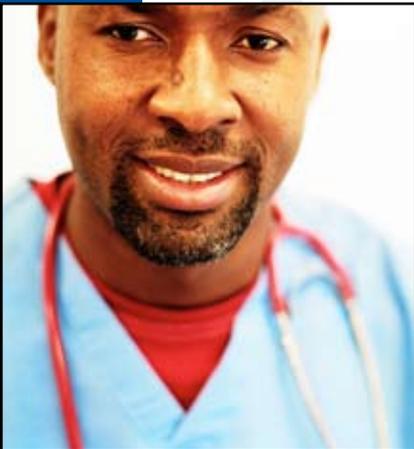


# Asthma! Is Your Company at Risk?





# **Asthma: Is Your Company at Risk?**

**Presented by**

**Barbara Hickcox, RN, MS  
Asthma Coordinator**

**Bureau of Environmental Health  
Indoor Environments Section  
Ohio Department of Health**

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# **Asthma: Is Your Company at Risk?**

## **Agenda**

**Presenter:**

**Barbara Hickcox, RN, MS  
Asthma Coordinator**

**Ohio Department of Health  
Bureau of Environmental Health  
Indoor Environments Section**

<b>8:30 - 8:45</b>	<b>Introductions</b>
<b>8:45 - 9:45</b>	<b>Asthma: The Basics</b>
<b>9:45 - 10:00</b>	<b>Break</b>
<b>10:00 - 11:30</b>	<b>Work-Related Asthma</b>
<b>11:30 - 12:30</b>	<b>Lunch</b>
<b>12:30 - 1:00</b>	<b>Costs of Work-Related Asthma: Personal, Company, Legal</b>
<b>1:00 - 1:45</b>	<b>Risk Management for Work Related Asthma</b>
<b>1:45 - 2:00</b>	<b>Break</b>
<b>2:00 - 3:00</b>	<b>Risk Management Systems for Asthma</b>
<b>3:00 - 3:15</b>	<b>Break</b>
<b>3:15 - 4:00</b>	<b>Creating your Risk Management Plans</b>
<b>4:00 - 4:30</b>	<b>Worksite Management of Asthma Symptoms Assignments</b>
<b>4:25 - 4:30</b>	<b>Evaluation</b>
<b>4:30 pm</b>	<b>Adjourn</b>







## ASTHMA: IS YOUR COMPANY AT RISK?

Barbara Hickcox, RN, MS  
Asthma Coordinator  
Ohio Department of Health



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### What Will We Talk About?

- What is Asthma?
- What is Occupational Asthma and how does it affect people?
- How does asthma affect your organization?
- What does asthma cost your company?
- What can you and your company do about your risk?



- Company wide
- For individuals

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### So Let's Talk About Asthma

- What is happening with asthma in the general population?
  - Who has it?
  - How many people have it?
  - What is it?
  - What does it look like?
  - What can be done about it?



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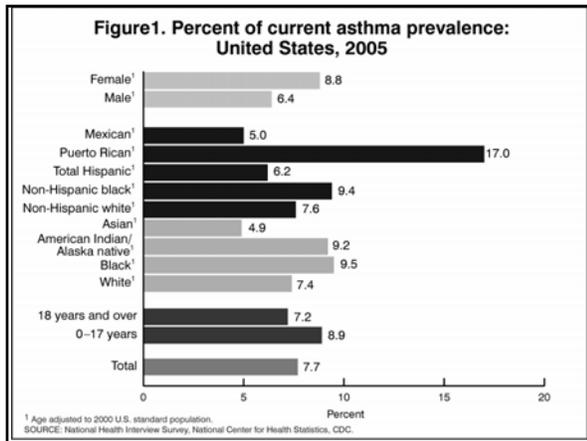
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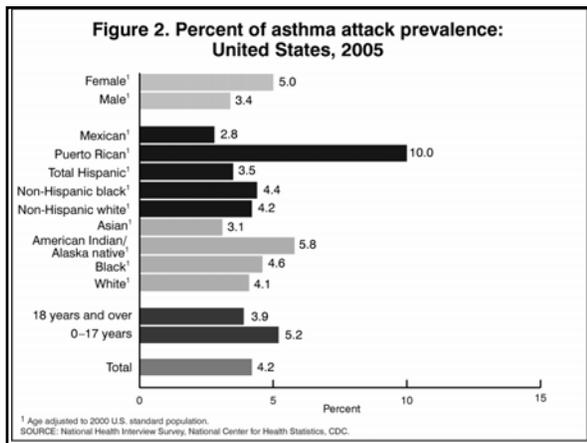
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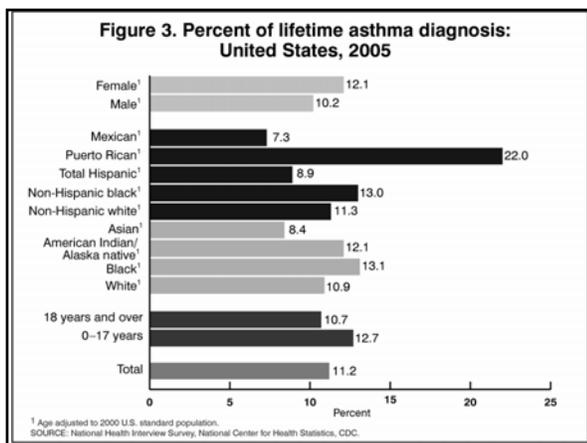
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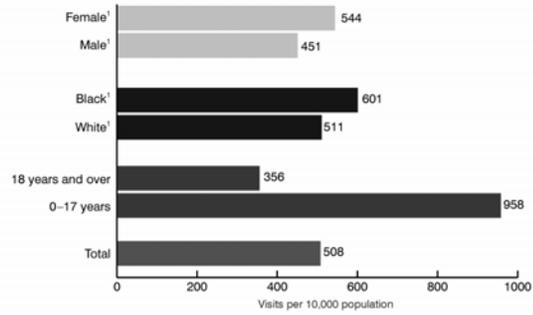
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**Figure 4. Number of asthma ambulatory care visits per 10,000 population: United States, 2004**



<sup>1</sup> Age adjusted to 2000 U.S. standard population.  
 NOTE: Includes visits to physician offices and hospital outpatient departments. Hispanic origin not available; estimates for race categories include both Hispanic and non-Hispanic persons.  
 SOURCE: National Ambulatory Medical Care Survey, National Hospital Ambulatory Medical Care Survey, National Center for Health Statistics, CDC.

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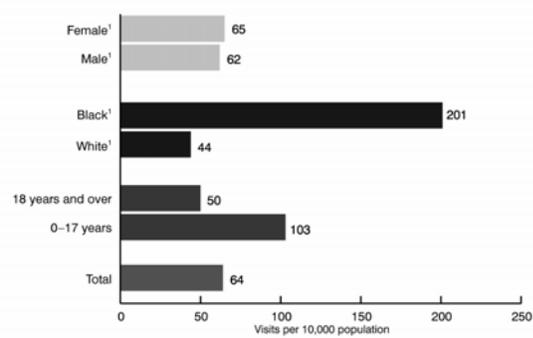
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**Figure 5. Number of asthma emergency department visits per 10,000 population: United States, 2004**



<sup>1</sup> Age adjusted to 2000 U.S. standard population.  
 NOTE: Hispanic origin not available; estimates for race categories include both Hispanic and non-Hispanic persons.  
 SOURCE: National Hospital Ambulatory Medical Care Survey, National Center for Health Statistics, CDC.

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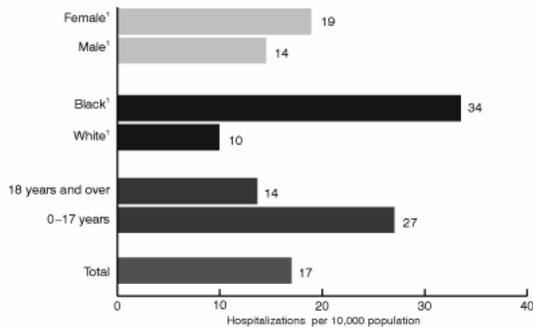
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**Figure 6. Number of asthma hospitalizations per 10,000 population: United States, 2004**



<sup>1</sup> Age adjusted to 2000 U.S. standard population.  
 NOTE: Hispanic origin not available; estimates for race categories include both Hispanic and non-Hispanic persons. Data for race was missing for 24% of discharges in 2004.  
 SOURCE: National Hospital Discharge Survey, National Center for Health Statistics, CDC.

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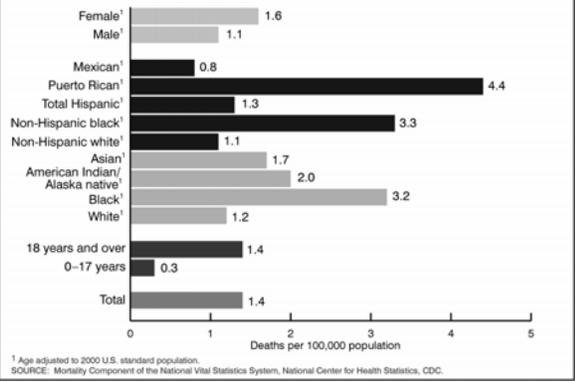
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**Figure 7. Number of asthma deaths per 100,000 population: United States, 2003**




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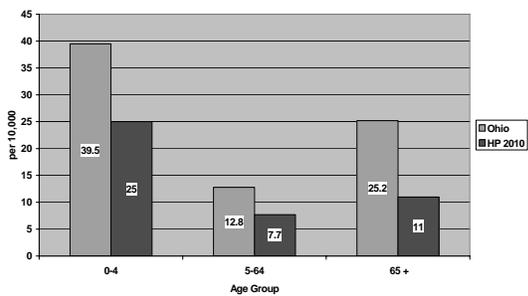
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**Hospital Discharges for Patients with a Primary Diagnosis of Asthma  
Ohio, 2003 Compared to Healthy People 2010 Goals**



Source: Ohio Hospital Association Discharge Data Set, 2003, Analysis by Injury Prevention Section, BHPRR, Prevention, Ohio Department of Health

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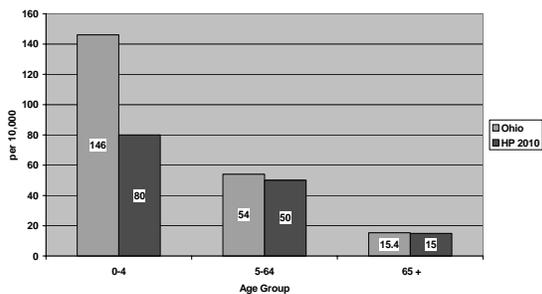
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**ED Visits for Patients with a Primary Diagnosis of Asthma  
Ohio, 2003 Compared to Healthy People 2010 Goals**



