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 2002. Although the number of cases identified by 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.

We call your attention to the fact that only 47 cases of WRA were reported by physicians in 2002. This is the lowest number of reports we received per year since we began tracking WRA in 1993. We suspect this decline is due to a decrease in reporting rather than in underlying incidence. We welcome your thoughts about this and recommendations for improving case reporting. In the meantime, we are proceeding with new initiatives to improve surveillance by working with pharmacists and community health centers and making use of the new statewide emergency department data set.

To receive your *Bulletin* by e-mail or provide comments, send a message to Occupational.Asthma@state.ma.us.

Sincerely,
Kathy Raleigh, MPH

Work-Related Asthma Cases Massachusetts SENSOR 1993 – 2002

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 work-related asthma 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) new onset asthma caused by sensitizers or irritants in the workplace and 2) pre-existing asthma aggravated by workplace exposures. 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.

WRA Surveillance Categories

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

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. SENSOR staff conduct follow-up telephone interviews with individuals reported to the Occupational Health Surveillance Program (OHSP) to learn more about the cases, and confirm the association of asthma with work. Information from cases is used to identify suspect asthma-causing agents and inform intervention activities.

Between January 1993 and December 2002 SENSOR received 873 case reports of work-related asthma (WRA). Interviews were completed with 481 cases (55%), of which 451 cases met the criteria for WRA. Summary findings about the 451 cases are presented below.

The majority of individuals with WRA were female (63%) and predominantly white (86%); six percent (n=29) were of Hispanic origin. The WRA cases were classified in accordance with the

aforementioned categories. The vast majority of the cases were new-onset occupational asthma (90%, n=405). RADS, a subset of new onset asthma accounted for 43 cases (10%), and the remaining 362 cases were new-onset occupational asthma with known or unknown asthmagens. Work-aggravated asthma accounted for 46 cases (10%).

Description of Industry, Occupation and Exposures

Over half of all the WRA cases were employed in the service sector (n=228, 52%), among whom most worked in the health care industry (n=132, 30%), followed by educational services (n=56, 13%). Manufacturing accounted for one quarter of all cases (n=111, 25%) led by chemical manufacturing (n=18, 4%) and industrial machinery (n=13, 3%). Public administration employed another ten percent (n=44, 10%), followed by the retail and wholesale trade industries (n=22, 5%). Construction only accounted for 4%. **See Table I**.

Table I: Distribution of WRA cases by industry, Massachusetts SENSOR, 1993-2002, n=437.

INDUSTRY	No.	%
Services	**228**	**52.2%**
*Health Care**	132	30.2%
Hospital**	104	23.8%
Educational services	56	12.8%
Elementary and Secondary **	41	9.4%
All other	40	9.2%
Manufacturing	**111**	**25.4%**
*Chemicals**	18	4.1%
Industrial machinery	13	3.0%
Measuring devices	10	2.3%
Electronics	10	2.3%
All other	60	13.7%
Public Administration	**44**	**10.1%**
*Regulation of transportation**	16	3.7%
Admin of economic programs	13	2.9%
All other	15	3.4%
Trade (wholesale/retail)	**22**	**5.0%**
Construction	**17**	**3.9%**
Transportation	**10**	**2.3%**
Other	**5**	**1.1%**

* Table includes industries at the 2-digit level with 9 or more case.
** Table includes industries at the 4-digit level with 35 or more cases.

Table II presents the occupations identified among the WRA cases. Managerial and professional workers accounted for over one-third of all occupations (n=147, 35%), followed by technical, sales and administrative (n=95, 22%). Operators and laborers accounted for 18% (n=77), while precision production, craft and repair workers accounted for 12% of cases (n=53). Overall, nurses, office workers and teachers were the most frequently reported occupations accounting for 39% of all WRA cases.

Each case may describe up to three exposures that trigger their asthma. Many of the cases were unable to identify the specific agent of concern. **Table III** shows the most frequently reported exposures including indoor air pollutants (n=94, 21%), cleaning products (n=77, 17%), mold (n=53, 12%),

Table II: Distribution of WRA cases by occupation, Massachusetts SENSOR, 1993-2002, n=425.

OCCUPATION	No.	%
Managerial and Professional	**147**	**34.6%**
Nurses	69	16.2%
Teachers	39	9.2%
Engineers/scientists	12	2.8%
Managers	9	2.1%
All other	18	4.2%
Technical, Sales, Administrative	**95**	**22.4%**
Administration/office workers	58	13.6%
Health technicians	30	7.1%
Sales	7	1.6%
All other	7	1.6%
Operators/Laborers	**77**	**18.1%**
Welders	8	1.9%
Painters	9	2.1%
Assemblers	8	1.9%
Mixing and blending machine	7	1.6%
All other	45	10.6%
Precision Production Craft and Repair	**53**	**12.4%**
Construction workers	16	3.8%
Mechanics	13	3.1%
Bakers	5	1.2%
Machinists	4	0.9%
All other	15	3.5%
Service	**48**	**11.3%**
Health aides	11	2.6%
Cleaning occupations	10	2.3%
Hairdressers	6	1.4%
Fire fighters	5	1.2%
All other	16	3.8%
Farming, Forestry, Fishing	**5**	**1.2%**

Table III: Fifteen most frequently reported asthma causing agents for cases of WRA separated into three categories: Work Aggravated Asthma (WAA), Reactive Airways Dysfunction Syndrome (RADS), and New Onset Asthma (NOA), Massachusetts SENSOR, 1993-2002, n=451*

