

# SENSOR

# Occupational Lung Disease Bulletin

Massachusetts Department of Public Health  
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Dear Health Care Provider,

I recently joined the work-related asthma surveillance project as the asthma epidemiologist and project coordinator. I am very excited to partner with you in identifying cases of work-related asthma and developing interventions to target problematic exposures, occupations, and industries. I appreciate your continued efforts to report cases of occupational lung disease and welcome any suggestions about how reporting might be made easier for you.

This issue of the *Occupational Lung Disease Bulletin* provides a summary of and additional comments on a recently published article about work-related asthma among workers and volunteers involved in rescue and recovery at the World Trade Center site. It serves as a reminder that both disaster and non-disaster workers are frequently exposed to a wide range of respiratory hazards, including potential asthmagens. It also emphasizes the necessity for ongoing medical surveillance of disaster workers and encourages the involvement of the occupational health community in disaster preparedness efforts.

**REMINDER: To receive your Bulletin by e-mail, or add the names of colleagues to our mailing list, please send a message to [occupational.asthma@state.ma.us](mailto:occupational.asthma@state.ma.us).**

Sincerely,  
Liza Lutzker, MPH

## Occupational Asthma in World Trade Center Rescue and Recovery Workers

Adapted from: Wheeler K, McKelvey W, Thorpe L, *et al.* Asthma Diagnosed after 11 September 2001 among Rescue and Recovery Workers: Findings from the World Trade Center Health Registry. *Environ Health Perspect* 2007; 15(11): 1584-1590.

Following the attacks of September 11, 2001 on the World Trade Center (WTC) in New York City (NYC), an estimated 91,469 workers and volunteers were involved in rescue, recovery, demolition, construction, clean-up, and support services. Workers present during the initial collapse of the buildings were exposed to a dust and smoke cloud consisting of a wide range of pulverized

## REPORT 2007 CASES NOW

Help us protect workers' health and promote safe workplaces! By January 31<sup>st</sup>, please report all occupational lung disease cases seen for the first time in calendar year 2007. Thank you.

building materials and products of pyrolysis.<sup>1</sup> The initial dust cloud settled approximately 12 hours following the collapse of the second tower, but airborne contaminants resulting from smoldering fires and re-suspension of particulate matter during debris removal persisted through May 2002. Throughout this rescue and recovery period, responders were permitted to enter sites and perform tasks where hazards were unevaluated, and issues of worker protection were poorly considered. For example, during the initial 48 hours after the attacks, hardware-store dust masks – which provide inadequate respiratory protection – were the primary type of respiratory protective equipment provided on site,<sup>2</sup> and while appropriately protective respirators were widely distributed to workers by September 17th, fit-testing and proper training for use of these respirators was not widely offered until October 17th, 36 days after the initial attack.<sup>3</sup>

Numerous other studies have documented adverse respiratory outcomes following exposure to WTC conditions, including RADS, increased bronchial hyperreactivity, "WTC cough", and declines in pulmonary function.<sup>4,5,6</sup> This is the first study to specifically examine new-onset asthma among WTC-site workers. A total of 926 workers reported newly diagnosed asthma after the events of September 11th, and exposure intensity and duration were found to be independently and significantly

<sup>1</sup> For detailed information on the relevant chemical exposures see: Lioy PJ, Weisel CP, Millette JR, *et al.* Characterization of the Dust/Smoke Aerosol that Settled East of the World Trade Center (WTC) in Lower Manhattan after the Collapse of the WTC 11 September 2002. *Environ Health Perspect* 2002; 110(7): 703-714.

<sup>2</sup> Banauch GI, Alleyne D, Sanchez R, *et al.* Persistent Hyperreactivity and Reactive Airway Dysfunction in Firefighters at the World Trade Center. *Am J Respir Crit Care Med* 2003; 168(1): 54-62.

<sup>3</sup> Lippy BE. Safety and Health of Heavy Equipment Operators at Ground Zero. *Am J Ind Med* 2002; 42(6): 539-542.

<sup>4</sup> Banuach, *op. cit.*

<sup>5</sup> Prezant DJ, Weiden M, Banauch GI, *et al.* Cough and Bronchial Responsiveness in Firefighters at the World Trade Center Site. *N Engl J Med* 2002; 347(11): 806-815.

<sup>6</sup> Banauch GI, Hall C, Weiden M, *et al.* Pulmonary Function after Exposure to the World Trade Center Collapse in the New York City Fire Department. *Am J Respir Crit Care Med* 2006; 174(3):312-319.