Source: Ohio Hospital Association Discharge Data Set, 2003, Analysis by Injury Prevention Section, BHPRR, Prevention, Ohio Department of Health

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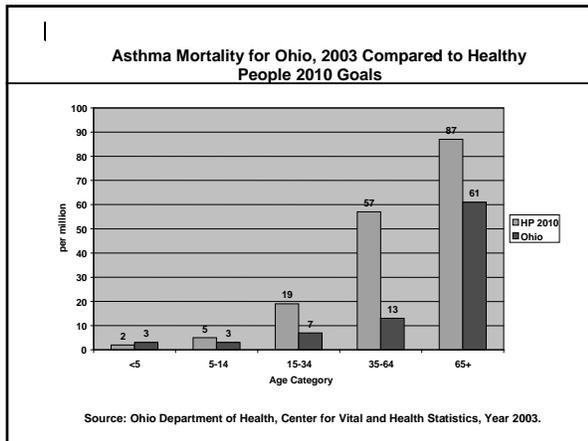
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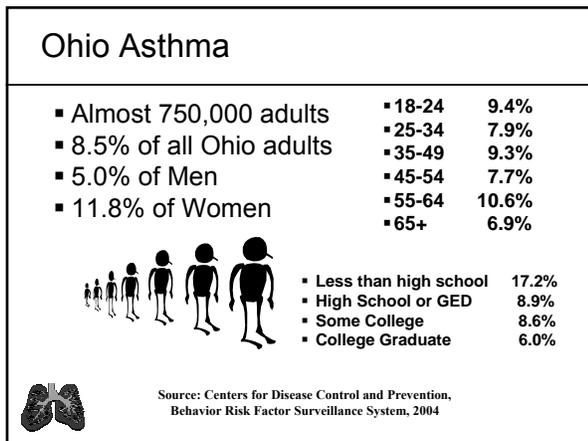
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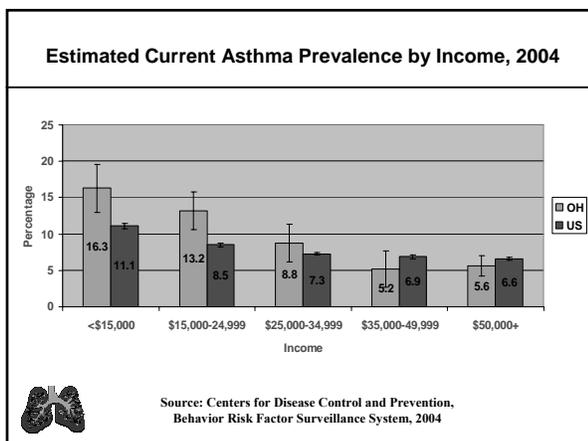
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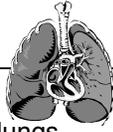
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## Asthma is:



- Life-long *inflammatory* disease of lungs
- Excessive sensitivity of the airways
- Episodes of airway narrowing
- Mucous production
- Difficulty breathing - asthma episodes



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## Some Ideas about Causes

- Environmental Factors
  - Indoor Air Hazards
  - Outdoor Air Hazards
- Lack of exposure to the environment
- Genetic factors
- Infections and immune response



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## Cause or Trigger?

### Cause

- Causes Inflammation
- Probably combination of factors
- Longer term problem
- Underlying problem



### Trigger

- Stimulates reaction when inflammation present, i.e. asthma episode
- Usually an episodic, short term problem
- May be the same as the cause



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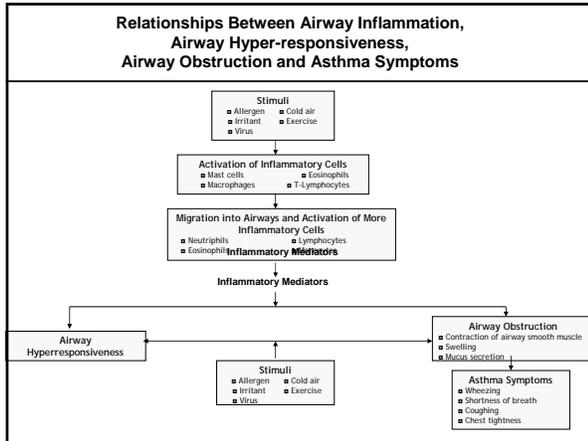
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### What is an Asthma Episode?

- Inflammation
- Irritation happens
- Swelling of airway
- Mucus is produced
- Airways narrow
- Breathing gets more difficult
- Limitation in activity





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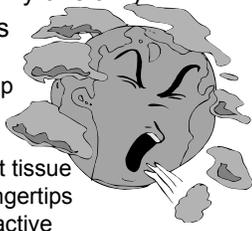
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### What does an episode look like?

- Varies from person to person
- Can develop suddenly or slowly
- Common symptoms
  - Coughing
  - Breathing speeds up
  - Wheezing
  - Air hunger
  - Depression of chest tissue
  - Grayness of lips, fingertips
  - Inability to talk, be active




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## Consequences of Asthma

- Less Breathing Capacity
- More visits to the doctor
- Emergency room visits
- Missed work and school
- Disrupted sleep
- Decrease in activity
- Limited activity
- Death



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## What Can be Done About Asthma?

- Major Treatment Goals
  - Assessment/Monitoring by objective tests
  - Education for a partnership in asthma care
  - Control of environmental factors and comorbid conditions
  - Pharmacologic therapy



USDHHS, NHLBI Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. NIH Publications NO. 07-4051, Revised August, 2007, Full Report, 2007.

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## Assessment

- All wheezing is not asthma
- Airway narrowing is reversible to some extent in asthma
- Often a process over time to diagnose
  - Frequent bronchitis
  - Cough at night
  - Cough without illness
  - Wheezing in bouts relieved by albuterol



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## Tools for Monitoring Asthma

- Spirometry
- Symptoms
- Peak Flow Meters



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## Symptoms

- Not much
- Cough
- Sleep disturbance
- Tightness in the chest
- Anxiety
- Shortness of breath
- Decreased ability to do multiple tasks



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## Peak Flow Meters



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## Peak Flow Monitoring

80% to 100% of personal best

Good Job!  
Keep going.

50% to 80% of personal best

Begin agreed upon, written  
plan of action.

< 50% of personal best

Take short acting  $\beta$ -agonist.  
Call primary care giver for further  
instructions.



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## What Is Your Peak Expiratory Flow?



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## Medications

- Controller Medications
  - Inhaled Anti-inflammatory agents
  - Long Acting Bronchodilators
  - Oral Anti-Leukotrienes
- Reliever Medications
  - Inhaled Short-acting Beta<sub>2</sub>-Agonists
  - × Oral Corticosteroids
  - × Anti-cholinergics



<http://www.ama-assn.org/special/asthma/treatmnt/drug/drugtop.htm>

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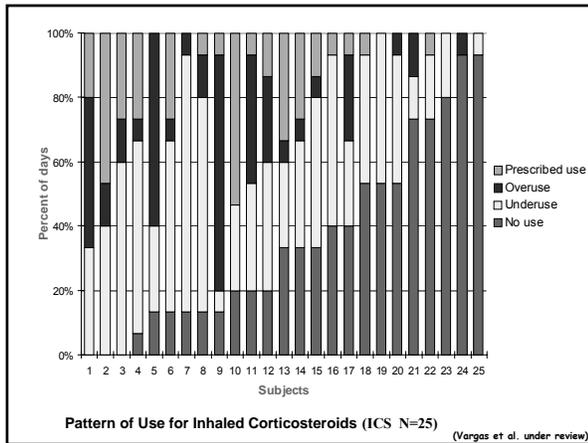
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## Asthma Therapy Adherence

- Enhanced Through Use of:
  - Effective doctor-patient communication
  - Education about asthma therapies, asthma self-monitoring and asthma management
  - Tailoring of asthma therapies and management regimens to match patients' lifestyles and abilities
  - Ongoing monitoring of patient adherence and asthma management




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## Metered Dose Inhalers




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## Breath Propelled Inhalers



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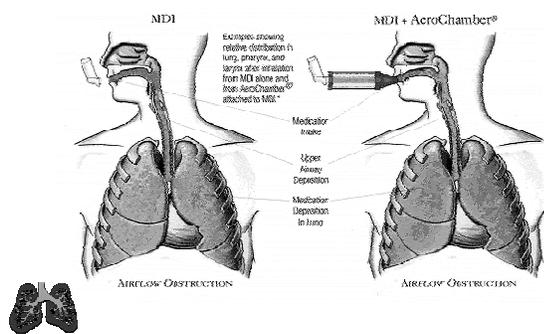
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## Why Use a Spacer?



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## Spacers and Holding Chambers



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## Control Contributing Factors

- Identify possible triggers
- Reduce exposure to the trigger by:
  - Removing the trigger from the environment, if possible
  - Controlling aerosolization of the trigger
  - Limiting personal contact with the trigger




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## Management



- A Decision Tool
  - Green, Yellow, Red
  - Stepping up to more treatment
- Partnership between Caregiver/Asthmatic
  - The education process
  - The asthmatic learns to make decisions
  - Teaching the caregivers to assist




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## Asthma Management Plan

### Asthma Medicine Plan

Name: \_\_\_\_\_  
 Doctor: \_\_\_\_\_ Date: \_\_\_\_\_  
 Phone for doctor or clinic: \_\_\_\_\_  
 Phone for taxi or friend: \_\_\_\_\_

You can use the colors of a traffic light to help learn about your asthma medicines.

**1. Green means Go.**  
Use preventive medicine.

**2. Yellow means Caution.**  
Use quick-relief medicine.

**3. Red means Stop.**  
Get help from a doctor.

**1. Green - Go** Use preventive medicine.

Medicine	How much to take	When to take it

20 minutes before sports, use this medicine:

Medicine	How much to take	When to take it

**2. Yellow - Caution** Take quick-relief medicine to keep an asthma attack from getting bad.

Medicine	How much to take	When to take it

Cough Wheeze \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Tight chest Wake up at night \_\_\_\_\_  
 \_\_\_\_\_  
 Peak Flow Number to \_\_\_\_\_

**3. Red - Stop - Danger** Get help from a doctor now!

Take these medicines until you talk with the doctor.

