

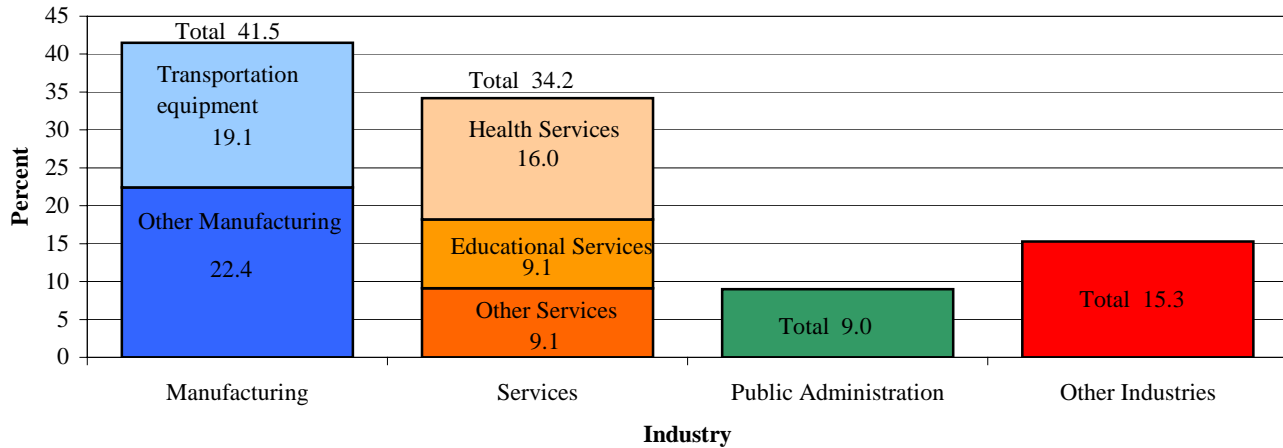
# Asthma in New Hampshire

## Work-Related Asthma



### I. BACKGROUND

**Figure 1**  
Percent distribution of work-related asthma cases by primary industry, 1993-1999



Note 1: Data is based on Michigan, New Jersey, Massachusetts, and California Sentinel Event Notification System for Occupational Risk.  
 Note 2: Data on Manufacturing is primarily from Michigan. In states like Massachusetts the Service industries have a higher proportion of work-related asthma cases.  
 Source: Surveillance Report 2002: Section 9 Asthma. May 2003.  
 Available at: <http://www.cdc.gov/niosh/docs/2003-111/pdfs/2003-111j.pdf>

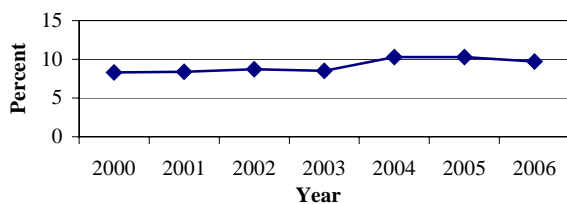
### What is work-related asthma?

Asthma is a chronic lung disease that involves swelling and inflammation of the airways, reversible airway obstruction, and muscle spasms around the airways in response to a variety of triggers. The main symptoms of asthma are cough, chest tightness, wheeze (a whistling, high-pitched noise coming from the chest), and shortness of breath.

Work-related asthma is asthma caused or made worse by workplace exposures. There are three types of work-related asthma:

- Work-aggravated asthma: pre-existing asthma that is worse at work.
- Reactive airway dysfunction syndrome (RADS): new-onset asthma resulting from an acute exposure to irritants in the work place.
- Allergic occupational asthma: new-onset asthma that occurs when a person becomes sensitized to a specific chemical agent due to continued exposure. The sensitization process does not occur after one exposure but develops over time.

**Figure 2**  
Prevalence of current asthma among adults, by survey year - New Hampshire, 2000-2006



Source: 2000-2006 NH Behavioral Risk Factor Surveillance System survey

### Why is work-related asthma important?

Work-related asthma (WRA) is a debilitating and sometimes fatal disease that affects a relatively large segment of the adult population. A 2003 statement of the American Thoracic Society concluded that approximately 15% of all adult asthma cases are attributable to occupational factors.<sup>1</sup> Subsequent U.S. studies found that 29%<sup>2</sup> to 33%<sup>3</sup> of new-onset asthma is attributable to workplace exposures; and 23% of adults with existing asthma show evidence of workplace exacerbation of symptoms.<sup>4</sup>

