



Occupational Lung Disease Bulletin for Health Care Providers

Massachusetts Department of Public Health

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Work-Related Asthma Surveillance Massachusetts, 2014 – 2022

Cases of work-related asthma (WRA) are sentinel health events – that is, an illness, injury, or death that indicates further investigation and intervention may be needed to prevent similar cases.¹ The National Institute for Occupational Safety and Health funds Massachusetts to conduct surveillance to identify cases of WRA and describe industries, occupations, and exposures that require attention. For surveillance purposes, a case of WRA is defined as an individual with a health care provider's diagnosis of asthma and an association between asthma symptoms and work.

WRA can be classified into two main categories:

- 1) **Work-aggravated asthma:** Pre-existing asthma worsened by workplace exposures, and
- 2) **New-onset asthma:** Newly diagnosed asthma caused by sensitizers or irritants in the workplace. Reactive Airways Dysfunction Syndrome (RADS) is a subset of new-onset asthma distinguished by persistent asthma symptoms caused by a one-time high level irritant exposure.

Work-Related Asthma Surveillance Classification

1. Work-aggravated asthma
2. New-onset asthma
 - a. Occupational asthma
 - b. Reactive airways dysfunction syndrome (RADS)

Data Sources

In Massachusetts, all health care providers are required by public health regulations to report confirmed and suspected cases of WRA to the Massachusetts Department of Public Health (DPH). Health care providers (HCPs) are key partners in prevention; timely, detailed HCP reports are a critical source of information about WRA in the state. These reports are further supplemented by other data sources that DPH's Occupational Health Surveillance Program (OHSP) uses to identify individuals with potential WRA, including statewide emergency department (ED) visit data, workers' compensation claims, and information from other Massachusetts state and federal agencies.

OHSP staff conduct follow-up telephone interviews with workers with probable WRA to learn more about their job environment and to confirm the association of asthma with work. For select workers that OHSP staff are unable to reach, case confirmation is attempted based on the medical record. Information from interviews and/or medical records is used to identify suspected asthma-causing agents and to inform intervention activities at both an individual worksite level and more broadly.

Work-Related Asthma Cases at a Glance

Between January 2014 and October 2022, OHSP identified 493 Massachusetts workers with probable WRA — an average of 62 per year. Of the workers with probable WRA, 275 (55.8%) met the surveillance case definition² for confirmed WRA. The following are summary findings on the 275 confirmed cases.

WRA Cases by Data Source

There has been a large decline in the number of WRA cases reported by HCPs to DPH over the years, and a significant proportion of cases have instead been identified through supplemental data sources. HCP reports accounted for less than a fifth (17.8%) of probable cases during the seven-year period, while ED data accounted for the majority (62.2%), workers' compensation data for 19.6%, and collaboration with other Massachusetts state and federal agencies for 0.4%.

WRA Cases by Select Demographics and Workers' Compensation Status

Workers with confirmed WRA had a median age of 45 years and were predominantly female (55.3%) and White, non-Hispanic (70.5%). Of those with information on race/ethnicity, 70.5% were White, non-Hispanic; 14.4% were Hispanic; and 12.7% were Black, non-Hispanic. It is worth noting that 20% of all cases with confirmed WRA had unknown or refused to provide race/ethnicity. It is important to note that overall, Black, non-Hispanic and Hispanic Massachusetts residents consistently had substantially higher age-adjusted rates of asthma-related ED and hospitalization visits than those who were White, non-Hispanic.³⁻⁴ There are known racial and ethnic disparities across industries and occupations, in which workers of color most often work in high-risk jobs, but their injuries and illnesses often go unreported.⁵⁻⁷ A majority of workers (63.6%) with confirmed WRA applied for workers' compensation.

WRA Cases by Classification Type

New-onset asthma accounted for 29.1% of confirmed WRA cases, of which 3.8% were RADs. Work-aggravated asthma accounted for another 26.6% of cases. Notably, 44.7% of confirmed WRA cases had insufficient information to classify them further, the majority of which (82.8%) were from ED data. The high proportion of cases that are unable to be classified highlights the important role that providers play in [recognizing and reporting WRA](#) due to the timely detail and nature of their reports.

WRA Cases by Industry

As shown in **Table 1**, nearly a third (32.4%) of all workers with confirmed WRA were employed in the Health Care and Social Assistance industry sector, mostly in hospitals. Manufacturing accounted for 10.9% of all cases, with cases distributed among many different industries within this sector. Public Administration employed another 8.4% of cases, followed by Transportation and Warehousing (5.8%), Retail Trade (5.5%), and Accommodation and Food Services (5.1%). Comparison with the distribution of the Massachusetts workforce (**Table 1**) suggests that workers in Health Care and Social Assistance, Manufacturing, Public Administration, and Transportation and Warehousing are overrepresented among the confirmed WRA cases. However, given the nature of the case-based surveillance system and the small number of cases identified, it is unknown whether these patterns reflect increased risks or better recognition and reporting of cases in these industries.

