

# SENSOR

# Occupational Lung Disease Bulletin

Massachusetts Department of Public Health  
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Dear Health Care Provider,

This issue of the *Bulletin* includes a summary of cases of work-related asthma (WRA) reported to Massachusetts SENSOR from 1993 through 2006. Although the number of cases identified by the surveillance system is believed to be only a small fraction of the total number of WRA cases in the Commonwealth, the data provide important information about the industries and occupations where workers are at risk of WRA and about workplace exposures that need to be addressed.

An updated version of the "Occupational Disease and Injury Reporting Form" is also provided, with changes to the collection of race and ethnicity. Please continue to report cases of work-related asthma using the enclosed form.

To receive your *Bulletin* by e-mail, to provide comments, or to contribute an article to the *Bulletin*, contact us at Occupational.Asthma@state.ma.us

Sincerely,  
Elise Pechter MPH, CIH

## Massachusetts SENSOR (Sentinel Event Notification System for Occupational Risk) Work-Related Asthma 1993 – 2006

Cases of work-related asthma (WRA) are sentinel health events that indicate the need for preventive intervention. Massachusetts and three other states track cases of WRA to identify these sentinel health events and describe the industries, occupations and exposures that need attention. For surveillance purposes, a case of WRA is defined as an individual with a physician's diagnosis of asthma and an association between the symptoms of asthma and work. WRA includes two main categories: 1) pre-existing asthma aggravated by workplace exposures, and 2) new onset 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 Categories

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

Since 1993, physicians in Massachusetts (and since January 2003, all health care providers) have been required by public health regulations to report confirmed and suspected cases of WRA to the Massachusetts Department of Public Health. In addition to cases reported by healthcare providers, we are now using the new statewide database of all emergency department visits to identify cases of asthma with workers' compensation as the expected payer. SENSOR staff in the Occupational Health Surveillance Program (OHSP) conduct follow-up telephone interviews with reported cases to learn more about the cases and to confirm the association of asthma with work. Information from interviews is used to identify suspect asthma-causing agents and inform intervention activities. For cases we are unable to be reach by telephone, SENSOR staff review medical records to increase case confirmation.

Between January 1993 and December 2006 OHSP received 1268 case reports of work-related asthma (WRA). Interviews were completed with 654 cases (52%), of which 633 cases met the criteria for WRA. Summary findings about the 633 cases are presented below.

Individuals with WRA were predominantly female (65%) and white (83%); seven percent (n=45) were Hispanic. The vast majority of the cases were new-onset occupational asthma (84%, n=533). Among the new-onset cases, 72 were cases of RADS (11% of all cases). Work-aggravated asthma accounted

for 87 cases (14%). An additional 13 (2%) cases met the case definition for WRA, but were not classifiable as new onset or work-aggravated.

### Description of Industry, Occupation and Exposures

Over half of all the WRA cases were employed in the service sector (n=334, 53%), mostly in the health care industry (n=181, 29%), followed by educational services (n=83, 13%). Manufacturing accounted for one quarter of all cases (n=150, 24%) with cases distributed among many different industries. Public administration employed another nine percent, followed by the retail and wholesale trade industries, and construction. **See Table I.**

**Table II** presents the occupations of the WRA cases. Managerial and professional workers accounted for one-third of all cases (n=206, 33%), with nurses and teachers as the most frequently reported occupations within this group. Operators, repair workers and laborers accounted for 27% of cases (n=171). Technical, sales and administrative workers accounted for 23% (n=145), with office workers and health technicians as the most frequently reported occupations in this category.

**Table I: Distribution of WRA cases by industry, Massachusetts SENSOR, 1993-2006, N=633**

| INDUSTRY                             | No.        | %            |
|--------------------------------------|------------|--------------|
| <b>Services</b>                      | <b>334</b> | <b>52.8%</b> |
| <i>Health Care</i>                   | 181        | 28.6%        |
| Hospital                             | 139        | 22.0%        |
| <i>Educational services</i>          | 83         | 13.1%        |
| Elementary and Secondary             | 66         | 10.4%        |
| All other                            | 70         | 11.1%        |
| <b>Manufacturing</b>                 | <b>150</b> | <b>23.7%</b> |
| <i>Chemicals and allied products</i> | 23         | 3.6%         |
| <i>Miscellaneous mfr</i>             | 17         | 2.7%         |
| <i>Electrical machinery</i>          | 15         | 2.4%         |
| <i>Machinery, excl electrical</i>    | 14         | 2.2%         |
| <i>Fabricated metal products</i>     | 13         | 2.1%         |
| <i>Food and kindred products</i>     | 13         | 2.1%         |
| <i>Measuring devices</i>             | 12         | 1.9%         |
| All other                            | 43         | 6.8%         |
| <b>Public Administration</b>         | <b>56</b>  | <b>8.8%</b>  |
| <i>Justice, public order, safety</i> | 23         | 3.6%         |
| <i>Regulation of transportation</i>  | 14         | 2.2%         |
| All other                            | 19         | 3.0%         |
| <b>Trade (wholesale/retail)</b>      | <b>42</b>  | <b>6.6%</b>  |
| <b>Construction</b>                  | <b>22</b>  | <b>3.5%</b>  |
| <i>Construction, special trades</i>  | 14         | 2.2%         |
| All other                            | 8          | 1.3%         |
| <b>Transportation</b>                | <b>16</b>  | <b>2.5%</b>  |
| <b>Other</b>                         | <b>13</b>  | <b>2.1%</b>  |