More than 350 substances used in the workplace are known to either cause asthma in healthy workers or aggravate asthma in those who already have the condition.<sup>5</sup> Poor indoor air quality, a common factor in the workplace, also contributes to WRA. Further research suggests that people with WRA have more severe symptoms, a higher utilization rate of health care services, and an increased rate of disability compared to those with asthma unrelated to work.<sup>6,7,8,9,10</sup>

### What causes work-related asthma?

Many substances in the workplace, coupled with poor ventilation, may cause WRA. Some examples include:

- chemicals in polyurethane paints
- isocyanates in truck bed liners and other products
- cleaning materials
- formaldehyde
- indoor air pollutants
- latex rubber
- grain and flour dust
- dust (dander) from animals and insects
- molds

These substances are sometimes referred to as *asthmagens*; exposure to asthmagens causes sensitization of the airways. Asthmagens can be inhaled or pass through the skin.

Additional information on substances that cause WRA can be found at:

- The Association of Occupational and Environmental Clinics (AOEC) maintains an updated list of asthmagens.  
[www.aoec.org/aoeccode.htm](http://www.aoec.org/aoeccode.htm)
- The NJ Department of Health and Human Services lists industries where work-related asthma has been found and the asthmagens associated with each.  
[www.nj.gov/health/eoh/survweb/wra/agents.shtml](http://www.nj.gov/health/eoh/survweb/wra/agents.shtml)

### Who is at risk for work-related asthma?

Cases of work-related asthma have been identified in a variety of industries (See Table 1 and Figure 1 for the distribution of WRA cases by primary industry). The Massachusetts Sentinel Event Notification System for Occupational Risk found the majority of their work-related cases in the education and health services. Most cases of WRA in New Hampshire are likely to be found in these industries as well, since manufacturing is not a large industry in the State.

**Table 1**  
**Primary distribution of work-related asthma cases by primary industry**

Industry	* SENSOR states 1993-1999	**Massachusetts 1993-2006
<b>Manufacturing</b>	<b>Total 41.5</b>	<b>Total 23.7</b>
Transportation equipment	19.1	No data available
Other manufacturing	22.4	No data available
<b>Services</b>	<b>Total 34.2</b>	<b>Total 52.8</b>
Health services	16.0	28.6
Educational services	9.1	13.1
Other services	9.1	11.1
<b>Public Administration</b>	<b>Total 9.0</b>	<b>Total 8.8</b>
<b>Other Industries</b>	<b>Total 15.3</b>	<b>Total 14.7</b>

\* The SENSOR states are Michigan, New Jersey, Massachusetts, and California. These states have a Sentinel Event Notification System for Occupational Risk. The data on manufacturing is primarily driven by data from Michigan.

Source: Surveillance Report 2002: Section 9 Asthma. May 2003.

\*\*Source: Massachusetts Department of Public Health, Occupational Health Surveillance Program, Sentinel Event Notification System for Occupational Risk.

Workers in hundreds of jobs are potentially exposed to substances in the air that may cause work-related asthma:

- welders
- machine operators
- construction workers
- auto body repair shop workers
- health care workers
- teachers
- hairdressers
- janitors and housekeeping staff
- bakery workers
- animal handlers



## II. WORK-RELATED ASTHMA IN NEW HAMPSHIRE

This section provides results from the work-related asthma questions on the 2006 New Hampshire Behavioral Risk Factor Surveillance System Adult Call-back Survey (NH BRFSS Adult Call-back Survey). The BRFSS Adult Call-back Survey converts the National Asthma Survey to a call-back survey administered as part of BRFSS. The NH BRFSS Call-back Survey was sponsored by the Centers for Disease Control and Prevention Asthma Program to further assist in understanding the burden of asthma in New Hampshire. In 2006, 25 states participated in the Call-back Survey.

The Adult Call-back Survey is administered when someone indicates on the BRFSS that they have asthma (by answering “yes” to the question, “Have you ever been told by a doctor, nurse, or other health professional that you had asthma?”) and agrees to be contacted again for additional asthma specific questions. It was designed to describe the health, socioeconomic, behavioral, and environmental predictors associated with better control of asthma. There are ten WRA questions; to view a complete list of the Adult Call-back Survey questions, visit [www.cdc.gov/asthma/pdfs/SurveyQuestions06.pdf](http://www.cdc.gov/asthma/pdfs/SurveyQuestions06.pdf).

