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Self-Reported Increase in Asthma Severity After the September 11 Attacks on the World Trade Center — Manhattan, New York, 2001

Asthma is a chronic condition that affects approximately 14 million persons in the United States and is characterized by airway inflammation, reversible airway obstruction, and airway hyperresponsiveness to a variety of triggers (*1*). Both environmental and psychological factors can trigger asthma exacerbations (*2–4*), and a seasonal increase in asthma morbidity occurs in the fall (*5*). This report summarizes the results of a telephone survey conducted among Manhattan residents 5–9 weeks following the September 11, 2001, terrorist attacks on the World Trade Center (WTC) in lower Manhattan in New York City. The findings indicate that among the 13% of adult respondents with asthma, 27% reported experiencing more severe asthma symptoms after September 11. Although a normal seasonal increase in asthma severity was expected, increased severity was reported more commonly among asthmatics reporting psychological distress associated with the attacks and/or difficulty breathing because of smoke and debris during the attacks. Persons with asthma and their clinicians should be aware of the role environmental and psychological factors might play in worsening asthma after disasters.

The study data were collected as part of a survey focused primarily on the psychological impact of the attacks (*6*). Telephone interviews were conducted during October 16–November 15, through a random-digit–dialed sample of persons aged ≥18 years living south of 110th Street in Manhattan. Households were screened for geographic eligibility, and an adult with the most recent birthday was selected to be interviewed. Sample weights based on the number of telephones and adults in each household were applied to adjust for varying probabilities of being interviewed. The response rate was 64.3%. A total of 1,008 persons were interviewed, of whom 20 were excluded from the analysis because of missing weight variables. Psychological factors, including life-stressors*, depression, and risk for post-traumatic stress disorder (PTSD), were assessed by using questions documented previously (*7*).

Among participants, 134 (13.4%) reported having been told previously by a doctor that they had asthma; 75 (58.2%) of those with diagnosed asthma were women. The median age of the 134 participants with asthma was 36 years (range: 18–78 years); 86 (70.7%) were non-Hispanic whites, 66 (64.8%) had an annual household income of ≥$40,000, and 99 (72.2%) had a college or graduate degree. Of the 134 persons with asthma, 17 (12.1%) reported that they lived or were present south of Canal Street (i.e., 15 blocks north of the WTC site) at the time of the attacks.

Of the 134 respondents with diagnosed asthma, 34 (27.0%) reported worsening of asthma symptoms after the September 11 terrorist attacks, defined as having moderate to severe symptoms during the weeks since September 11 compared with having none to mild symptoms during the 4 weeks before

* Include death of a close family member; serious illness or injury; change in marital status, family, or work situation; or emotional problems.

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5. Nicas M, Neuhaus H, Spear RC. Risk-based selection for respirators against infectious aerosols: application to anthrax spores. J Occup Environ Med 2000;42:737–48.
6. CDC. Update: investigation of bioterrorism-related anthrax and interim guidelines for exposure management and antimicrobial therapy. MMWR 2001;50:909–19.
7. CDC. Use of anthrax vaccine in the United States: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2000;49(No. RR-15).
8. CDC. Interim guidelines for investigation of and response to *Bacillus anthracis* exposures. MMWR 2001;50:987–90.

Notice to Readers

Protecting Building Environments from Airborne Chemical, Biologic, or Radiologic Attacks

In November 2001, following the discovery that letters containing *Bacillus anthracis* had been mailed to targeted locations in the United States, the Secretary of the U.S. Department of Health and Human Services requested site assessments of an array of public- and private-sector buildings by a team of engineers and scientists from CDC's National Institute for Occupational Safety and Health (NIOSH). In November 2001, this team assessed six buildings, including a large hospital and medical research facility, a museum, a transportation building, two large office buildings, and an office/laboratory building. In January 2002, additional building assessments were conducted at CDC campuses in Atlanta and, in April 2002, at a large, urban transportation facility. A total of 59 buildings were evaluated during this 5-month period.

The primary goal of these assessments was to determine the vulnerability of building air environments, including heating, ventilation, and air-conditioning (HVAC) systems, to a terrorist attack with chemical, biologic, and radiologic (CBR) agents and to develop cost-effective prevention and control strategies. At each facility, CDC investigators performed onsite evaluations to assess the building's vulnerability to CBR attack from internal and external sources. The investigators also reviewed security and safety plans at each facility. Facility owners received confidential reports identifying observed vulnerabilities and possible remedial options. Collectively, the field observations and prevention recommendations from the building assessments were combined with input from government and industry experts to identify general guidance that encourages building owners, facility managers, and engineers to review design, operational, and security procedures at their own facilities.

The recommendations include measures that can transform buildings into less attractive targets by increasing the difficulty of introducing a CBR agent, increasing the ability to detect terrorists before they carry out an intended release, and incorporating plans and procedures to mitigate the effects of a CBR release. These recommendations are presented in the recently completed NIOSH guidelines (*1*), which address physical security, airflow and filtration, maintenance, program administration, and staff training. The guidelines recommend that building owners and managers first understand their buildings' systems by conducting walk-through inspections of the HVAC, fire protection, life-safety, and other systems. Security measures should be adopted for air intakes and return-air grills, and access to building operation systems and building design information should be restricted. The guidelines also recommend that the emergency capabilities of the systems' operational controls should be assessed, filter efficiency should be evaluated closely, buildings' emergency plans should be updated, and preventive maintenance procedures should be adopted. The guidelines also caution against detrimental actions, such as permanently sealing outdoor air intakes.

The recommendations are intended for building owners, managers, and maintenance personnel responsible for public, private, and government buildings, including hospitals, laboratories, offices, retail facilities, schools, transportation facilities, and public venues. The recommendations do not address single-family or low-occupancy residences or higher-risk facilities such as industrial or military facilities, subway systems, or law-enforcement facilities. Copies of these recommendations are available at http://www.cdc.gov/niosh or by telephone, 800-356-4674.

References

1. National Institute for Occupational Safety and Health. Guidance for protecting building environments from airborne chemical, biological, or radiological attacks. Cincinnati, Ohio: U.S. Department of Health and Human Services, CDC, National Institute for Occupational Safety and Health, 2002; DHHS publication no. NIOSH2002-139.