Table 1. Distribution of confirmed WRA cases by industry, Massachusetts, 2014-2022, N=275

Industry ¹	#	%	MA workforce % ²
Health Care and Social Assistance	89	32.4%	16.1%
Hospitals	49		
Ambulatory Health Care Services	15		
Nursing and Residential Care Facilities	13		
Social Assistance	10		
All Other	2		
Manufacturing	30	10.9%	9.0%
Food Manufacturing	9		
All Other	21		
Public Administration	23	8.4%	3.8%
Fire Protection	8		
Police Protection	6		
All Other	9		
Transportation and Warehousing	16	5.8%	3.5%
Urban Transit Systems	8		
All Other	8		
Retail Trade	15	5.5%	9.9%
Accommodation and Food Services	14	5.1%	5.8%
Food Services and Drinking Places	11		
All Other	3		
Other³	88	32.0%	51.9%
Total	275	100.0%	100.0%

¹ Categories based on North American Industry Classification System. Codes available upon request. ² Source: American Community Survey, Massachusetts 2018-2022. ³ Includes 14 other major industry sectors such as but not limited to Educational Services, Construction, and Administrative and Support Waste Management as well as workers who were missing an industry code.

WRA Cases by Occupation

Table 2 presents the occupation groups of workers with confirmed WRA; example occupations in each group are provided. The largest proportion (24.0%) worked in a broad range of Service occupations. Within Service, over a third (37.9%) worked in Protective Service roles, most frequently law enforcement (48.0%). Nearly a fifth (17.5%) worked in Healthcare Support roles, the majority of whom were nurses (58.6%).

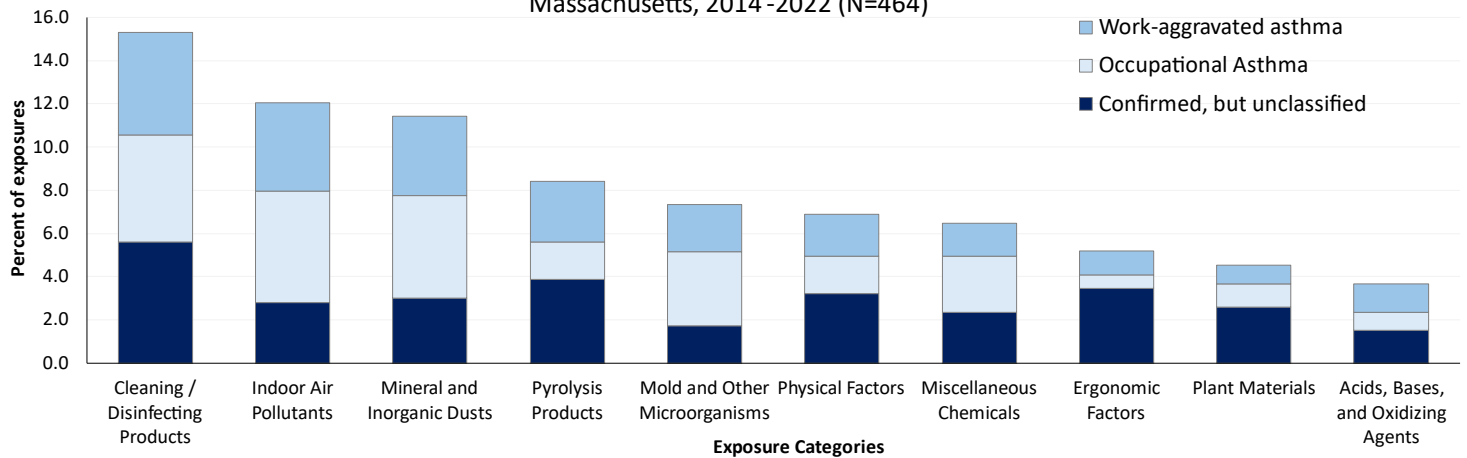
Table 2. Distribution of confirmed WRA cases by occupation, Massachusetts, 2014-2022, N=275			
Occupation¹	Example Occupations	#	%
Service		66	24.0%
Protective Services	Fire fighter, Police officer, Animal control worker, Corrections officer	25	
Healthcare Support	Nursing Aide/Orderly/Attendant	15	
Building and Grounds Cleaning and Maintenance	Housekeeper/Maid, Custodian, Landscaper	11	
Food Preparation and Serving Related	Cook, Bartender, Waiter/Waitress, Host/Hostess	9	
Personal Care and Service	Hair stylist, Cosmetologist, Recreation worker, Concierge	6	
Professional and Related		48	17.5%
Healthcare Practitioners and Technical	Nurse, Clinical lab technician, Pharmacist, Respiratory therapist	29	
Education, Training, and Library	Teacher, Teaching assistant, Librarian	8	
All Other	Counselor, Social worker, Chemist, Biological scientist, Civil engineer	11	
Production	Welder, Baker, Assembler, Mixing machine operator, Printing machine operator, Painting/Coating worker	26	9.5%
Construction, Extraction, Maintenance and Repair	Carpenter, Electrician, Painter, Plasterer, Flooring worker, Paving equipment operator, Automotive body repairer, Mechanic, Industrial machinery mechanic	20	7.3%
Office and Administrative	File clerk, Receptionist, Executive secretary, Administrative assistant, Stock clerk	16	5.8%
Transportation and Material Moving	Bus driver, Truck driver, Parking lot attendant, Cleaners of vehicles/equipment, Freight/stock mover	14	5.1%
Management, Business, and Financial	Chief executive, Accountant, HR specialist, Industrial production manager, Education administrator	9	3.3%
Sales and Related	Cashier, Retail salesperson, Rental clerk, Telemarketer	8	2.9%
All Other²		68	24.7%
Total		275	100.0%

^{1.} Categories based on Standard Occupation Codes. Codes available upon request. ^{2.} Includes workers who were missing an occupation code.