Medicine	How much to take	When to take it

Peak Flow Number \_\_\_\_\_




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So –  
Is asthma controlled?



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### Goals of Asthma Care

- Goal of asthma care is to maintain control of asthma with the least amount of medication and hence minimal risk of adverse effects.
  - Reduce impairment
    - Prevent Chronic or troublesome symptoms
    - Infrequent use of quick relief for symptoms
    - Maintain (near) normal pulmonary function
    - Maintain normal activity levels
  - Reduce risk
    - Prevent recurrent exacerbations: ED visits, hospitalizations
    - Prevent progressive lung function loss
    - Provide optimal pharmacotherapy w/ minimal/no adverse effects



USDHHS, NHLBI, Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. NIH Publications NO. 07-4051, Revised August, 2007, Full Report, 2007.

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### Some Factors in Performance

- Poor communication between physicians and patients
- Patient un-awareness that asthma means airway inflammation
- Insidious nature of effects of asthma
- Lack of understanding of symptoms
- Lack of asthma education
- Physician failure to know current guidelines



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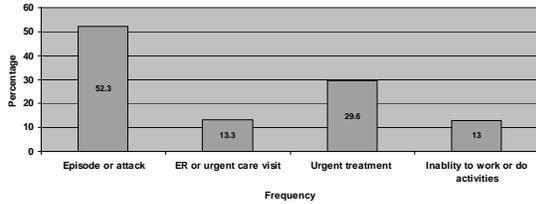
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## What is the Real Impact of Treatment for Asthma?

Asthma Episodes/Services Used in the Past 12 Months by Adults with Asthma, 2004



Source: Centers for Disease Control and Prevention, Behavior Risk Factor Surveillance System, 2004

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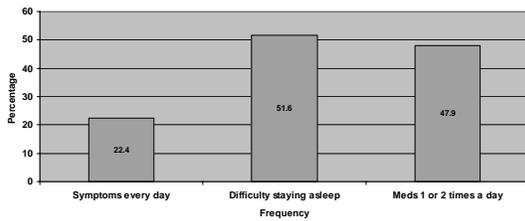
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## Does Asthma Really Affect Lives?

Asthma Symptoms in the Past 30 days, for Adults with Asthma, 2004



Source: Centers for Disease Control and Prevention, Behavior Risk Factor Surveillance System, 2004

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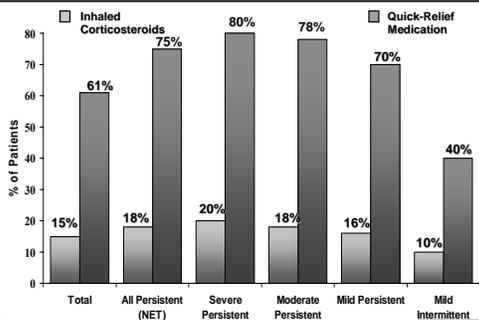
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## Patients and Inhaled Corticosteroids

Medicines Used to Treat Asthma by NIH Severity Index:  
Inhaled Corticosteroids vs Quick-Relief Medications



Base: All patients (unweighted N=2509).




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## Any Questions About Asthma in General?



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## Work-Related Asthma



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### What's so Important about Work-Related Asthma?

- 15-20% of all asthma is Work-Related (Occupational) Asthma
- More asthmatics entering the workplace
- Often a specific chemical, animal or particle agent can be identified as a cause
- Removal of the cause may remove the symptoms of asthma
- Treatment may be mostly environmental



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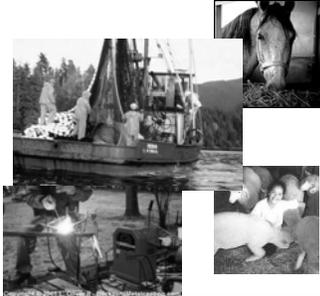
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## Historical Aspects of Occupational Asthma

- Hippocrates described in the 4th century B.C.
  - Metal workers
  - Fullers
  - Tailors
  - Horsemen
  - Farmhands
  - Fishermen



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## More History

- In earlier times industry was primarily small scale and much was conducted out of doors
- Roman times - Pliny described people using masks of bladder skin to protect from inhaling dust from work
- 15th century - more interest in mining and metal working "fumes and smokes"



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## Olaus Magnus, 1555

"When sifting the chaff from the wheat, one must carefully consider the time when a suitable wind is available that sweeps away the harmful dust. This fine-grained material readily makes its way into the mouth, congests in the throat, and threatens the life organs of the threshing men. If one does not seek instant remedy by drinking one's beer, one may never more, or only a short time, be able to enjoy what one has threshed."



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## 19th and 20th Centuries

- 1832 - Charles Turner Thackrah discussed the respiratory conditions associated with maltsters and coffee roasters, hatters and hairdressers, pharmacists.
- Spirometer developed in 1836
- Industrial hygiene recognized as discipline in 1910



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## Causes of Work-Related Asthma

- High (mainly protein) molecular causes include:
  - Castor bean dust
  - Western red cedar
  - Gum acacia
  - Wood dust
  - Locust and mayfly



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## Low Molecular Weight Causes

- Low (mainly chemical) Molecular Weight Causes include:
  - Platinum and platinum salts
  - Chromium and chromates
  - Phthalic anhydride
  - Sulfonechloramides
  - Toluene diisocyanate
  - Chrome, nickel and aniline
  - Rubber, lacquer and shellac (Latex)



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## Huge Increase in Substances Causing Work-Related Asthma

- From 1960 on - rapid increase began
- 1980 - more than 200 causes had been identified
- 1980: 2000 new substances developed each year
- 2000: 347 clearly identified agents and the list is growing
- Most substances have not been tested for human toxicity



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## Work-Related Asthma Defined

- Airway inflammation
- Increased airway responsiveness
- Airway obstruction - partially reversible
- Association with workplace exposures
- Aggravated by workplace exposures



Massachusetts Workers Compensation Reform Act 1991, Guideline No. 28



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## How do people react to agents?

- Sensitization
  - A specific immune system response to a specific protein or chemical that a person has come in contact with over time.
- Non-Sensitization
  - Airway symptoms that occur in response to exposure to a chemical the person has been exposed to over time. No specific immune response.
- Inflammation becomes chronic.



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### List of Sensitizers and Irritants



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### How is Work Related Asthma Diagnosed?

- Refer to Handout -
- Diagram behind slides



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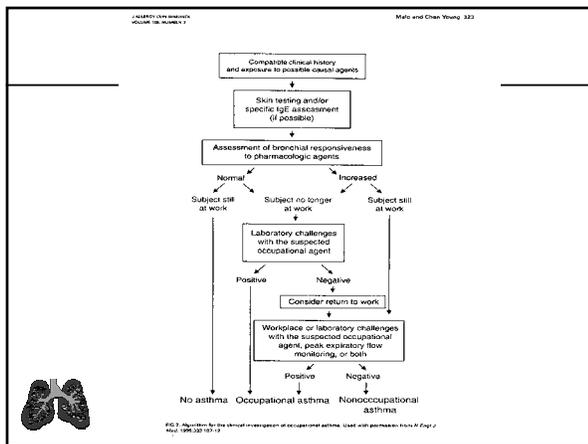
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### Diagnostic Tests Include:

- History and physical examination
- Respiratory function testing (spirometry)
- Measurements of peak flow(PEF) during days at work and days away from work
- Nonspecific and specific inhalation challenge tests
- Specific skin tests
- Radioallergosorbent test - specific antibody tests



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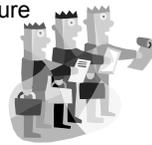
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### Occupational Asthma in Ohio

- Is a reportable disease in Ohio
- No current system for reporting
- BWC Claims Approved for Work-related Asthma
  - 61-84 per year
  - Not broken down by specific exposure
  - 675 during 1990-2000



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### What Other States are Finding?

- Refer to Tables 1-4 in the packet.
- Massachusetts SENSOR



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## Symptoms of Work-Caused Asthma

- Same as for all asthma with some differences
  - Symptoms appear after exposure to the sensitizing or irritating agent
  - May have no symptoms if no longer exposed to that agent
  - Continued exposure may result in worsening, even death



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## Testing in Asthma

- Detailed history including work environmental questions
- Allergy testing ▶ specific allergen tests
- Lung Function Testing - Spirometry
- Peak Flow Testing
- Methacholine challenge
- Specific broncho-challenge



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## Workplace Asthma Management

- Asthma management plan on file
- Asthmatics carry "rescue" medication
- Train employees
- Have an Asthma Emergency Protocol



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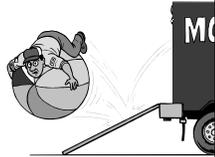
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## New Occupational Asthmatic

- Remove from contact with the occupational agent
  - As soon as possible
  - To reduce or remove symptoms
  - Treat for asthma



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## The Cost of Work Related Asthma



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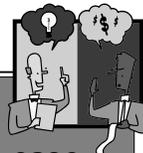
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Not only is there a human case for health and safety, but there is also a very strong business case.



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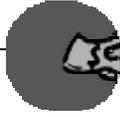
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## Direct Costs



- Wages paid to absent employees
- Property damage
- Production losses and delays due to the absence of the employee
- Legal fees in case of a lawsuit
- Damage to goods or equipment



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## Direct Costs - Insurance Related

- Medical expenses
- Physical and vocational rehabilitation costs
- Life insurance and/or survivor benefits
- Group health insurance for off the job and dependent coverage
- Higher insurance premiums (or even loss of insurability)
- Workers' compensation benefits



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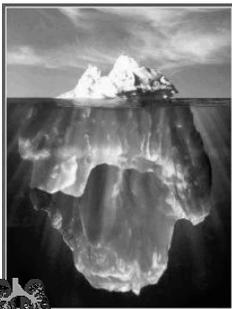
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## Direct Costs are the Tip of the Iceberg!



- Indirect costs can be 5-50 times the direct cost!