As with the BRFSS, the data are weighted by probability of selection, age and gender. This adjusts the data to compensate for non-response and non-coverage and to more accurately reflect the population of New Hampshire. Unlike the majority of other states, New Hampshire’s Call-back Survey data are not weighted by race or ethnicity due to the small number of minorities in the State and the resulting small survey sample size for minority populations.

Additional information on the Adult Call-back Survey is available at: [www.cdc.gov/asthma/questions.htm](http://www.cdc.gov/asthma/questions.htm).

### Data limitations

The CDC and implementing states have developed rigorous survey methods, including methods to increase survey response and quality assurance checks to make data from the BRFSS and the Adult Call-back Survey some of the best telephone survey data available. However, there are some limitations to these data that should be kept in mind when interpreting results.

The number of respondents for the 2006 NH Call-back Survey was relatively small; of 324 respondents, 103 to

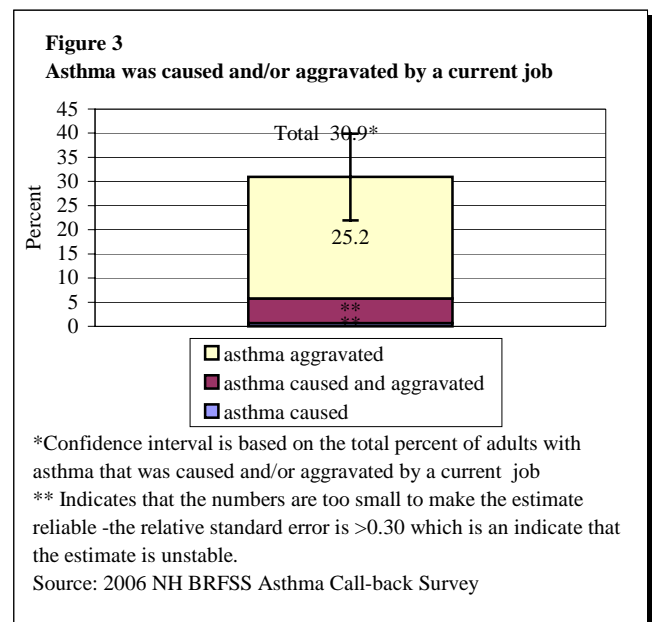
225 answered the questions pertaining to work-related asthma –the number of respondents varies by question. Because the numbers are small, the confidence intervals (CI) are fairly wide. The 95% CI represents the range of values that, with 95% certainty, includes the true value for the entire population.

One potential source of error for the Adult Call-back Survey is that all data are self-reported. Inaccurate recall by respondents may lead to response bias and recall bias and thus result in under- or over-estimation of specific behaviors or conditions. Other potential data limitations are outlined on p.14 of the *Asthma in New Hampshire, 1990-2004* burden report, which can be found on-line at: [www.asthmanow.net](http://www.asthmanow.net).

### Survey results

Figures 3-5 represent survey findings for adults with current asthma based on three sets of different questions. Adults with current asthma are those who said “yes” to the following two questions: “Have you ever been told by a doctor, nurse, or other health professional that you had asthma?” and “Do you still have asthma?” Approximately 9.7% of NH adults, or 98,700 individuals, have current asthma (2006 NH BRFSS).

Figure 3 shows that approximately 30.9% (95% CI: 21.5-40.3) of adults with current asthma who were currently employed reported that their asthma is either caused by or aggravated by their current job.



Of those who said their asthma was caused and/or aggravated by a previous and/or current job, only 27.5% (95% CI: 16.5-38.5) told their doctor or were told by their doctor that their asthma was work-related (Source: 2006 NH BRFSS Asthma Call-back Survey).

Figure 4 shows that approximately 14.0% (95% CI: 8.5-19.5) of adults with current asthma either told their doctor or were told by a doctor or other medical professional that their asthma was related to their job and 86.0% (95% CI: 80.5-91.5) did not.