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associated with an increased risk of new-onset asthma among those interviewed.

Workers and volunteers participating in rescue, recovery, and other activities at the WTC site between September 11, 2001 and June 30, 2002 were recruited into the World Trade Center Health Registry (WTCHR), a collaboration between the NYC Department of Health and Mental Hygiene and the U.S. Agency for Toxic Substances and Disease Registry. 30,655 eligible participants (33.5% of all WTC workers) completed an interview, and of these, 25,748 workers were included in the analysis of new-onset asthma. Workers were considered to have newly diagnosed asthma if they affirmed during an interview that a doctor or other health care professional first told them they had asthma after September 11, 2001.

Risk factors considered in modeling the 3-year risk of newly diagnosed asthma were: arrival date to the WTC site, duration of work at the WTC site, exposure to the initial dust cloud, work within the immediate footprints of the collapsed buildings, general category of worker, frequency of mask/respirator use, and delay in mask/respirator use. The final model for 3-year risk was adjusted for age, gender, NYC residence, smoking status, and method of enrollment into the WTCHR.

Citing an estimated incidence of asthma in the general adult population of 100/100,000 person-years,<sup>7</sup> the expected 3-year risk for WTC workers was calculated to be 0.3%. However, the 926 cases of newly diagnosed asthma represented an observed 3-year risk among WTC workers of 3.6%, 12 times higher than expected. [A recently published review of major population studies of adult asthma incidence calculated a pooled estimate closer to 400/100,000 person-years.<sup>8</sup> Use of this estimate would not change the effect seen in this study, merely the magnitude of the effect.]

An earlier arrival date and longer duration of work at the site were each independent risk factors for newly diagnosed asthma when modeled simultaneously ( $p < 0.001$  for both), and a 3-year risk of 7% was found among those workers who arrived at the WTC site on September 11th and worked there for >90 days. Other significant risk factors included exposure to the initial dust cloud and work within the immediate footprints of the collapsed buildings, while category of worker had no effect. Use of a mask or respirator was associated with a decreased risk of newly diagnosed asthma only for workers who arrived on site September 11-12. Additionally, among workers who arrived on September 11th and worked into 2002, longer delays in initial use of a mask or respirator were associated with a significantly increased risk of newly diagnosed asthma.

The results of this study suggest that new-onset asthma was not only associated with acute exposure to

the respiratory hazards present at the WTC site but also with chronic low-level exposures. Further, the results reinforce the importance of rapid distribution and fit-testing of appropriate respiratory protective equipment when responding to disasters with unknown respiratory hazards.

### Relevance to Work-Related Asthma in Massachusetts

The lessons from the Wheeler *et al.* article are of great relevance to health care providers in Massachusetts and nationwide. The addition of new-onset asthma to the litany of illnesses experienced by WTC responders reminds us that work-related asthma may be caused by exposures not previously suspected. Further, recognition of a novel WTC-related condition more than six years post-exposure underscores the importance of cataloging responders presenting to a disaster site and long-term surveillance of their health status.

- Health care providers throughout the U.S. should inquire about any prior work experience at or near the WTC site, or other emergency response site, when assessing their patients for asthma and other lung diseases.
- Since chronic low-level exposures to collapsed building materials and smoke were shown to be significant risk factors in the development of new-onset asthma, the use of the term “nuisance dust,” to distinguish between hazardous and non-hazardous exposures, is no longer useful. Accordingly, health care providers should suspect dust, demolition debris, and smoke exposures among their asthma patients who work in construction or fire and rescue.
- Rescue and recovery workers from disaster sites require ongoing surveillance for work-related injuries and illnesses. Detection of these work-related conditions at the earliest possible stage allows for the most beneficial treatment as well as the introduction of controls and risk management for workers at future disaster sites.
- Responder safety must be incorporated into disaster preparedness planning, with attention also paid to non-rescue responders such as those in the construction, sanitation, and electrical trades.

### Work-Related Asthma Cases Reported to Massachusetts SENSOR

Mar. – May 2007	June – Aug. 2007	Sep. – Nov. 2007	Total (3/92 – 11/07)
8	6	4	1086

<sup>7</sup> Reed CE. The Natural History of Asthma in Adults: The Problem of Irreversibility. *J Allergy Clin Immunol* 1999; 103(4): 539-547.

<sup>8</sup> Eagan TML, Brøgger JC, Eide GE, *et al.* The Incidence of Adult Asthma: A Review. *Int J Tuberc Lung Dis* 2005; 9(6): 603-612.

**Please report work-related asthma cases to SENSOR by phone, fax, or mail!**