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### Indirect Costs - Labor Related

- Supervisors' time
- Rescheduling staff
- Overtime pay
- Replacing employees
- Hiring a permanent replacement
- Administrative costs



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### Indirect Costs, Continued

- Lost production and quality
- Process interruptions/yield losses
- Time off for Litigation
- Damage to customer relations & public image
- Missed shipments
- Loss of morale



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### Asthma in Workers is Costly to Employers

- Annual per capita costs for employers of a worker with asthma est. at \$5385 vs \$2121
- Disability from asthma costs 3x other disabilities
- Annual costs of WRA in U.S. estimated at **\$1.1 – 2.1 Billion**



Birnbaum et al '02, Leigh et al '02



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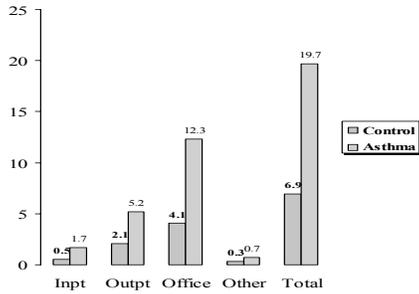
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### Average Number of Claims per Individual



Birnbaum, H.G.; Berger, W.E., et al. Direct and Indirect Costs of Asthma to an Employer, *Journal of Allergy, Clinical Immunology*, 2002; Vol. 109, Number 2, p.264-270.

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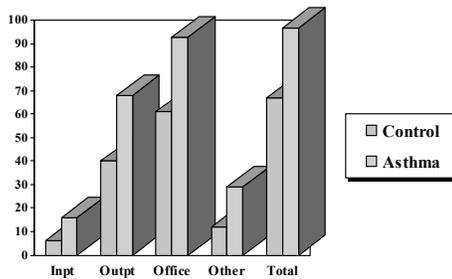
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### Percentage of Individuals with At Least One Claim



Birnbaum, H.G.; Berger, W.E., et al. Direct and Indirect Costs of Asthma to an Employer, *Journal of Allergy, Clinical Immunology*, 2002; Vol. 109, Number 2, p.264-270.

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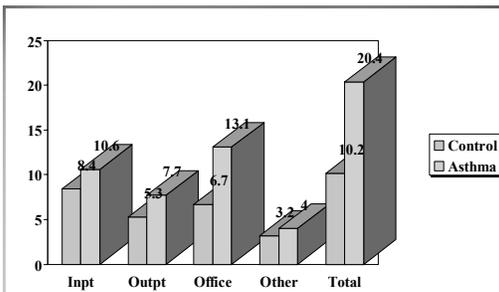
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### Average Number of Claims per User of a Specific Service



Birnbaum, H.G.; Berger, W.E., et al. Direct and Indirect Costs of Asthma to an Employer, *Journal of Allergy, Clinical Immunology*, 2002; Vol. 109, Number 2, p.264-270.

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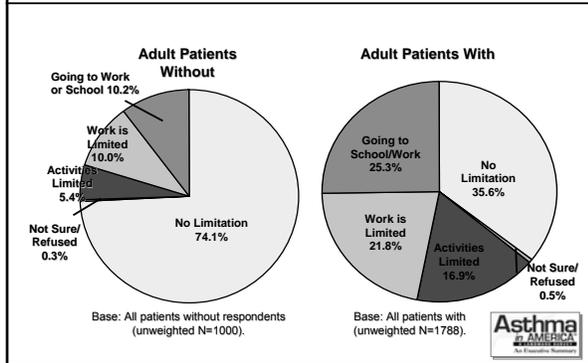
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### Comparison of Activity Limitations Adult Patients Without Asthma vs With Asthma




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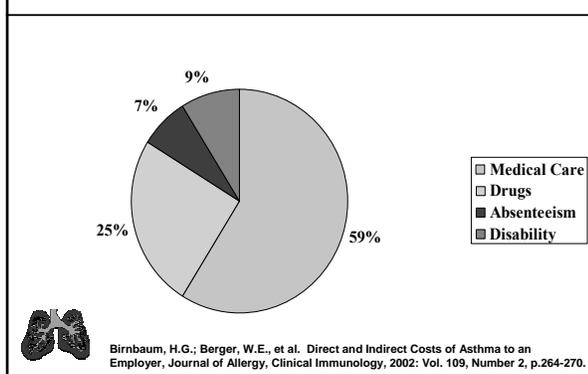
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### Breakdown of Direct Costs




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### What was NOT considered in this study?

- Caregiver expenses
- Cost to the patient not borne by employer
- Employees were insured
- Various indirect costs
- Still, resource use by asthmatic patients is substantial




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Why should Worker's Comp costs matter to you?

Cost-Estimating Exercise



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Formula for Direct Costs  
(Worker's Comp Costs)

$$\text{Sales Equivalent Dollars (SE\$)} = \frac{\text{\$Losses/Savings}}{\text{Profit Margin as \%}} \times 100\%$$



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For Example

$$\text{SE\$} = \frac{\text{\$10,000}}{5\%} \times 100\% = \text{\$1,000,000} = \text{\$200,000}$$



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### Table of Costs/Savings

Costs or Savings \$1000s	Net Profit Margin		
	4%	7%	10%
25	625	358	250
100	2500	1430	1000
250	6250	3580	2500
500	12500	7155	5000
1000	25000	14310	10000

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### Formula for Indirect Costs

$$SE\$ = \frac{\$lost/saved \times 100\% \times 2x \text{ multiplier}}{\text{Profit margin as \%}}$$




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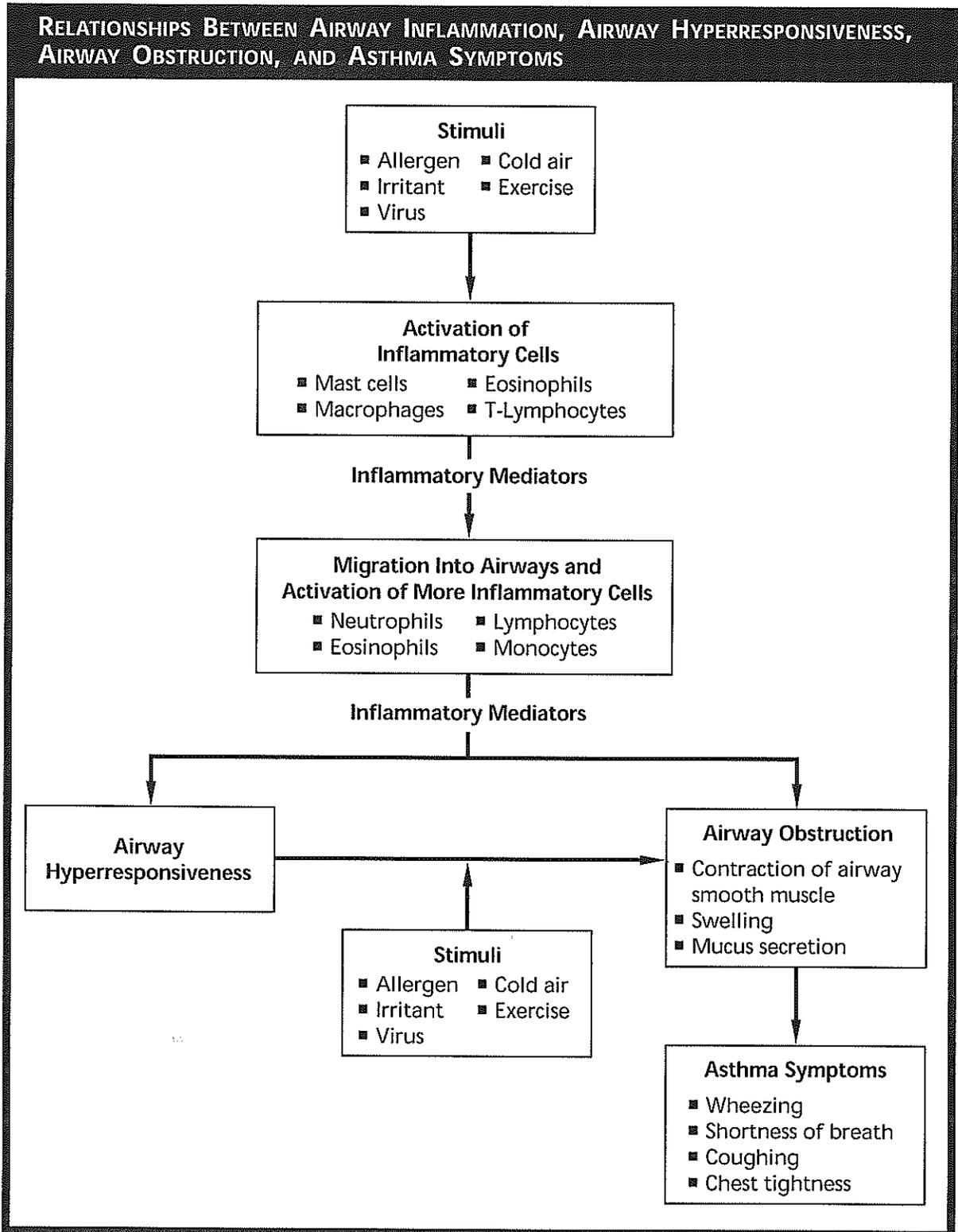
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Figure 1



# Measuring Peak Expiratory Flow

Physicians and respiratory therapists perform respiratory tests to determine how well a patient's lungs function. Spirometry is the term given to these measurements. Spirometry is often used to determine whether a person has asthma.

A Peak Expiratory Flow Rate, a measure of how much air leaves the lungs during a forced exhalation, (how fast a person can exhale) is one of the types of airflow measured in spirometry. Primarily it measures large airway function. The volume of air is measured in units of liters per minute (L/min). Peak flow varies with the height of the person, the size of their airways, and the coordination of the person performing the test. Measurements also vary because everyone is unique. Only a doctor can determine whether or not a person has asthma or another respiratory disease.

To get an accurate measurement, a person takes a deep breath and exhales as fast and forcefully as possible. Because the measurement of peak flow is dependent on effort and technique, doctors take time to teach patients the techniques to obtain a valid measure. During class, you will have the opportunity to measure your own peak flow using a peak flow meter.

## A Peak Experience: Your Lungs

### Summary of the activity:

**Part A.** Measure your height, because peak flow measurements vary with height.

**Part B.** Find your predicted peak flow based on your height.

**Part C.** Measure your peak flow in liters/minute (L/min) using a peak flow meter.

### Instructions:

#### Predicted Peak Flow

1. Find your Predicted Peak Flow in the **Predicted Peak Flow Table** below. The table lists what peak flow rate is expected for persons of a given height, sex and age.