AGENT	NOA	RADS	WAA	No.	%
Indoor Air Pollutants **	83	2	9	94	20.8
Cleaning Products ***	60	10	7	77	17.1
Mold	45	0	8	53	11.8
Dust	34	2	10	46	10.2
Latex	37	1	4	42	9.3
Chemicals, NOS	23	7	4	34	7.5
Isocyanates****	22	4	1	27	6.0
Smoke, NOS	15	3	5	23	5.1
Formaldehyde	19	0	2	21	4.7
Solvents, NOS	12	2	4	18	4.0
Paint	13	0	2	15	3.3
Gluteraldahyde	15	0	0	15	3.3
Glues, NOS	9	1	2	12	2.7
Diesel Exhaust	10	0	1	11	2.4
Welding	9	1	1	11	2.4

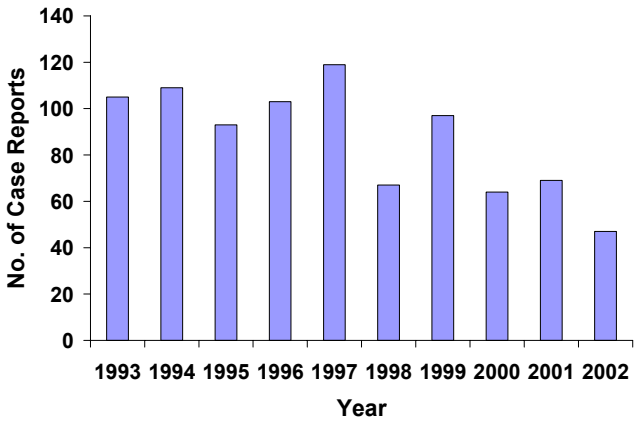
NOS = Not otherwise specified
*Up to 3 agents were reported for each case.
*** Includes specific cleaning products (e.g., bleach and ammonia)
**** Includes MDI, TDI, and HDI etc.
** Includes cases who report "bad air", "indoor air pollutants", "poor ventilation", or "sick building syndrome". More specific agents associated with indoor air pollution, including dust and mold, are coded separately.

and dust (n=46, 10%). Specific agents identified included latex (n=42, 9%), isocyanates (n=26, 6%) smoke (n=23, 5%), and formaldehyde (n=21, 5%). Among the 43 RADS cases, cleaning products (n=10, 23%) and unspecified chemicals (n=7, 16%) were most frequently reported. Among the 46 work-aggravated asthma cases, dust (n=10, 22%) and indoor air pollutants (n=9, 20%) were most frequently reported. While teachers and office workers identified indoor air pollutants as common triggers, health care workers most frequently identified cleaning products (33 of 77 case reports).

Work-related asthma can have very serious health and financial impacts on working adults. Over 90% of those with WRA still had breathing problems at the time of the interview and 30% reported their symptoms had become "more severe," since their initial diagnosis. Half of the cases (n=227) reported one or more emergency room treatments for their asthma symptoms; almost one quarter of the cases (n=109, 24%) reported multiple visits to the emergency department. A total of 159 (35%) cases reported leaving the job that caused their breathing problems, including 18 cases who were fired. More than half the cases (n=251, 55%) applied for workers' compensation.

As shown in **Graph I**, the number of cases of WRA reported to SENSOR has declined in recent years. It is unlikely that this decline in the number of cases reflects a drop in incidence and is more likely due to reduced reporting. Physicians may not recognize the association of the patients' symptoms with work. In addition, those cases that are identified may not be reported due to time and paperwork pressures that are barriers to conducting the public health aspects of clinicians' actions.

Graph I: Number of case reports per year, Massachusetts, SENSOR, 1993-2002, n=873



Discussion

There are some limitations to the data analysis. Only a small proportion of the WRA cases are reported. The analysis is based on those cases who consented to participate in a telephone interview, 55% (n=451) of the reported cases (n=876). 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. While the data are not necessarily representative, the problems identified are serious and warrant attention.

SENSOR is implementing initiatives to address the limitations by 1) working to use the new statewide emergency department database to identify cases of asthma with workers compensation as the expected payer; 2) using medical records for those workers not reached by telephone to increase case confirmation; and 3) analyzing all reported cases (not just those interviewed) to reduce any selection bias.

In addition, SENSOR is developing an educational brochure for distribution by community based pharmacists in Chelsea, working with a health care provider to design WRA information for construction workers, designing a survey of elementary school staff and presenting information at NECOEM's annual meeting in December.

SENSOR's ability to describe the burden of WRA on the working population is based on the case reports and the information collected from the reporting health care providers and the workers themselves. Continue to report all confirmed and suspected work-related asthma cases. Notably, thirteen health care providers reported cases for the first time in 2002. These cases accounted for 28% of the 2002 WRA cases. SENSOR welcomes requests for assistance in identifying exposures or an on-site inspection, please contact OHSP staff.

If you or your colleagues would like to write an *Occupational Lung Disease Bulletin* about an occupational lung disease or illustrative case, contact OHSP staff who administer SENSOR.

Number of Work-Related Asthma Cases Reported to Massachusetts SENSOR, March 1992 – Present

July 2003	August 2003	September 2003	Total to Date (3/92-present)
6	3	3	944