Note: Industry codes are coded according to the Standard Industrial Classification system (1987).

SENSOR staff record up to three workplace exposures identified by the case as associated with his/her asthma. Many cases were unable to identify a specific agent of concern, but reported broad categories such as indoor air pollutants and chemicals, NOS. As shown in **Table III**, the most frequently reported exposures included indoor air pollutants (8%), cleaning products (8%), dusts and fibers (8%), chemicals, NOS (6%), mold (4%), and solvents (4%). The most frequently reported agents among new-onset asthma (excluding RADS cases) and work-aggravated asthma cases were similar; however, among RADS cases, cleaning products, unspecified chemicals, and solvents were the most frequently identified agents.

The most frequently reported known asthma-causing agents<sup>1</sup> (according to the Association of Occupational and Environmental Clinics) were latex, isocyanates, formaldehyde, glutaraldehyde, metal working oils, quaternary ammonium compounds<sup>2</sup> and baking flour.

**Table II: Distribution of WRA cases by occupation, Massachusetts SENSOR, 1993-2006, N=631**

| OCCUPATION                               | No.        | %            |
|--|------------|--------------|
| <b>Managerial and Professional</b>       | <b>206</b> | <b>32.6%</b> |
| <i>Nurses</i>                            | 84         | 13.3%        |
| <i>Teachers</i>                          | 54         | 8.6%         |
| <i>Managers</i>                          | 26         | 4.1%         |
| <i>Engineers/scientists</i>              | 10         | 1.6%         |
| All Other                                | 32         | 5.1%         |
| <b>Operators/Repair/Laborers</b>         | <b>171</b> | <b>27.1%</b> |
| <i>Construction/painters</i>             | 21         | 3.3%         |
| <i>Mechanics/repairers</i>               | 20         | 3.2%         |
| <i>Assemblers</i>                        | 13         | 2.1%         |
| <i>Spray painting</i>                    | 12         | 1.9%         |
| <i>Plastic/metal machine operators</i>   | 12         | 1.9%         |
| <i>Welders</i>                           | 12         | 1.9%         |
| <i>Textile/apparel</i>                   | 10         | 1.6%         |
| All Other                                | 71         | 11.3%        |
| <b>Technical, Sales, Administrative</b>  | <b>145</b> | <b>23.0%</b> |
| <i>Administration/office workers</i>     | 83         | 13.2%        |
| <i>Health technicians</i>                | 47         | 7.4%         |
| <i>Sales</i>                             | 15         | 2.4%         |
| <b>Service</b>                           | <b>80</b>  | <b>12.7%</b> |
| <i>Cleaning occupations</i>              | 22         | 3.5%         |
| <i>Health aides</i>                      | 21         | 3.3%         |
| <i>Protective services (police/fire)</i> | 17         | 2.7%         |
| <i>Food preparation</i>                  | 10         | 1.6%         |
| All Other                                | 10         | 1.6%         |
| <b>Transportation</b>                    | <b>21</b>  | <b>3.3%</b>  |
| <b>Farming, Forestry, Fishing</b>        | <b>7</b>   | <b>1.1%</b>  |

Note: Occupation codes are coded according to the Census Occupation Code. Occupation codes are missing for two 2 cases.

<sup>1</sup> Exposures labeled with "A" meet the criteria as a known asthma inducer. <http://www.aoc.org/tools.htm>

<sup>2</sup> Three quaternary ammonium compounds meet the criteria as known asthma inducers.