WRA Cases by Type of Exposure

Suspected exposures associated with the workers' breathing problems were identified during interviews or through ED data notes (**Figure 1**). Up to three suspected agents were recorded for each individual. A total of 464 exposures were recorded, with 54.0% of individuals reporting more than one exposure. Worth noting, interviewed workers and/or information from ED medical record notes often did not identify a specific agent of concern (e.g., quaternary ammonium compounds), and instead reported general exposure categories (e.g., cleaning product). The most frequently reported exposures were cleaning/disinfecting products (15.3%) and indoor air pollutants (12.1%). Mineral and inorganic dusts, pyrolysis products, and mold and other microorganisms were also commonly reported. The distribution of WRA classification varied by exposure category (**Figure 1**). Known asthmagens (asthma-causing agents) were identified using criteria developed by the [Association of Occupational and Environmental Clinics](#). Reported asthmagens commonly included bleach, mixture of hydrogen peroxide and peroxyacetic acid, diesel exhaust, hydrochloric acid, epoxy resins, formaldehyde, and diisocyanates.

Figure 1. Top ten most frequently reported exposures among confirmed cases by WRA classification, Massachusetts, 2014-2022 (N=464)



Note: Exposures coded according to Association of Occupational and Environmental Clinics criteria. At least one exposure reported for each case: a maximum of three reported per case. All other exposure categories accounted for 18.9% (n=87) of reported exposures.

Prevention Efforts are Needed

Work-related asthma is common. Approximately 17% of new-onset adult asthma cases are related to workplace exposures, and regardless of cause, it is estimated 22% to 58% of adults with asthma suffer work-related exacerbations.⁸ In 2021, an estimated 44.8% of ever-employed MA residents with asthma reported that their asthma had been caused or made worse by exposures at their job.⁹

It is well recognized that due to under-recognition and under-reporting, only a small proportion of Massachusetts workers with WRA are identified by our surveillance system. Given this, findings from sentinel WRA surveillance may not represent all WRA cases in Massachusetts, particularly among workers of color. Despite this, the leading industries, occupations, and exposures provide important information about where workers are at risk for WRA, and which workplace exposures/conditions need to be addressed. WRA surveillance findings have informed the development of prevention efforts by employers, enforcement agencies, policy makers, and other partners.

Here are two recent examples of how WRA cases have led to prevention recommendations for external partners:

- OHSP identified and heightened awareness of new and existing hazards, such as cannabis dust, mold, and cleaning/disinfecting products in the relatively new legalized cannabis (medical and recreational marijuana) industry in MA. We shared this information and recommendations with health care providers:

- [Death of Cannabis Production Worker Highlights the Under-Recognition of Work-Related Asthma: Healthcare Providers are Key Partners in Prevention](#) (Fall 2023 issue of the *Bulletin*)



Cannabis production worker trimming marijuana leaves from dry buds

- OHSP conducted worksite investigations and made referrals to other agencies for worksite follow-up. We collaborated with multiple partners on reducing asthma hazards associated with cleaning, sanitizing, and disinfecting products across industries. We shared this information and recommendations in a webinar to local boards of health and the Massachusetts Facilities Management Association:
 - Cleaning and Disinfecting Products: Resources for Prevention ([slides](#) / [recorded webinar](#)) (Winter 2024)

Health Care Providers Play an Important Role in Preventing Work-Related Asthma

Health care providers are mandated to report suspected cases of WRA or other work-related respiratory disease to the Department of Public Health (DPH) ([105 CMR 300.180](#)). Data presented here serve as a reminder that providers should ask each adult patient with new or worsening asthma about potential associations between symptoms and work and document that information in the medical record.¹⁰⁻¹¹ By documenting information about work and reporting suspected work-related cases to DPH, health care providers play an important role in protecting public health. DPH can use reported cases to describe the burden of WRA, identify emerging respiratory hazards, protect workers, and promote prevention.

Read more about reporting cases at www.mass.gov/how-to/report-an-occupational-disease-or-injury

Have a case to report? Report in one of four ways:

1. **Online:** Click [here](#) or scan this QR code:



2. **Phone:** (617) 624-5632

Or [download this form](#) and report by:

3. **Fax:** (857) 323-8376

4. **Mail:** DPH Occupational Health Surveillance Program
250 Washington Street, 4th floor, Boston, MA 02108

Additional information on WRA is available at www.mass.gov/work-related-asthma

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