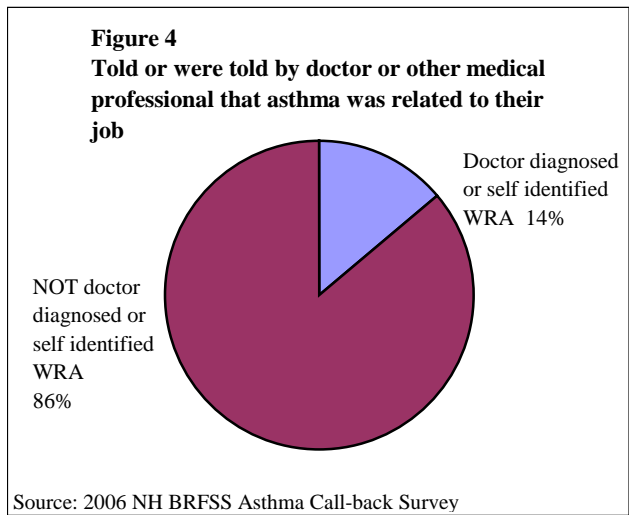
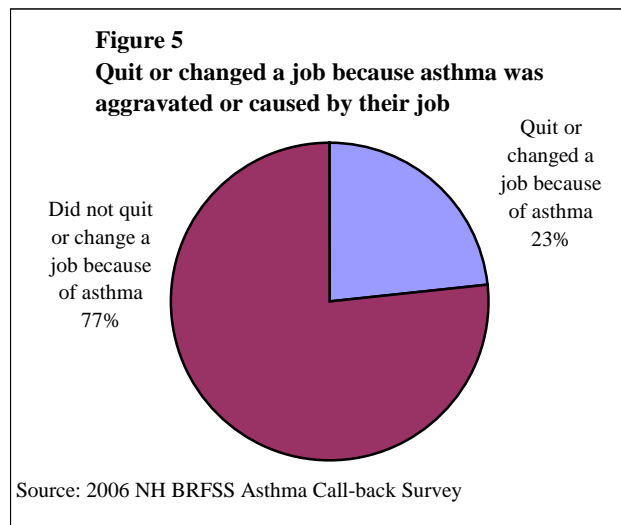


Figure 5 shows that approximately 23.3% (95% CI: 12.1-34.5) of adults with current asthma who have ever worked reported they had quit or changed a job because their asthma was aggravated or caused by their job and 76.7% (95% CI: 65.5-87.9) did not.



Age, gender, income, education, age at diagnosis, how long since diagnosis, and smoking status were also examined, but numbers were either too small to report or no difference was found due to small numbers.

### III. STEPS TO TAKE TO IDENTIFY AND PREVENT WRA

#### Key things to remember about WRA

- Symptoms of work-related asthma usually occur while or after a worker is exposed to a particular substance at work. However, some workers will only get symptoms many hours after leaving work.
- Symptoms usually go away during weekends or vacations, and return after going back to work.
- Work-related asthma is usually reversible, but permanent lung damage, or even death, can occur if exposure to the substance that causes the disease continues. In some workers, very small amounts of the substance can cause an asthma episode.

#### Steps employers can take to prevent WRA

- Substitute asthma-causing agents with less hazardous chemicals or substances. For example, cleaning chemicals are one of the most common substances associated with work-related asthma. Because cleaning products impact indoor air quality,

they affect not just the janitorial staff but all employees in the building. Employers can alleviate this problem by using “green” cleaning products.

- Follow instructions on Material Safety Data Sheets (MSDS) on proper safety and use of all chemicals.
- Keep exposures as low as possible using engineering controls such as local exhaust ventilation. Monitor exposures regularly.
- Provide respiratory protection if none of the options above can be implemented - make sure employee is medically evaluated prior to use. See the U.S. Occupational Safety and Health Administration (OSHA) for additional guidance.
- Train workers how to recognize the signs of breathing problems.
- Assign any employee who develops asthma to a non-exposed job as soon as they are identified.

By identifying problems early on, employers can prevent other workers from developing work-related asthma.

### ***What employees can do if they suspect they have WRA***

- Document their symptoms: when they occur and what they were doing at the time.
- Talk to their doctor about their symptoms and exposures.
- See an asthma specialist.

If there is evidence of WRA, the employee can request a position change to reduce harmful exposure. Their doctor can provide supporting documentation.

### ***Questions health care providers can ask to help determine if a patient's asthma is work-related***

Work-related asthma is under-diagnosed because most physicians do not inquire about the work-relatedness of symptoms. They can improve diagnosis of WRA by asking the following:

- Are you an adult with new-onset asthma?
- Do asthma symptoms develop or worsen with a new job or introduction of new materials?
- Do asthma symptoms develop within minutes of specific activities or exposures at work?
- Do symptoms improve away from work or on vacation?
- Do symptoms worsen on return to work after being away?

## **IV. WHAT NEW HAMPSHIRE HAS DONE AND IS DOING TO ADDRESS WRA**

### ***Workers Compensation Study***

In 2006, the New Hampshire Asthma Control Program (NHACP) evaluated whether it was feasible for the program to conduct workplace surveillance. One of the steps the program and its partners took was to look at workers compensation data as the most comprehensive, intact source of work-related illness and injury data in the State.