**Table III: Fifteen most frequently reported exposures for cases of WRA by case classification: New Onset Asthma (NOA), Reactive Airways Dysfunction Syndrome (RADS), and Work Aggravated Asthma (WAA), Massachusetts SENSOR, 1993-2006, N=1899 agents<sup>a</sup>**

| AGENT                               | NOA <sup>b</sup> | RADS | WAA | WRA      |     | No. | % |
|-------------------------------------|------------------|------|-----|----------|-----|-----|---|
|                                     |                  |      |     | unclass. |     |     |   |
| Indoor Air Pollutants <sup>c</sup>  | 119              | 10   | 24  | 3        | 156 | 8.2 |   |
| Cleaning Products <sup>d</sup>      | 87               | 32   | 22  | 4        | 145 | 7.6 |   |
| Minerals and Inorganic Dusts        | 102              | 14   | 22  | 4        | 142 | 7.5 |   |
| Chemicals, NOS                      | 75               | 18   | 13  | 2        | 108 | 5.7 |   |
| Mold                                | 64               | 2    | 12  | 0        | 78  | 4.1 |   |
| Solvents                            | 46               | 15   | 11  | 1        | 73  | 3.8 |   |
| Products of Combustion <sup>e</sup> | 35               | 7    | 9   | 0        | 51  | 2.7 |   |
| Latex                               | 41               | 1    | 4   | 0        | 46  | 2.4 |   |
| Isocyanates <sup>f</sup>            | 35               | 3    | 1   | 0        | 39  | 2.1 |   |
| Paints and Lacquers                 | 18               | 1    | 6   | 2        | 27  | 1.4 |   |
| Acids and Bases                     | 15               | 9    | 1   | 0        | 25  | 1.3 |   |
| Metals                              | 19               | 2    | 2   | 0        | 23  | 1.2 |   |
| Formaldehyde                        | 19               | 0    | 2   | 0        | 21  | 1.1 |   |
| Polymers                            | 14               | 3    | 3   | 0        | 20  | 1.1 |   |
| Welding Fumes                       | 14               | 4    | 1   | 0        | 19  | 1.0 |   |

NOS = Not otherwise specified

<sup>a</sup> At least one agent was reported for each case; a maximum of three agents could be reported

<sup>b</sup> Excludes RADS cases

<sup>c</sup> Includes cases who report "bad air", "indoor air pollutants", "poor ventilation" or "sick building syndrome". More

specific agents associated with indoor air pollution, including dust and mold, are coded separately

<sup>d</sup> Includes specific cleaning products such as bleach and ammonia.

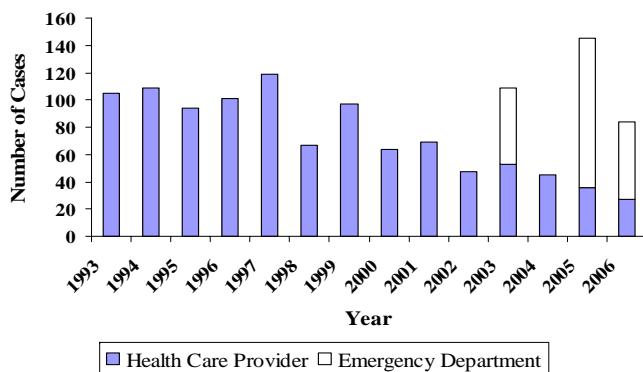
<sup>e</sup> Includes smoke and exhaust

<sup>f</sup> Includes MDI, TDI, and HDI, etc.

WRA can have serious health and financial impacts on working adults. Eighty-eight percent (n=553) of those with WRA still had breathing problems at the time of the interview and 25% reported their symptoms had become "more severe" since their initial diagnosis. More than half of the cases (n=348) reported at least one emergency room visit; 30% (n=191) reported multiple visits to an emergency department for treatment of asthma symptoms. More than a third (n=215) of cases reported leaving the job that caused their breathing

problems, including 25 cases who reported that they were fired because of their breathing problems. Only half the cases (n=336, 53%) applied for workers' compensation.

**Figure I: Number of health care provider case reports and emergency department cases per year, Massachusetts, SENSOR, 1993-2006, N=1268**



Note: Data collection is ongoing for 2006.

As shown in **Figure I**, the number of cases of WRA reported to SENSOR by physicians has declined in recent years. As described on page 1, OHSP began conducting case ascertainment using emergency department (ED) data, in 2003, 2005, and 2006. Preliminary assessment of data comparing patients from ED records and healthcare provider reports suggests that cases identified through ED records may represent a different distribution of WRA, and may represent different industries and occupations. As MA SENSOR continues to identify cases from ED records, further analyses of these differences and similarities will help inform case ascertainment and prevention efforts.

## Discussion

It is well recognized that only a small proportion of WRA cases are reported to SENSOR and that findings may not be representative of the underlying incidence of WRA in the Massachusetts population. Interview response patterns also influence the

findings reported here, which are based on the 52% (n=654) of all reported cases who consented to participate in telephone interviews. White-collar workers were more likely to respond than blue-collar workers and women were more likely to respond than men. Thus white-collar workers and women are over-represented in the findings. It is unlikely that the observed decline in healthcare provider reported cases over time reflects a true drop in incidence, but is more likely due to reduced reporting. It has been suggested this decline may be due, in part, to the time required in the face of increasing workloads among healthcare providers.