#### 2. Calculating Predicted Peak Flow

If your height is not listed, use the following formula to determine your predicted peak flow rate.

$$\text{Predicted Peak Flow (L/min)} = [\text{Height (cm)} - 80] \times 5$$

(1 meter = 39.37inches) (1 inch = 2.54cm)

### Normal Adult Predicted Average Peak Flow Table (LPM)

Age (yrs)	Men Height					Women Height				
	60"	65"	70"	75"	80"	55"	60"	65"	70"	75"
20	554	602	649	693	740	390	423	460	496	529
25	543	590	636	679	725	385	418	454	490	523
30	532	577	622	664	710	380	413	448	483	516
35	521	565	609	651	695	375	408	442	476	509
40	509	552	596	636	680	370	402	436	470	502
45	498	540	583	622	665	365	397	430	464	495
50	486	527	569	607	649	360	391	424	457	488
55	475	515	556	593	634	355	386	418	451	482
60	463	502	542	578	618	350	380	412	445	475
65	452	490	529	564	603	345	375	406	439	468
70	440	477	515	550	587	340	369	400	432	461

### Part C: Actual Peak Flow

Use the peak flow meter to measure your actual peak flow. What you are measuring is how fast you can exhale.



**Step 1:** Before each use, make sure the sliding marker or arrow on the peak flow meter is at the bottom of the numbered scale (zero or the lowest number on the scale).

**Step 2:** Stand up straight. Remove gum or any food from your mouth. Take a couple of deep long breaths filling your lungs completely (as deeply as you can). Put the mouthpiece of the peak flow meter into your mouth. Close your lips tightly around the mouthpiece. Be sure to keep your tongue away from the mouthpiece. Blow out as hard and as quickly as possible and empty all of the air from your lungs.

**Step 3:** The force of the air coming out of your lungs causes the marker to move along the numbered scale. Record your measurement on your **Personal Data Sheet** on the previous page.

**Step 4:** Repeat steps 1-3 two more times and record your measurements each time. (You know you have done the routine correctly when the numbers from all three tries are very close together.)

**Step 5:** Record the highest of the three readings as your “Personal Best”. Do not calculate an average.

**Step 6:** Note any difference between your Actual peak flow and your Predicted Peak Flow.

#### Personal Data Sheet

Fill in data for Part A, B and C in the spaces provided:

A. Height (inches): \_\_\_\_\_

B. Predicted Peak Flow (L/min) \_\_\_\_\_

C. Actual Peak Flow (L/min)      1<sup>st</sup> Try: \_\_\_\_\_

2<sup>nd</sup> Try: \_\_\_\_\_

3<sup>rd</sup> Try: \_\_\_\_\_

Personal Best (the highest of your three tries): \_\_\_\_\_

# ASTHMA DAILY SELF-MANAGEMENT PLAN (EXAMPLE 1)

ASTHMA SELF-MANAGEMENT PLAN FOR \_\_\_\_\_

(Name)

## YOUR TREATMENT GOALS

- Be free from severe symptoms day and night, including sleeping through the night
- Have the best possible lung function
- Be able to participate fully in any activities of your choice
- Not miss work or school because of asthma symptoms
- Not need emergency visits or hospitalizations for asthma
- Use asthma medications to control asthma with as few side effects as possible

Add personal goals here:

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## YOUR DAILY MEDICATIONS

Daily Medication

How Much To Take

When To Take It

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RECORD DAILY SELF-MONITORING ACTIONS in the asthma diary your doctor gives you.

**Peak flow:** At least every morning when you wake up, before taking your medication, measure your peak flow and record it in your diary. Bring these records to your next appointment with your doctor.

**Symptoms:** Note if you had asthma symptoms (shortness of breath, wheezing, chest tightness, or cough) and rate how severe they were during the day or night: mild, moderate, severe.

**Use of your quick-relief inhaler (bronchodilator):** Keep a record of the number of puffs you needed to use each day or night to control your symptoms.

Actual use of daily medications:

Activity restriction:

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This plan is provided as an example to clinicians.

# ASTHMA ACTION PLAN FOR

Doctor's Name \_\_\_\_\_

Date \_\_\_\_\_

Doctor's Phone Number \_\_\_\_\_

Hospital/Emergency Room Phone Number \_\_\_\_\_

## GREEN ZONE: Doing Well

- No cough, wheeze, chest tightness, or shortness of breath during the day or night
- Can do usual activities

And, if a peak flow meter is used,  
Peak flow: more than \_\_\_\_\_  
(80% or more of my best peak flow)

My best peak flow is: \_\_\_\_\_

## Take These Long-Term-Control Medicines Each Day (include an anti-inflammatory)

Medicine	How much to take	When to take it

## Before exercise

- \_\_\_\_\_
- 2 or  4 puffs
- 5 to 60 minutes before exercise

## YELLOW ZONE: Asthma Is Getting Worse

- Cough, wheeze, chest tightness, or shortness of breath, or
- Waking at night due to asthma, or
- Can do some, but not all, usual activities

-Or-

Peak flow: \_\_\_\_\_ to \_\_\_\_\_  
(50% - 80% of my best peak flow)

## Add: Quick-Relief Medicine - and keep taking your GREEN ZONE medicine

- \_\_\_\_\_ (short-acting beta<sub>2</sub>-agonist)
- 2 or  4 puffs, every 20 minutes for up to 1 hour
- Nebulizer, once

If your symptoms (and peak flow, if used) return to GREEN ZONE after 1 hour of above treatment:

- Take the quick-relief medicine every 4 hours for 1 to 2 days.
- Double the dose of your inhaled steroid for \_\_\_\_\_ (7-10) days.

-Or-

If your symptoms (and peak flow, if used) do not return to GREEN ZONE after 1 hour of above treatment:

- Take: \_\_\_\_\_ mg, per day For \_\_\_\_\_ (3-10) days  
(short-acting beta<sub>2</sub>-agonist)
- Add: \_\_\_\_\_ mg, per day For \_\_\_\_\_ (3-10) days  
(oral steroid)
- Call the doctor  before/  within \_\_\_\_\_ hours after taking the oral steroid.

## RED ZONE: Medical Alert!

- Very short of breath, or
- Quick-relief medicines have not helped, or
- Cannot do usual activities, or
- Symptoms are same or get worse after 24 hours in Yellow Zone

-Or-

Peak flow: less than \_\_\_\_\_  
(50% of my best peak flow)

## Take this medicine:

- \_\_\_\_\_ mg, per day For \_\_\_\_\_ (3-10) days  
(short-acting beta<sub>2</sub>-agonist)
- \_\_\_\_\_ mg, per day For \_\_\_\_\_ (3-10) days  
(oral steroid)

Then call your doctor NOW. Go to the hospital or call for an ambulance if:

- You are still in the red zone after 15 minutes AND
- You have not reached your doctor.

## DANGER SIGNS

- Trouble walking and talking due to shortness of breath
- Lips or fingernails are blue

- Take  4 or  6 puffs of your quick-relief medicine AND
- Go to the hospital or call for an ambulance ( \_\_\_\_\_ ) NOW!

# ASTHMA ACTION PLAN (EXAMPLE 1)

Name \_\_\_\_\_ Date \_\_\_\_\_

It is important in managing asthma to keep track of your symptoms, medications, and peak expiratory flow (PEF).  
You can use the colors of a traffic light to help learn your asthma medications:

- A. **GREEN means Go** Use preventive (anti-inflammatory) medicine
- B. **YELLOW means Caution** Use quick-relief (short-acting bronchodilator) medicine in addition to the preventive medicine.
- C. **RED means STOP!** Get help from a doctor.

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A. Your **GREEN ZONE** is \_\_\_\_\_ 80 to 100% of your personal best. **GO!**  
Breathing is good with no cough, wheeze, or chest tightness during work, school, exercise, or play.

**ACTION:**

- Continue with medications listed in your daily treatment plan.

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B. Your **YELLOW ZONE** is \_\_\_\_\_ 50 to less than 80% of your personal best. **CAUTION!**

Asthma symptoms are present (cough, wheeze, chest tightness).

Your peak flow number drops below \_\_\_\_\_ or you notice:

- Increased need for inhaled quick-relief medicine
- Increased asthma symptoms upon awakening
- Awakening at night with asthma symptoms
- \_\_\_\_\_

**ACTIONS:**

- Take \_\_\_\_\_ puffs of your quick-relief (bronchodilator) medicine \_\_\_\_\_  
Repeat \_\_\_\_\_ times.
- Take \_\_\_\_\_ puffs of \_\_\_\_\_ (anti-inflammatory) \_\_\_\_\_ times/day.
- Begin/increase treatment with oral steroids:  
Take \_\_\_\_\_ mg of \_\_\_\_\_ every a.m. \_\_\_\_\_ p.m. \_\_\_\_\_.
- Call your doctor (phone) \_\_\_\_\_ or emergency room \_\_\_\_\_.

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C. Your **RED ZONE** is \_\_\_\_\_ 50% or less of your best. **DANGER!!**

Your peak flow number drops below \_\_\_\_\_, or you continue to get worse after increasing treatment according to the directions above.

**ACTIONS:**

- Take \_\_\_\_\_ puffs of your quick-relief (bronchodilator) medicine \_\_\_\_\_ Repeat \_\_\_\_\_ times.
  - Begin/increase treatment with oral steroids. Take \_\_\_\_\_ mg now.
  - Call your doctor now (phone \_\_\_\_\_). If you cannot contact your doctor, go directly to the emergency room (phone \_\_\_\_\_).
- Other important phone numbers for transportation \_\_\_\_\_.

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**AT ANY TIME, CALL YOUR DOCTOR IF:**

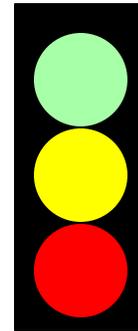
- Asthma symptoms worsen while you are taking oral steroids, or
- Inhaled bronchodilator treatments are not lasting 4 hours, or
- Your peak flow number remains or falls below \_\_\_\_\_ in spite of following the plan.

Physician Signature \_\_\_\_\_ Patient's/Family Member's Signature \_\_\_\_\_

This plan is provided as an example to clinicians.

# Asthma Action Plan

Name:		Date:
Birth Date:	Provider Name:	Provider Phone #
Patient Goal:		Parent/Guardian Phone #
Important! Avoid things that make your asthma worse:		



The colors of a traffic light will help you use your asthma medicines.