With the cooperation of the Department of Labor, the program was able to examine the Employers First Report of Occupational Injury or Disease (Form 8WC).

Collection of this data is primarily focused on reporting, not prevention. At the time of the study, many of the fields were missing or completed improperly. As a result, the program determined it was not feasible to use workers compensation data for surveillance on work-related asthma at this time. The Department of Labor is currently taking steps to make the reporting form more user-friendly and implement a standard coding system.

### ***Schools as workplaces***

Because schools tend to have higher rates of WRA (See Figure 1), the program has incorporated a workplace focus into its healthy schools activities. NHACP and partners are implementing a Healthy Schools Pilot Project to address indoor air quality and asthma management in elementary schools. Many New Hampshire schools have reported poor indoor air quality. The pilot project is aimed at assessing school environments and taking steps that will improve building maintenance and improve student and staff health and productivity.

### ***NH BRFSS Call-back Survey***

NHACP plans on conducting the Adult Call-back Survey yearly to track WRA as well as the health, socioeconomic, behavioral, and environmental predictors associated with better control of asthma. This survey will allow the program to monitor the prevalence of WRA in the State.

### ***Occupational Health Surveillance Committee***

The NH Department of Health and Human Services, Health Statistics and Data Management Section has convened occupational health stakeholders from around the State to explore the development of an occupational health surveillance program.

This group has already begun developing partnerships to share resources to collect and analyze important data on work-related injury and illness. Having this data will help organizations better understand the magnitude and severity of the problem and how they might put appropriate interventions in place to prevent unnecessary workplace injuries and disease.

The committee intends to apply for a National Institute for Occupational Safety and Health (NIOSH) grant to build and sustain a State Occupational Health Surveillance Program.

## Where to go for more information



For more information on the data presented here or to receive a copy of *Asthma in New Hampshire, 1990-2004*, contact the New Hampshire Asthma Control Program at (800) 852-3345 ext. 0856.

- Visit [www.AsthmaNow.net](http://www.AsthmaNow.net), New Hampshire's website for asthma. Sections on asthma and the workplace, asthma care and management, asthma and the environment, and resources for adults, parents, teens, children and providers. Use the AsthmaNow.net website to link to other helpful web pages and sites.
- The **U.S. Occupational Safety and Health Administration (OSHA)** provides a free consultation service to help employers find out about potential hazards at their worksites, improve their occupational safety and health management systems, and even qualify for a one-year exemption from routine OSHA inspections. [www.osha.gov/dcsp/smallbusiness/consult.html](http://www.osha.gov/dcsp/smallbusiness/consult.html)
- The **Association of Occupational and Environmental Clinics (AOEC)** maintains an updated list of asthmagens located at: [www.aoec.org/aoeccode.htm](http://www.aoec.org/aoeccode.htm)
- To find out about other occupational diseases and how to prevent them visit the **Massachusetts Occupational Health Surveillance Program**. [www.mass.gov/dph/ohsp](http://www.mass.gov/dph/ohsp)
- To find out more about indoor environmental asthma triggers visit the **US Environmental Protection Agency (EPA)** website on asthma and indoor environments. [www.epa.gov/asthma/triggers.html](http://www.epa.gov/asthma/triggers.html)
- The EPA's **Integrated Pest Management for Schools: A How-to Manual** can be adapted for other work places. Integrated Pest Management (IPM) focuses on pest prevention using effective, least-toxic methods that are practical to apply and cost-effective to operate. [www.epa.gov/opp00001/ipm/schoolipm/index.html](http://www.epa.gov/opp00001/ipm/schoolipm/index.html)
- **Green Cleaning Pollution and Prevention Calculator** quantifies the projected environmental benefits of purchasing and using "green" janitorial services and products. It also provides links to certified green cleaning products through EcoLogo and Green Seal. [www.ofee.gov/janitor/index.asp](http://www.ofee.gov/janitor/index.asp)
- **New Hampshire Coalition for Occupational Safety and Health (NH COSH)** educates workers about occupational hazards and workers' rights. [www.nhcosh.org](http://www.nhcosh.org)
- An employee can request a **Health Hazard Evaluation** from the **National Institute of Occupational Safety and Health (NIOSH)** if he or she is concerned about a potential health hazard in their workplace. [www.cdc.gov/niosh/hhe](http://www.cdc.gov/niosh/hhe)

