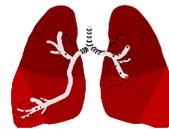




# Occupational Airways



A newsletter of the Occupational Health & Special Projects Program, Division of Environmental Epidemiology and Occupational Health (EEOH), Connecticut Department of Public Health, 410 Capitol Avenue, MS# 11OSP, P.O. Box 340308, Hartford, CT 06134-0308 (860) 509-7744

Vol. 4 No. 1

April 1998

## This issue:

- ⇒ Isocyanate asthma in Connecticut: Are you missing the diagnosis?
- ⇒ ConnectiCOSH: CT's Council on Occupational Safety and Health
- ⇒ Summary Table of Reported Cases of Selected Respiratory Diseases in CT

Dear Health Care Provider:

In this issue, isocyanate asthma is revisited. The greatest number of occupational asthma reports in the CT Occupational Disease Surveillance System (ODSS) are due to isocyanates. Isocyanate asthma is a difficult disease to diagnose. Yale University School of Medicine is currently conducting two studies related to isocyanates. Both studies are described in this issue.

With this issue, we begin the first in a series of articles about occupational health resources in CT. There are many valuable resources available in CT for you and your patients. This month features an article on ConnectiCOSH, CT's Council on Occupational Safety and Health.

As always, please report all known or suspected cases of occupational disease. Without your support, we can not monitor occupational disease in CT nor conduct follow-up activities to improve the health of CT's workforce. Thank you!

Sincerely,

Walter E. Barbee, MD, MPH

## ISOCYANATE ASTHMA IN CONNECTICUT: ARE YOU MISSING THE DIAGNOSIS?

*Carrie A. Redlich, MD, MPH*  
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Section of Pulmonary and Critical Care Medicine  
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Diisocyanates are a group of highly reactive, low molecular weight compounds widely used throughout industry, primarily as the hardening agents in urethane paints and plastics. With dramatically expanded use of polyurethane paints, plastics, foams, and coatings, diisocyanates have emerged by far as the most common identified cause of occupational asthma in developed countries. Between 5 and 20 % of workers exposed to isocyanates develop asthma. The most commonly used isocyanates are toluene diisocyanate (TDI), methylene diphenyl diisocyanate (MDI) and hexamethylene diisocyanate (HDI). One of the most common settings for isocyanate exposure in Connecticut is autobody repair shops where HDI-containing paints are used extensively. Other common settings for isocyanate exposure are foam and coating operations which use polyurethanes.



Isocyanate-induced asthma is an idiosyncratic, progressive airways disease that is frequently indistinguishable from adult-onset asthma of other causes, therefore making recognition and diagnosis difficult. Patients develop the insidious onset of respiratory symptoms after recurrent exposures over several

months to a few years, rather than after an isolated exposure. Initially, symptoms occur immediately after exposure, after a 4-6 hour delay, or both (dual), documented by experimental bronchoprovocation challenge. Methacholine sensitivity is usually also increased, and many patients develop bronchospasm to more generalized stimuli over time. More than half will have persistent asthma, even after removal from exposure. Fatal cases due to isocyanate exposure have been documented.

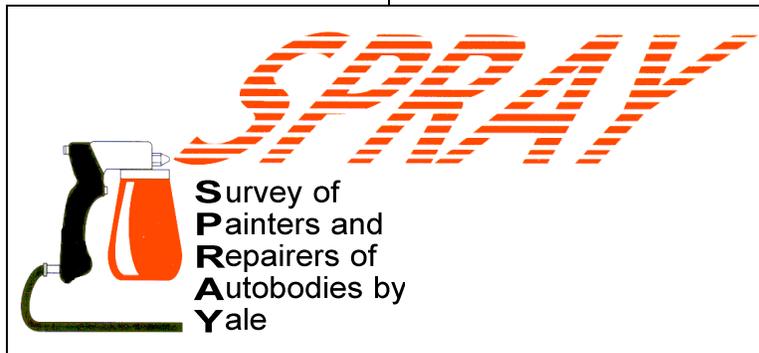
The mechanisms by which isocyanates cause airway inflammation and asthma are not well understood. The clinical disease and limited studies suggest that isocyanate asthma is an immunological disease mediated predominantly via non-IgE mechanisms, most likely T lymphocytes. T lymphocytes may become sensitized to the isocyanate antigen(s), leading to isocyanate-specific immune responses, airway inflammation and asthma. IgE and IgG isocyanate antibodies have not been helpful diagnostically and are not recommended.

The importance of early diagnosis is underscored by recent data suggesting that prompt removal from exposure results in the best prognosis. Currently, however, there is no simple way to differentiate asthma related to isocyanates from asthma of other causes. No identifiable host risk factor, such as atopy or pre-existing airways disease, has been associated with risk for isocyanate asthma; the incidence of atopy in affected patients is not increased. Despite careful clinical history, specific knowledge of the work environment, and serial physiologic (i.e. peak flow) testing, the diagnosis can be difficult to make. The key to diagnosis is a high level of suspicion and a careful patient history.

Prevention of this disease is also problematic. Even very low level isocyanate exposure (below workplace standards) can cause asthma, and the exposure characteristics most associated with risk of developing asthma remain unclear. All of these factors make isocyanate asthma extremely difficult to both diagnose and prevent.