**Green means Go Zone!**  
Use controller medicine.

**Yellow means Caution Zone!**  
Add quick-relief medicine.

**Red means Danger Zone!**  
Get help from a provider.

Personal Best Peak Flow: \_\_\_\_\_

**GO – You're Doing Well!** ➔ **Use these daily controller medicines:**

You have ***all*** of these:

- Breathing is good
- No cough or wheeze
- Sleep through the night
- Can work and play



Peak flow from \_\_\_\_\_ to \_\_\_\_\_

MEDICINE	HOW MUCH	HOW OFTEN/ WHEN

**CAUTION – Slow Down!** ➔ **Continue with green zone medicine and add:**

You have ***any*** of these:

- First signs of a cold
- Cough
- Mild wheeze
- Tight Chest
- Coughing at night



Peak flow from \_\_\_\_\_ to \_\_\_\_\_

MEDICINE	HOW MUCH	HOW OFTEN/ WHEN

CALL YOUR PRIMARY CARE PROVIDER: \_\_\_\_\_

**DANGER – Get Help!** ➔ **Take these medicines and call your provider now.**

Your asthma is getting worse fast:

- Medicine is not helping
- Breathing is hard and fast
- Nose opens wide
- Ribs show
- Can't talk well



Peak flow from \_\_\_\_\_ to \_\_\_\_\_

MEDICINE	HOW MUCH	HOW OFTEN/ WHEN

**Get help from a provider now! Do not be afraid of causing a fuss. Your provider will want to see you right away. It's important! If you cannot contact your provider, go directly to the emergency room and bring this form with you. DO NOT WAIT.**  
Make an appointment with your primary care provider within two days of an ER visit or hospitalization.

Provider Signature: \_\_\_\_\_ Date: \_\_\_\_\_

I, \_\_\_\_\_ give permission to the school nurse and/or the school-based health  
(parent/guardian name-please print)  
clinic to exchange information and otherwise assist in the asthma management of my child including direct communication with my child's primary care provider. \_\_\_\_\_ Date: \_\_\_\_\_  
(signature)

**\*\*Please refer to the back of the school copy for the Medication Authorization form.**

# YOUR ASTHMA ACTION PLAN

To be completed by you and your doctor.

Your Name \_\_\_\_\_ Date \_\_\_\_\_

Doctor's Name \_\_\_\_\_ Emergency Department Phone # (\_\_\_\_) \_\_\_\_\_

Doctor's Phone # (\_\_\_\_) \_\_\_\_\_ Emergency Department Address \_\_\_\_\_

## HOW YOU FEEL

Your **Personal Best** peak flow number is:

## WHAT YOU SHOULD DO

### GREEN ZONE

Your peak flow is **greater than 80%** of personal best

#### You are feeling well:

- Able to participate in everyday activities
- Able to work
- Able to play
- Able to go to school
- Asthma does not interfere with sleep

- Use your Peak Flow Meter
- Take the following medicines: \_\_\_\_\_  
\_\_\_\_\_
- Take \_\_\_\_\_ before exercising.
- List and avoid the following triggers: \_\_\_\_\_  
\_\_\_\_\_
- List your early warning signs: \_\_\_\_\_  
\_\_\_\_\_

### YELLOW ZONE

Your peak flow is **between 60 - 80%** of personal best

#### You are having asthma symptoms such as:

- Cough
- Wheezing
- Shortness of breath
- Chest tightness

#### You may have:

- Difficulty with normal activities
- Nighttime asthma symptoms

- Take \_\_\_\_\_ puffs of your inhaled, quick-relief bronchodilator \_\_\_\_\_ or use your nebulizer \_\_\_\_\_. Repeat \_\_\_\_\_.
- Take \_\_\_\_\_ puffs of your inhaled, anti-inflammatory medicine \_\_\_\_\_, \_\_\_\_ x / day, for \_\_\_\_ days, or until your peak flow is back to \_\_\_\_\_.
- Ask your doctor if you need to begin or increase oral steroids \_\_\_\_\_.
- Continue taking your daily medications.
- Stop taking \_\_\_\_\_ medicine.
- Call your doctor.

### RED ZONE

Your peak flow is **below 60%** of personal best

#### Your asthma symptoms are worse and may include:

- Extreme shortness of breath
- Difficulty talking
- Pulling of neck & chest muscles
- Blueness around your lips or fingertips
- Severely limited activities
- Asthma medicines are **not** working

- Take \_\_\_\_\_ puffs of your inhaled, quick-relief bronchodilator \_\_\_\_\_ **or** nebulizer **NOW**. Repeat \_\_\_\_\_ times.
- Take oral steroids as follows: \_\_\_\_\_  
\_\_\_\_\_
- Call your doctor **NOW** \_\_\_\_\_.
- If you cannot reach your doctor, and you are still in the red zone, go to the Emergency Room or call 911.**

Always call your doctor if:

Eligible for flu shot  yes  no

- You don't return to your yellow or green zone after following the above treatment.
- Your quick-relief inhaled bronchodilators are needed more often than every four hours.

Patient Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Doctor Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## **Work-Related Asthma**



## Work-Related Asthma: True or False?

1.  A person who had childhood allergies is more likely to get work-related asthma.
2.  If a person smokes they are more likely to get work-related asthma.
3.  Being in compliance with OSHA air quality limits for chemicals protects workers from getting work-related asthma.
4.  A proper pre-placement screening would prevent people from being hired places where they could develop work-related asthma.
5.  If a worker has work related asthma they should transfer to a different job or company to get rid of the problem.
6.  After 10 years working in a single environment a person is unlikely to develop work-related asthma.
7.  Symptoms of work-related asthma happen only on the job.
8.  People with work-related asthma are generally fired when they develop the condition.

**Table 1--Chemicals Associated with Occupational Asthma**

Chemical Name	Alternative Names	Occupation or Industry
<b>Acrylates &amp; Methacrylates</b>		
Ethyl cyanoacrylate	Ethyl-2-cyanoacrylate, Krazy Glue, Super Glue, Miracle Glue, Nail Glue, Instant Magic	Building airplane models
Methyl 2-cyanoacrylate	Adhere; Coapt; alpha-Cyanoacrylate acid methyl ester	
Methyl methacrylate	Methacrylic acid methyl ester	Nurse
<b>Metals</b>		
Chromium	Chrome	Printer, plater, welder, tanner
Cobalt	Cobalt metal dust, Cobalt metal fume	Hard metal grinder, diamond polisher
Nickel		Metal plating; welder
Platinum		Platinum refinery
Tungsten and cemented tungsten carbide	Tungsten carbide	Grinder
<b>Aldehydes</b>		
Formaldehyde	Gas: methanal; Methyl aldehyde; Methylene oxide; Aqueous: Formalin	Hospital staff, Wood products, adhesives, carpet manufacturers
Glutaraldehyde	Cidex	Hospital endoscopy unit
<b>Amines</b>		
Ethanolamine	2-Aminoethanol; Monoethanolamine; Ethylolamine; 2-Hydroxyethylamine; beta-Aminoethyl alcohol	Beauty culture
Ethylenediamine	1,2-Diaminoethane; 1,2-Ethanediamine; Ethylenediamine (anhydrous)	Shellac handler, photographer
Hexamethylene tetramine	Methenamine; urotropin; HMTA; Hexaform; Hiprex; Mandelamine; UREX; Uroqid; Hexamine; HMT; Ammoform; Cystamin; Cystogen; Formin; Uritone;	Lacquer handler
N,N-Dimethyl-1,3-propanediamine	3-(Dimethylamio) propylamine; 3-DMAPA; 3-dimethylamino propylamine	Ski manufacturer
N,N-Dimethylethanolamine	beta-Dimethylaminoethyl alcohol; Deanol; N,N-Dimethyl-2-Hydroxyethylamine; Dimethylethanolamine; DMAE; dimethylaminoethanol; N,N-Dimethylaminoethanol;	Spray painter
N-(2-hydroxyethyl)ethylenediamine	(2-Aminoethyl) ethanolamine; aminoethylethanolamine; N-(2-hydroxyethyl)-1,2-diaminoethane; N-hydroxyethylethylenediamine; 2-((aminoethyl)amino)ethanol; N-aminoethylethanolamine;	Solderer, cable jointer
Triethylene tetramine	TETA; N,N'-bis(2-aminoethyl)-ethylenediamine; N,N'-Bis(2-aminoethyl)-1,2-ethanediamine; 1,8-Diamino-3,6-diazaoctane; 3,6-Diazaoctane-1,8-diamine; 1,4,7,10-Tetraazadecane; Tecza; Trien; Trientine;	Manufacturing aircraft filters
EPO 60		Mold maker

Chemical Name	Alternative Names	Occupation or Industry
Trimethylhexanediamine + Isophorondiamine		Floor covering material salesman
4-Methylmorpholine	Methyl morpholine; N-methyl morpholine; 4-Methyl-1-oxa-4-azacyclohexane;( N-Methylmorpholine is used in peptide synthesis protocols.)	
Piperazine dihydrochloride	Piperazine Hydrochloride; Diethylenediamine dihydrochloride	Chemist, pharmaceutical, chemical plant
p-Phenylene diamine	N-(2-Aminoethyl)1,2-ethanediamine; bis(2-Aminoethyl)amine; DETA; 2,2'-Diaminodiethylamine	Fur dyeing
<b>Anhydrides</b>		
Hexahydrophthalic anhydride	Hexahydro-1,3-isobenzofurandione; 1,2-Cyclohexanedicarboxylic anhydride;	Chemical worker
Himic anhydride	5-Norbornene-2,3-dicarboxylic anhydride; Carbic anhydride; Nadic anhydride	Manufacture of flame retardant
Methyltetrahydrophthalic anhydride	1,3-Isobenzofurandione, 3a,4,7,7a-tetrahydromethyl-	Curing agent
Phthalic anhydride	1,2-Benzenedicarboxylic anhydride; PAN; Phthalic acid anhydride	Plastics, toolsetter or resin plant agent; production of resins
Pyromellitic dianhydride	pyromellitic dianhydride; PMDA; 1,2,3,5-benzenetetracarboxylic anhydride; 1,2,4,5-Benzenetetracarboxylic anhydride	Epoxy adhesives
Tetrachlorophthalic anhydride	tetrachloro-1,2-benzenedicarboxylic acid anhydride; niagathal; 4,5,6,7-tetrachloro-1,3-isobenzofurandione	Epoxy resins and plastics
Trimellitic anhydride	1,2,4-Benzenetricarboxylic anhydride; 4-Carboxyphthalic anhydride; TMA; TMAN; Trimellitic acid anhydride [Note: TMA is also a synonym for Trimethylamine.]	Epoxy resins and plastics
<b>Detergents and Antiseptics</b>		
Chloramine T	Sodium p-toluenesulfochloramine	Chemical manufacturing, brewery, janitorial/cleaning
Chlorhexidine	Chlorhexidine digluconate (gluconate), Bacticens, Hibicens, Hibidil, Hibiscrub, Hibitane, Corsodyl, Plac Out, Peridex, pHisoMed, Plurexid, Rotersept, Unisept;	Nurse
Hexachlorophene	2,2'-Methylenebis[3,4,6-trichlorophenol]; 2Bilevon; Dermadex; Exofene; G-11; Hexosan; pHisoHex; Surgi-Cen; Surofene;	Hospital staff
Isononanoyl oxybenzene sulfonate		Laboratory technician
<b>Isocyanates</b>		
Dicyclohexylmethane 4,4-diisocyanate	Hydrogenated MDI	
Hexamethylene diisocyanate	HDI	Spray painter
Isophorone diisocyanate	IPDI	Spray painter
Methylene bisphenyl isocyanate	MDI; Diphenylmethane diisocyanate	Foundry
Naphthalene diisocyanate	NDI	Rubber manufacturer
Polymethylene polyphenyl isocyanate	PPI; Polymeric diphenylmethane diisocyanate; Isocyanic acid, polymethylenepolyphenylene ester; Polymeric MDI	Paint shop worker
Toluene diisocyanate	TDI, all isomers	Polyurethane, plastics and varnish. Floor varnisher

