

SENSOR Occupational Lung Disease Bulletin

A project of the Massachusetts Department of Public Health's Occupational Health Surveillance Program, the Massachusetts Thoracic Society, and the Massachusetts Allergy Society

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Dear Health Care Provider,

In this issue we present a cluster investigation prompted by a report to SENSOR that identified a new sensitizing agent. An astute pulmonologist identified a case of work-related asthma that he suspected was related to other cases being seen by his colleagues. A note written on the Confidential Report of Occupational Disease and Injury (<http://www.state.ma.us/dph/bhsre/ohsp/crodi.pdf>) alerted OHSP to the cluster. OHSP received Technical Assistance from NIOSH, which performed a comprehensive evaluation including medical, industrial hygiene and toxicological assessments necessary to identify a new asthma-causing agent.

Sentinel surveillance succeeded in several important public health functions. Initially, a cluster of WRA was revealed. Subsequent investigation of this cluster provided important information about a previously unrecognized asthmagen, AMT (amino mercapto triazole). The manufacturer implemented methods to reduce exposures to this hazardous chemical. Additionally, state and federal occupational health agencies collaborated to enhance communication and provide a comprehensive evaluation in response to knowledgeable medical evaluation.

This sentinel surveillance system relies upon health care providers. Accurate diagnosis of asthma, with follow-up that links symptoms to work are the cornerstones of prevention. Please continue to report confirmed and suspected work-related asthma cases to OHSP.

Sincerely,
Elise Pechter MPH, CIH
Industrial Hygienist

Cluster of Work-Related Asthma Reveals a New Asthmagen: AMT at ChemDesign

Background

A pulmonologist reported a case of new-onset work-related asthma to the Massachusetts Department of Public Health (MDPH) Occupational Health Surveillance Program (OHSP). He noted that his colleagues were evaluating two or more other patients from the same company for respiratory problems. This note enabled OHSP to uncover a cluster of nine work-related asthma cases that had been referred to this pulmonary clinic from January 1998 to December 1999.

ChemDesign is a specialty chemical manufacturer, with about 250 employees, 125 of whom were production workers at the time of the evaluation. The chemical exposures of concern were AMT (later identified as 3-amino-5-mercapto-1,2,4-triazole) and two products manufactured using AMT (one of which was a herbicide).

Employees diagnosed with occupational asthma reported that they developed severe upper and lower respiratory symptoms while working with AMT. The symptoms developed progressively within several months after starting manufacture of the new herbicide. The company physician referred these employees to the pulmonology clinic for treatment.

Methods

OHSP requested technical assistance from the National Institute for Occupational Safety and Health (NIOSH) in December 1999. NIOSH then implemented a comprehensive health hazard evaluation at ChemDesign that included medical, laboratory and industrial hygiene assessments in February and June 2000.

NIOSH offered to evaluate all employees at ChemDesign, whether or not they were exposed to AMT. They extended the offer to former employees who had also been exposed. The medical investigation included:

- ♦ A questionnaire on respiratory symptoms and exposures
- ♦ Blood samples for IgE, and IgG for AMT
- ♦ Lung function tests, including methacholine tests for nonspecific bronchial hyperactivity (NSBH).

Forty-one current employees and four former employees participated; NIOSH reviewed the 45 company medical files, including lung function results.

Laboratory studies were undertaken to determine if exposed workers had any serologic evidence of allergic disease. In addition, animal studies were conducted to evaluate the sensitization potential of AMT and the herbicide.

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The industrial hygiene evaluation used personal and area air samples to characterize chemical operator exposures to AMT and the herbicide in the building where the herbicide was still being manufactured. New analytical methods were developed to detect the two chemicals that were present as particulates in the air samples.

Results

Among the 45 employees (present and former), 42 had been exposed to AMT; an unexposed comparison group was not available. NIOSH identified 11 cases of physician diagnosed work-related asthma directly related to AMT exposure, two more than in the original cluster. In addition, there were 27 participants who developed upper respiratory symptoms or eye irritation after they started working on the herbicide manufacture.

Onset of symptoms occurred on average 10 months after the individuals started working with AMT. In most of the cases, nonspecific bronchial hyperactivity (NSBH) was present at diagnosis, but improved after removal from exposure. The NSBH was not associated with allergy to common allergens.

Of the 45 participants, 43 had lung function tests done by NIOSH. All the participants were males; the average age of the group was 42.2 years. The FEV₁ and FEV₁/FVC ratio were both significantly decreased in the participants. FVC were not below predicted values.

Review of the company pulmonary function records allowed analysis over time for 34 participants with three or more years of testing. The annual rate of decline for FEV₁ and FEV₁/FVC was greater than expected with increasing years of age.

Animal studies were conducted to evaluate the potential of AMT or the herbicide to cause sensitization. The AMT, but not the herbicide, caused lymphocyte proliferation and IgE production, indicating sensitization potential. Neither AMT nor the herbicide caused systemic toxicity (as measured by body weight gain) or irritation at the concentrations tested. The human studies were inconclusive.

AMT was detected in air samples, especially when AMT was being charged or loaded into the chemical processor; the herbicide was measured in the air when discharged from the dryer. ChemDesign had already implemented controls to reduce particulate exposures at the time that air sampling was conducted. These air samples did not reflect air concentrations at the time workers were initially exposed.

NIOSH recommended:

- ◆ Implementation of a medical monitoring program designed for early detection and prevention of health effects from exposure to hazardous chemicals. This should include:
 - Pre and post shift peak expiratory flow measurements to evaluate acute changes in lung function
 - Management provision of specific education and information to employees regarding recognition of respiratory symptoms
 - Timely evaluation by a health care provider of respiratory symptoms, including wheezing, chest tightness, shortness of breath, cough and other upper respiratory symptoms
 - Utilization of annual lung function tests for disease prevention, by plotting results over time for individuals and discussions about these results with tested employees
- ◆ Workers should be informed about the health hazards of AMT, including dermal and inhalation exposure. AMT is a likely asthmagen.
- ◆ Engineering controls such as closed systems and local exhaust ventilation should be the principal method for minimizing exposure to chemicals in the workplace.
- ◆ Improvements were also recommended in housekeeping and respirator use. On two occasions workers used, or attempted to use, air-purifying respirators to perform activities for which a supplied air respirator was specified by the company.

Copies of the interim report of the ChemDesign evaluation (HETA # 2000-0096-2876) may be obtained by contacting NIOSH.

REPORT AUGUST-OCTOBER CASES NOW
By October 31st, report all occupational lung disease cases seen for the first time between August and October 2002. If you have NOT seen any cases, it is not necessary to return the report form.

**Number of WRA Cases Reported to
 Massachusetts SENSOR, March 1992- August 2002**

June 2002	July 2002	August 2002	Total to Date (3/92-8/02)
5	9	3	890