Investigators from the Yale Occupational Medicine Program and Pulmonary and Critical Care Section have undertaken two large studies to address the problem of isocyanate asthma in Connecticut. An epidemiologic field study of autobody shops in New Haven County, **SPRAY**, (Survey of Painters and Repairers of Autobodies by Yale) is just getting underway. The goals of this study are to develop improved tools to help practitioners diagnose isocyanate asthma, to obtain information about actual isocyanate exposure levels in Connecticut, and to determine which factors increase the risk of developing isocyanate asthma.

A second study, part of Yale's National Institute of Health (NIH)-funded Specialized Center of Research (SCOR) to understand the pathogenesis of asthma, is designed to study the mechanisms by which isocyanates cause airway inflammation and asthma. The project involves identifying what isocyanates actually bind to when inhaled into the lung, and which T cells recognize and respond to the isocyanate "antigen". These studies should lead to the identification of markers of isocyanate sensitization, greatly facilitating early diagnosis. To facilitate both studies, an isocyanate exposure chamber has been built at Yale, enabling researchers to perform specific isocyanate inhalational challenge testing. The ultimate goal of both studies is to develop better strategies to diagnose and prevent isocyanate asthma.



The Yale investigators are eager to evaluate any patients with known or suspected isocyanate asthma in Connecticut. Patients will receive a *free* medical evaluation including methacholine and/or specific isocyanate challenge, and an extensive exposure assessment. The patient and referring physician will both be informed of results. Patients will also be compensated financially for their participation. Autobody shops are also being recruited to participate in SPRAY, and will receive a free industrial hygiene evaluation and respiratory health survey.

For more information, or to refer a patient or autobody shop, please contact: Dr. Carrie Redlich (203) 737-2817, or Ms. Carole Holm, RN (203) 737-4263 at the Yale Occupational and Environmental Medicine Program.

## REFERENCES

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## ConnectiCOSH: Connecticut's Council on Occupational Safety and Health

ConnectiCOSH is a non-profit, statewide organization which assists individuals, unions, and communities to secure healthier and safer working and living conditions. ConnectiCOSH supports health and safety, works for effective legislation at the state and national level, and actively seeks better enforcement of existing laws. Its membership includes local unions, labor councils, community groups, health and safety personnel and health professionals. Financial support comes from members' dues, union contributions, grants and fund raising activities.

ConnectiCOSH is a resource center with useful information on a wide range of topics including asbestos, toxic wastes, solvents, video display terminals, indoor air quality, reproductive health hazards and repetitive trauma. ConnectiCOSH also has information on health and safety committees and contract language.

ConnectiCOSH's services include:

### Technical and Legal Support

- Research on hazards
- Referral to medical services
- Assistance with filing OSHA complaints
- Aid in filing worker compensation claims
- Aid in developing joint Health and Safety Committees

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<b>Summary of Number of Reported Cases of Selected Respiratory Diseases in CT</b>					
<b>CT DPH Occupational Disease Surveillance Data</b>					
	1994	1995	1996	1997*	ODSS Total**
<b>Asthma</b>	13	34	33	26	147
<b>RADS***</b>	1	1	5	4	17
<b>Silicosis</b>	4	1	0	1	8
<b>Asbestosis</b>	3	5	10	3	48
<b>Asbestos-related pleural diseases</b>	17	8	7	2	125
<b>Total</b>	38	49	55	36	345

\* As of March 31, 1998. Data subject to change.

\*\* Occupational Disease Surveillance System (ODSS) total since 11/91

\*\*\* Reactive Airways Dysfunction Syndrome

TO:

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Education Support

- Speakers bureau
- Training sessions on hazardous materials, blood-borne pathogens, ergonomics and more
- Conferences
- Videos, films, fact sheets
- Newsletter-free to members

*ConnectiCOSH* is currently involved in a variety of projects. Three are briefly described below.

School Indoor Air Quality: ConnectiCOSH is working towards building coalitions of parents, school staff and health professionals to address the indoor air problems in Hartford schools utilizing U.S. Environmental Protection Agency's (EPA) Tools for Schools program.

Migrant Farm Worker Health: ConnectiCOSH is planning three health fairs for migrant farm workers. They also will be conducting outreach to the urban seasonal workers in Hartford and will be going directly to the camps to discuss health issues with the migrant workers.

Ergonomic Trainings: ConnectiCOSH is collaborating with the UConn Health Center's Ergonomic Technology Center to offer Ergonomic Intervention Team trainings for workers in various industries.

The next two trainings are scheduled for Manufacturing Workers, May 7-8, and for Retail Workers, September 17-18. The two day trainings are \$45.00 each.

ConnectiCOSH programs and services are available to the general public and to members of ConnectiCOSH. Membership is open to any worker in CT, including physicians, nurses, physician assistants, industrial hygienists, health and safety personnel and public health professionals. For more information, call (860) 549-1877. ConnectiCOSH is located at 77 Huyshope Ave., 2nd floor, Hartford, CT 06106-7000. E-mail: [Connecticosh@snet.net](mailto:Connecticosh@snet.net).

Occupational Airways is produced by the Occupational Health & Special Projects Program, Division of Environmental Epidemiology & Occupational Health, Connecticut Department of Public Health.

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