, bartender, maid, landscaper, manicurist, hairdresser	680	7.7	(4.0 - 11.4)
Office & administrative support (5000-5930)	bookkeeper, receptionist, bank teller, customer service agent, library clerk, hotel clerk, mail carrier, courier	704	3.4	(1.5 - 5.3)
Management, business & financial operations (0010-0950)	legislator, sales manager, financial officer, accountant, bank examiner, HR specialist, school principal	1,147	3.0	(1.6 - 4.5)
Professional & related occupations (1000-3540)	software engineer, architect, high school teacher, actor, social worker, registered nurse, physician, biologist	2,518	3.0	(1.9 - 4.2)
Other ²	...	663	3.7	(1.6 - 5.8)
All workers³	...	6,498	5.4	(4.4 - 6.3)

1. COC = 2002 Census Occupation Code 2. Other = Sales & Related (4700-4960), Farming, Forestry, & Fishing (6000-6130), and Production (7700-8960)

3. Includes workers who were missing an occupation code. Data Source: MA Behavioral Risk Factor Surveillance System, MDPH

The 2004 law may not be as effective among these three occupation groups, either because it does not cover or is not enforced in settings where they work. Workers in these groups may be exposed to coworkers', clients' or ambient smoke in predominantly three locations: outdoors, private residences and vehicles. A 2010 Cochrane review of 50 studies on legislative smoking bans concluded that although these bans were successful overall, they did not result in reduced ETS exposure in vehicles and private homes (Callinan 2010).

First, outdoor non-enclosed workplaces are not covered by the statewide Smoke-Free Workplace Law. However, local jurisdictions can pass stricter policies and increase enforcement. For example, the Boston Public Health Commission's 2008 regulations prohibit smoking in outdoor workspaces that are adjacent to indoor workspaces, such as restaurant and hotel patios, loading docks, valet parking areas, and unenclosed floors of construction sites.

Private residences are also not covered under the law, which may contribute to ETS exposure among workers who provide in-home services, such as those in *Installation*,

repair and maintenance occupations. Several city housing authorities, including Boston and Springfield, have banned smoking in public housing, and similar policies are being considered across the state.

Lastly, while vehicles are covered by the Massachusetts law, enforcement can be challenging. Nevertheless, if more than one employee uses a company vehicle, that vehicle is covered and smoking is prohibited. The law includes taxis, delivery vans, courtesy vehicles and municipal vehicles (only private passenger vehicles are exempt). Employers should inform employees of the law and ensure that 'no smoking' signs are clearly posted, as required.

Resources

Employers are responsible for providing a smoke-free environment for employees. Furnishing a smoke-free work environment has been shown to decrease the number of cigarettes consumed as well as increase smoking cessation rates among employees (Bauer 2005). Therefore, compliance with the law can promote health among non-smokers and smokers alike. For the full law, fact sheets, and 'no smoking' signs visit www.mass.gov/dph/mtcp.

Healthcare providers play an important role in encouraging patients not to smoke and to avoid ETS. Please ask your patients about smoking and workplace ETS exposure. Resources include:

- <http://quitworks.makesmokinghistory.org/>
- <https://massclearinghouse.ehs.state.ma.us/TOB/TC3406.html>

Employees can anonymously report violations of the Smoke-Free Workplace Law to the Massachusetts Department of Public Health at 1-800-992-1895. It is unlawful for employers to discriminate or retaliate against anyone involved in filing a complaint.

References are available upon request.

Data Source

The Massachusetts Behavioral Risk Factor Surveillance System, a collaborative effort of the Centers for Disease Control and Prevention and MDPH, is an annual random-digit-dial telephone survey of adults aged 18+ that collects data on health conditions, risk factors, and behaviors. Workers were identified as adults who reported being employed for wages, self-employed, or out of work for < one year. In 2010, workers were asked "What kind of work do you do, that is, what is your occupation?" Free-text responses were coded by CDC's National Institute for Occupational Safety and Health using 2002 Census Occupation Codes. Workers with ETS exposure at work were defined as those who responded > 1 to the question: "Thinking about the past 7 days, about how many hours a week were you exposed to other people's tobacco smoke when you were at work?" Non-smokers included former and never smokers. For more information visit www.mass.gov/dph/hsp/