Chemical Name	Alternative Names	Occupation or Industry
<b>Plastic Dusts</b>		
Plexiglass powder	Poly (methyl methacrylate); Acronal S 320 D; Acrylite; 101; Disapol M; DV 400; Elvacite; Kallocryl K; Lucite; Metaplex 4002T; Methyl methacrylate polymer; Osteobond surgical bone cement;	Plexiglass manufacturing
Polyvinyl chloride powder		Manufacturer of bottle caps
<b>Pyrolysis Products</b>		
Polyvinyl chloride fumes		Meat wrapper's asthma
Polyethylene fumes	Ethene, homopolymer; Ethylene polymer; Polyethylene wax; Ethylene resin; Ethylene latex	Paper wrapper's asthma
Rosin core solder	Rosin flux pyrolysis products, Rosin core soldering flux pyrolysis products	Electronics worker, manufacture of solder flux
Zinc chloride fume		Solderer, locksmith
<b>Fungicides</b>		
Bis(tri-n-butyltin)oxide	Tributyltin oxide; TBTO; hexabutyldistannoxane;	Venipuncture technician
Chlorothalonil	2,4,5,6-tetrachloroisophthalonitrile; m-tetrachlorophthalonitrile; bravo-w-75; chloroalonil; Dacobre; Echo 75; Vanox;	Farmer
<b>Other Chemicals</b>		
Drugs	(See <u>Skin and Respiratory Allergens--Drugs</u> )	Pharmacist, pharmaceutical worker
Textile dyes	(See <u>Skin and Respiratory Allergens--Dyes</u> )	Textiles, dye manufacture
Ammonium persulphate	Ammonium peroxydisulfate	Hairdresser
Diazonium salt	Examples include diazonium tetrafluoroborate and p-diethylaminobenzenediazonium chloride;	Manufacturer of photocopy paper, manufacture of fluorine polymer precursor
Oil mist, mineral	Metalworking or machining fluids, cutting oils (may contain numerous additives and contaminants)	Toolsetter
Aluminum smelting	Yet to be identified substance or mixture (? aluminum, ? fluorides) that can cause "potroom asthma" in workers at electrolytic reduction facilities	Potroom worker
Tetrazene	4-Amidino-1-[nitrosamino-amidino]-1-tetrazene	Detonator manufacture
Ethylene Oxide	Dimethylene oxide; 1,2-Epoxy ethane; Oxirane	Nurse
1,1'-Azobisformamide	Azodicarbonamide, Diazenedicarboxamide, 1,1'-azobiscarbamide, azobiscarbonamide, Genitron, Unifoam, Nitropore, Porofor	Plastics and rubber
Urea formaldehyde	Kaurit S	Resin, manufacture of foam
Styrene	Vinyl benzene; phenylethylene	Plastics
Furfuryl alcohol	2-Furylmethanol; 2-hydroxymethylfuran	Foundry mold making, wool dye house
<p>Based on the <u>Table of Major Inducers of Occupational Asthma</u>  What is occupational asthma? Read the OSHA "<u>hazard description.</u>"</p> <p>Revised August 25, 2002  All rights reserved. Haz-Map© 2002</p>		

**Table 2--Biological Agents Associated with Occupational Asthma**

Agent Name	Comments or Alternative Names	Industry or Occupation
<b>Animal-Derived Proteins</b>		
Frog		Frog catcher
Egg protein		Egg producer
Milk protein	Casein	Dairy industry, Tanner,
Farm animals		Agricultural worker, Poultry worker, Butcher
Laboratory animals		Laboratory worker
Bat guano	Bat droppings	Various
<b>Biological Enzymes</b>		
Esperase		Detergent industry
Fungal amyloglucosidase & hemicellulase		Baker
Fungal amylase		Baker
Papain		Pharmaceutical
Egg lysosyme		Pharmaceutical
Flaviastase		Pharmaceutical
Subtilisins		Detergent industry
Pancreatin		Pharmaceutical
Pepsin		Pharmaceutical
Trypsin		Plastic and pharmaceutical
Bromelin		Pharmaceutical
Serratial peptidase	Park H, Nahm D. New occupational allergen in a pharmaceutical industry: serratial peptidase and lysozyme chloride. <i>Ann Allergy Asthma Immunol</i> 1997 Feb;78(2): 225-229.	Pharmaceutical
Fungal pectinase & glucanase	Sen D, Wiley K, Williams G. Occupational asthma in fruit salad processing. <i>Clin Exp Allergy</i> 1998 28:363-367.	Food Processing
Fungal lactase	Muir DCF, et al. Occupational Sensitization to Lactase. <i>Am J Ind Med</i> 1997 31: 570-571.	Formulating and Packaging
<b>Insect-Derived Allergens</b>		
L. Caesar larvae		Angler
Grain mite		Farmer, grain storage worker
Locust		Laboratory worker
Screw worm fly		Flight crew
Cricket		Laboratory worker
Moth		Entomologist
Butterfly		Entomologist
Echinidorus larva	Echinodoros plamosus	Aquarium keeper
Fruit fly		Laboratory worker
Silkworm		Silk worker
Sericin	silk gum; gelatinous protein on raw silk	Hairdresser
Fowl mite		Poultry worker
Barn mite		Farmer
Acarus (mite)	Panonychus Ulmi	Apple grower
Sheep blowfly		Technician
Larva of silkworm		Sericulture
Lesser mealworm		Grain and poultry worker
Mexican bean weevil		Seed house worker
Bee moth		Fish bait breeder
Honeybee		Honey processor

Agent Name	Comments or Alternative Names	Industry or Occupation
<b>Plant-Derived Allergens</b>		
Tobacco leaf		Tobacco manufacturer
Pectin		Christmas candy maker
Lycopodium	Moss spores; used in fireworks, pills, etc.	
Sunflower		Laboratory worker
Chicory		Chicory grower
Cacoon seed		Decorator
Mushroom		Mushroom soup processor
Paprika		Horticulturist
Henna		Hairdresser
Hops		Brewery chemist
Garlic		Food packager
Herbal tea		Herbal tea processor
Tea		Tea processor
Castor bean		Oil industry
Coffee bean (green)		Food processor
Vicia sativa	Vetch	Farmer
Lathyrus sativus	Grass pea	Flour handler
Freesia	Freesia is a South African plant of the iris family.	Horticulturist
Gluten		Baker
Buckwheat		Baker
Flour (wheat, rye and soya)		Baker or miller
Baby's breath		Florist
Grain dust		Grain elevator worker
Weeping fig		Plant keeper
Latex		Glove manufacture
Rose hips		Pharmaceutical
<b>Aquatic Animal Allergens</b>		
Hoya	Sea-squirt	Oyster farm worker
Crab	Snow crab	Snow crab processor
Prawn		Prawn processor
Fish		Trout processor, deep-sea fisher
Shrimpmeal		Technician
Red soft coral	Dendronephthytia nipponica	Fisherman
Daphnia	Water flea (a small freshwater crustacean.)	Fish food storage worker
Nacre	Mother-of-pearl	Nacre (mother-of-pearl) button maker
<b>Vegetable Gums</b>		
Guar		Carpet manufacturer
Karaya		Hairdresser
Acacia		Printer
Tragacanth		Gum importer
<b>Wood Dusts</b>		
Abiruana	Pouteria	
California redwood	Sequoia sempervirens	Wood carver, carpenter
Cedar of Lebanon	Cedra libani	
Cocabolla	Dalbergia retusa	
Iroko	Chlorophora excelsa	Carpenter
Eastern white cedar	Thuja occidentalis	Sawmill worker
Fernambouc	Caisalpinia echinata	Bow making
Cinnamon	Cinnamomum Zeylanicum	
Kotibe wood	Nesorgordonia papverifera	
Ebony wood	Diospyros crassiflora	
Western red cedar	Thuja plicata (Plicatic acid has been identified as the low-molecular-weight chemical sensitizer.)	Carpentry, furniture making, cabinetmaking, sawmill worker
Cabreuva	Myrocarpus fastigiatus Fr. All.	Parquet floor layer

English Oak	Quercus robur	
Ashwood	Fraxinus americana	Sawmill worker
Mahogany	Shorea Sp	
Quillaja bark		Factory to produce saponin
Agent Name	Comments or Alternative Names	Industry or Occupation
Ramin	Gonystylus bancanus	Woodworker
Tanganyika aningre		
African zebrawood	Microberlinia	
Kejaat	Pterocarpus angolensis	
Central American Walnut	Juglans olanchana	
African maple	Triplochiton scleroxylon	
Pau Marfim	Balfourodendron riedelianum	Woodworker
<b>Fungi</b>		
Neurospora		Plywood factory worker
<p>Based on the large table in "<a href="#">Aetiological agents in occupational asthma</a>"; also in <a href="#">Harber</a>, Appendix B  What is occupational asthma? Read the OSHA "<a href="#">hazard description</a>."</p> <p>Revised August 25, 2002  All rights reserved. Haz-Map© 2002</p>		