There has also been increased concern in recent years about patient confidentiality. Health care providers are reminded that reporting cases of WRA to the Massachusetts Department of Public Health (MDPH) is **NOT** a violation of the Health Insurance Portability and Accountability Act (HIPAA) because Massachusetts regulations require reporting of this condition. HIPAA expressly “authorizes health care providers to disclose protected health information without permission of the individual, to MDPH, the public health authority authorized to receive it.”

While the SENSOR data are not necessarily representative, findings do provide important information about the industries and occupations where workers are at risk of WRA and about workplace exposures that need to be addressed. Using surveillance data from the last 14 years, the Massachusetts SENSOR data have:

- drawn attention to the risks of latex exposures, contributing to reduced use of natural rubber latex and development of safer products;
- led to the identification of a new asthma causing agent in a chemical manufacturing facility;
- together with findings from other SENSOR states, brought attention to the hazards of:
  - cleaning products
  - isocyanates in truck bed liners and other products
  - diacetyl in flavoring manufacture
  - indoor air pollution
  - and focused on health care workers and school staff as workers at risk of WRA.

Inspections and referrals by the SENSOR program have led to the reduction of hazards in a number of specific Massachusetts workplaces. SENSOR also continues to serve as an important vehicle for educating the community—providers and the public alike—about work-related asthma and the potential for asthma prevention.

**New Adult Asthma Action Plan to Be Released**

Massachusetts Health Quality Partners (MHQP), in collaboration with representatives from 21 Massachusetts health care organizations, including MDPH and The Asthma and Allergy Foundation of New England, will disseminate an Adult Asthma Action Plan to physicians to be used with their adult patients, along with a pocket Asthma Care Card to help patients remember their medications. The card and plan will be available later this summer, from the Massachusetts Health Promotion Clearinghouse, free of charge to health care providers and patients, in eight languages. A WRA fact sheet and reporting form will be included in the initial mailings. For more information, visit [www.mhqp.org](http://www.mhqp.org).

**Massachusetts Adult Asthma Action Plan**

Name: \_\_\_\_\_ Date: \_\_\_\_\_  
 Date of birth: \_\_\_\_\_ Next visit: \_\_\_\_\_  
 Drug allergies: \_\_\_\_\_ Prepared by: \_\_\_\_\_  
 Emergency contact: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Doctor/nurse: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Needs flu shot  
 Your personal best peak flow: \_\_\_\_\_  
 Avoid things that make your asthma worse: \_\_\_\_\_

Date: \_\_\_\_\_  
Next visit: \_\_\_\_\_  
Prepared by: \_\_\_\_\_  
Bring this plan to every visit

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**greenzone-go** Take these medicines to control your asthma

| Medicine | How much | When |
|----------|----------|------|
|          |          |      |
|          |          |      |
|          |          |      |
|          |          |      |
|          |          |      |

Breathing is good  
 - No cough or wheeze  
 - Sleep through the night  
 - Can perform usual daily activities  
 - This is how you should feel every day

Peak flow (100%-80%) from \_\_\_\_\_ to \_\_\_\_\_

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**yellowzone-caution** Take these medicines to get your asthma under control

| Medicine | How much | When | How long |
|----------|----------|------|----------|
|          |          |      |          |
|          |          |      |          |
|          |          |      |          |
|          |          |      |          |
|          |          |      |          |

Cough  
 - Mild wheeze  
 - Tight chest  
 - Trouble breathing  
 - Wake up at night  
 - First signs of a cold

Peak flow (80%-50%) from \_\_\_\_\_ to \_\_\_\_\_

Continue "green zone" controller medicines  
 Use an spacer with \_\_\_\_\_

If symptoms do not improve within \_\_\_\_\_ hours, call your doctor/nurse. Let your doctor/nurse know if you keep going into the yellow zone. The green zone medicines may need to be changed to keep other episodes from starting.

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**redzone-danger** Take action right away

| Medicine | How much | How long |
|----------|----------|----------|
|          |          |          |
|          |          |          |
|          |          |          |
|          |          |          |
|          |          |          |

Breathing hard & fast  
 - Difficulty walking and talking  
 - Working hard to breathe

Peak flow (less than 50%) \_\_\_\_\_

**DANGER SIGNS- Call 911 or go to the nearest emergency room if:**  
 - Lips or fingernails are blue  
 - You are struggling to breathe  
 - You do not feel any better 15 minutes after you start the red zone medicines and you have not reached your doctor/nurse

**Contact your doctor/nurse within two days of an emergency room visit or hospitalization.**

White Copy: Patient      Yellow Copy: Provider      www.mhqp.org      MHQP 2007