## CITATIONS

1. Balmes J, Becklake M, Blanc P, Henneberger P, Kreiss K, Mapp C, Milton D, Schwartz D, Toren K, Viegi G. American Thoracic Society Statement: Occupational contribution to burden of airway disease. *Am J Respir Crit Care Med* 2003; 167:787-797.
2. Sama SR, Milton DK, Hunt PR, Houseman EA, Henneberger PK, Posiell RA. Case-by-case assessment of adult-onset asthma attributable to occupational exposures among members of a health maintenance organization. *J Occup Environ Med* 2006; 48:400-407.
3. Vollmer WM, Heumann MA, Bree VR, Henneberger PK, O'connor EA, Villnave JM, Frazier EA, Buist AS. Incidence of work-related asthma in members of a health maintenance organization. *J Occup Environ Med* 2005; 47:1292-1297.
4. Henneberger PK, Derk SJ, Sama SR, Boylstein RJ, Hoffman CD, Preusse PA, Rosiello RA, Milton DK. The frequency of workplace exacerbation among health maintenance organization members with asthma. *Occup Environ Med* 2006; 63:55-1557.
5. The Association of Occupational & Environmental Clinics, AOEC Exposure Codes. Available at: <http://www.aoec.org/aoeccode.htm>. Accessed January 16, 2008.
6. Liss GM, Tarlo SM, MacFarlane Y, Yeung KS. Hospitalization among workers compensated for occupational asthma. *Am J Respir Crit Care Med* 2000;162(1):112-118.
7. Henneberge PK, Hoffman CD, Magid DJ, Lyons EE. Work-related exacerbations of asthma. *Int J Occup Environ Health* 2002;8:291-296.
8. Lowery EP, Henneberger PK, Rosiello R, Sama SR, Preusse P, Milton DK. Quality of life of adults with workplace exacerbation of asthma. *Qual Life Res*. 2007 Dec;16(10):1605-13.
9. Lemiere C, Forget A, Dufour MH, Boulet LP, Blais L.. Characteristics and medical resource use of asthmatic subjects with and without work-related asthma. *J Allergy Clin Immunol*. 2007 Dec; 120(6):1354-9.
10. Axon EJ, Beach JR, Burge PS. A comparison of some of the characteristics of patients with occupational and non-occupational asthma. *Occup Med (Lond)*. 1995 Apr;45(2):109-11.

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**Work-Related Asthma brief  
Evaluation Form**

The New Hampshire Asthma Control Program would appreciate your feedback on the *Work-Related Asthma* brief. Your feedback will help us improve future briefs.

1. Please select all that apply:

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>a. I am a person living with asthma</li> <li>b. I have work-related asthma</li> <li>c. I am an employee</li> <li>d. I am an employer</li> <li>e. I am a medical provider</li> <li>f. I am a healthcare administrator</li> <li>g. I work for an insurer</li> <li>h. I work for a state agency interested in asthma</li> </ul> | <ul style="list-style-type: none"> <li>i. I work for a federal agency interested in asthma</li> <li>j. I work for a non-profit organization interested in asthma</li> <li>k. I work for a for profit organization interested in asthma</li> <li>l. Other (specify)_____</li> </ul> |
|---|--|

2. Where did you see the *Work-Related Asthma* brief?

- a. At a meeting hosted by the New Hampshire Asthma Control Program
- b. At another meeting
- c. At the AsthmaNow.net website
- d. At another website
- e. At a conference
- f. In an email
- g. Other (please specify)\_\_\_\_\_

3. Have you read any other data briefs or reports produced by the New Hampshire Asthma Control Program?

- a. Yes
- b. No
- c. Don't Know

<b>Using the five-point scale, please rate the degree to which you agree with each statement.</b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither Agree nor Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>
4. The brief is easy to read.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
5. The brief contains new information.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
6. The brief provides useful information.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

7. What would make this brief more useful? Please be specific. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

8. How do you plan on using this information?

- a. To increase my knowledge about asthma work-related asthma
- b. To help raise awareness about work-related asthma
- c. To encourage my employer to address work-related asthma
- d. To help employees understand what work-related asthma is
- e. To address employee concerns
- f. To support related legislation
- g. To apply for a grant
- h. Other (please specify)\_\_\_\_\_

9. What did you like most about the brief? \_\_\_\_\_

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10. What did you like least about the brief? \_\_\_\_\_

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11. What other asthma topics would you like to see a brief on (e.g., Pediatric Asthma, Smoking and Asthma)? \_\_\_\_\_

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Thank you for taking the time to complete this evaluation. Completed forms can be mailed, faxed, or emailed to:

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