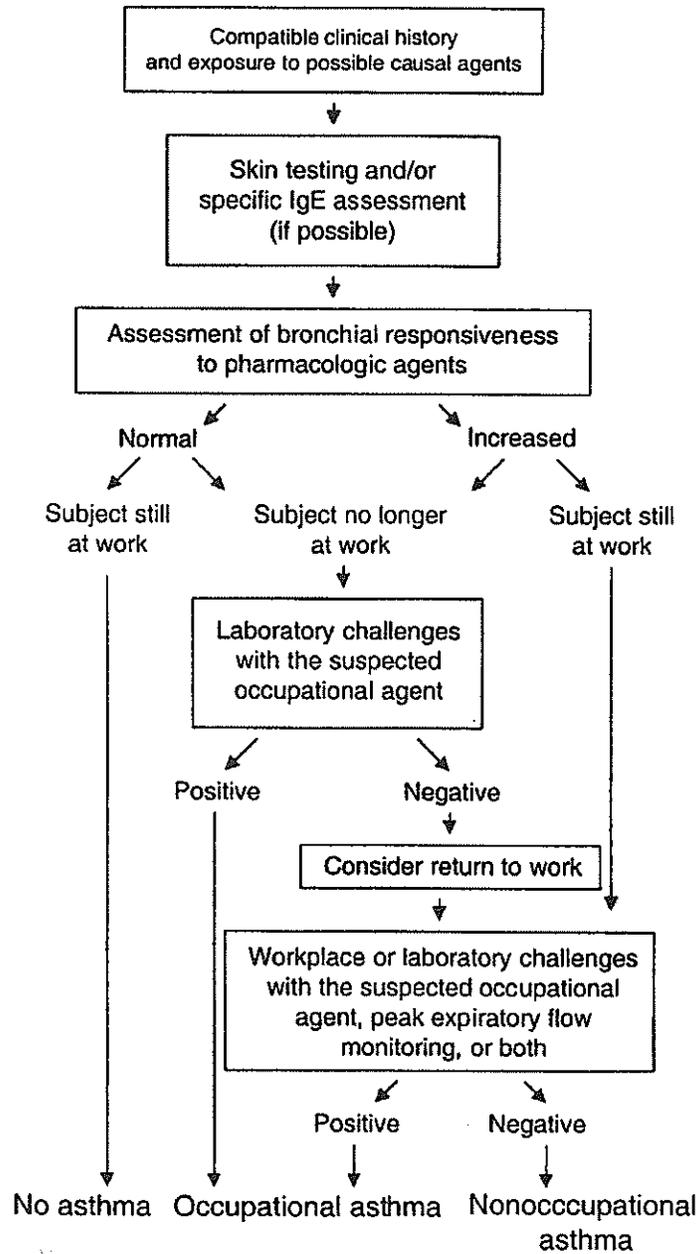


FIG 3. Algorithm for the clinical investigation of occupational asthma. Used with permission from *N Engl J Med.* 1995;333:107-12.

# Occupational History Form

## Employment History

1. Demographic information \_\_\_\_\_
2. Current Department \_\_\_\_\_
3. Current job description \_\_\_\_\_
4. List chemicals or other substances encountered in the workplace.

Substance	How Worker is Exposed	Year Started	Year Ended
a. _____	_____	_____	_____
b. _____	_____	_____	_____
c. _____	_____	_____	_____
d. _____	_____	_____	_____

5. Date started in current job (month/year) \_\_\_\_\_
6. Previous jobs at you current place of employment. Please begin with your most recent job and end with your first job. (Current job *will not* be listed here.)

Department	Job	Year Started	Year Ended	Duration
7. _____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____

10. List prior jobs at previous places of employment as in question 6.

Department	Job	Year Started	Year Ended	Duration
7. _____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____

## Medical Interview

1. Have you ever been transferred from a job for health reasons? Yes \_\_\_\_\_ No \_\_\_\_\_
  2. What is your usual work shift? \_\_\_\_\_
  3. What shift are you working presently? \_\_\_\_\_
  4. How long have you worked at your current job? \_\_\_\_\_
  5. How long have you been in your current department? (Or, if transferred in and out, when did you first begin working in the current department?)  
\_\_\_\_\_
  6. While working at your current job, have you had:
    - a. Wheezing Yes \_\_\_\_\_ No \_\_\_\_\_
    - b. Cough Yes \_\_\_\_\_ No \_\_\_\_\_
    - c. Shortness of breath Yes \_\_\_\_\_ No \_\_\_\_\_
- If "Yes" to questions 6a, 6b, or 6c, answer questions 7-17.
7. Do these symptoms begin immediately after starting work (less than 1 hour)?  
Yes \_\_\_\_\_ No \_\_\_\_\_
  8. Do these symptoms begin hours after starting work?  
Yes \_\_\_\_\_ No \_\_\_\_\_
  9. If yes, How many hours? \_\_\_\_\_
  10. How many hours do these symptoms last while at work? \_\_\_\_\_
  11. Do these symptoms continue after coming home from work? (Example: cough while sleeping)  
Yes \_\_\_\_\_ No \_\_\_\_\_
  12. If yes, for how many hours? \_\_\_\_\_ Days? \_\_\_\_\_
  13. What time of day do they stop? \_\_\_\_\_
  14. Are these symptoms better on weekends? Yes \_\_\_\_\_ No \_\_\_\_\_
  15. Are these symptoms better on vacation? Yes \_\_\_\_\_ No \_\_\_\_\_
  16. What month/year did the symptoms start? \_\_\_\_\_/\_\_\_\_\_
  17. A) Work-related symptoms present? Yes \_\_\_\_\_ No \_\_\_\_\_
- 
-

B) Are symptoms associated with exposure to a substance or process at work?

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, what process and/or substance? \_\_\_\_\_

18. While working at your current job, have you had:

a. Nasal stuffiness Yes \_\_\_\_\_ No \_\_\_\_\_

b. Itchy eyes or tearing Yes \_\_\_\_\_ No \_\_\_\_\_

c. Runny nose Yes \_\_\_\_\_ No \_\_\_\_\_

If "yes" to questions 18a, 18b, or 18c, repeat questions 7-17.

19. A) Occupational-related symptoms present? \_\_\_\_\_

B) Are symptoms associated with exposure to process or substance(s) at work?

Yes \_\_\_\_\_ No \_\_\_\_\_

If "yes", what process or substance(s)? \_\_\_\_\_

20. While working at your current job, have you had:

a. Fever Yes \_\_\_\_\_ No \_\_\_\_\_

b. Chills Yes \_\_\_\_\_ No \_\_\_\_\_

c. Muscle aches Yes \_\_\_\_\_ No \_\_\_\_\_

If "yes" to questions 20a, 20b, or 20c, repeat questions 7-17.

21. Impression:

A) Occupationally-related symptoms present? \_\_\_\_\_

B) Are symptoms associated with exposure to a process or substance(s) at work?

Yes \_\_\_\_\_ No \_\_\_\_\_

If "yes" what process or substance(s)? \_\_\_\_\_

22. Do you smoke cigarettes? Now \_\_\_\_\_ Ex-smoker \_\_\_\_\_ Never \_\_\_\_\_

23. How many packs per day? \_\_\_\_\_

24. How many years have you smoked? \_\_\_\_\_

25. Do you cough on most days for at least 3 months out of the year?

Yes \_\_\_\_\_ No \_\_\_\_\_

26. Do you have a past history of asthma?

Yes \_\_\_\_\_ No \_\_\_\_\_

27. Have you ever been told by a physician that you have emphysema or chronic bronchitis?

Yes \_\_\_\_\_ No \_\_\_\_\_

28. Do you have itchy eyes, runny and congested nose during spring, summer, or fall or on a yearly basis?

Yes \_\_\_\_\_ No \_\_\_\_\_

29. Have you had a pneumonia seen on a chest x-ray?

Yes \_\_\_\_\_ No \_\_\_\_\_

If "yes" what year? \_\_\_\_\_

Did you also have, associated with the pneumonia, any of the following?

a) Elevated temperature

Yes \_\_\_\_\_ No \_\_\_\_\_

b) Chills

Yes \_\_\_\_\_ No \_\_\_\_\_

c) Fever

Yes \_\_\_\_\_ No \_\_\_\_\_

d) Joint pain

Yes \_\_\_\_\_ No \_\_\_\_\_

29. Have you been close to any accidents or spills of substances or chemicals at work?

Yes \_\_\_\_\_ No \_\_\_\_\_

If so, which substances and how many? \_\_\_\_\_

List dates \_\_\_\_\_

Associated symptoms: \_\_\_\_\_

\_\_\_\_\_

# Tables for Sensor Data on Occupational Asthma

**Table 1. Ten most frequently reported putative agents associated with cases or work-related asthma, both new-onset and work-aggravated - California, Massachusetts, Michigan, and New Jersey SENSOR programs, 1992-1995**

Agents	New Onset Asthma		Work - Aggravated Asthma		Total	
	No.	%	No.	%	No.	%
Air pollutants, indoor	67	7.5%	19	9%	86	7.8%
Mineral and Inorganic Dust, NOS**	45	5.1%	34	16.2%	79	7.2%
Chemicals, NOS	56	6.3%	17	8.1%	73	6.6%
Lubricants, NOS	55	6.2%	2	1.0%	57	5.2%
Cleaning Materials, NOS	42	4.7%	9	4.3%	51	4.6%
Smoke, NOS	40	4.5%	10	4.8%	50	4.5%
Solvents, NOS	36	4.0%	7	3.3%	43	3.9%
Toluene diisocyanate	41	4.6%	-	0.0%	41	3.7%
Welding fumes, stainless steel	31	3.5%	6	2.9%	37	3.4%
Diisocyanates, NOS	34	3.80%	2	1.0%	36	3.3%

\* Agents are coded according to the Association of Occupational and Environmental Clinics' (AOEC) exposure coding scheme.

\*\* Not otherwise specified.

**Table 2: Ten most frequently reported occupational allergens associated with cases of WRA, Massachusetts SENSOR, 1993-1998, N=335\*.**

<i>Agents</i>	<i>No.</i>	<i>%</i>
Poor Indoor Air Quality**	65	19.4%
Cleaning Agents	45	13.4%
Latex	33	9.9%
Mold	32	9.6%
Dust	32	7.8%
Chemicals, NOS	26	6.3%
All Metals	21	5.7%
Smoke, NOS	19	5.4%
Formaldehyde	18	4.5%
Solvents, NOS	15	4.5%

NOS = Not otherwise specified

\* Up to 3 agents were reported for each case.

\*\* Includes cases who reported "bad air", "indoor air pollution", "poor ventilation", or "sick building syndrome". More specific agents associated with poor indoor air quality, including dust and mold are coded separately.

**Table 5: Number of Lung Disease Cases Reported to MA SENSOR, March 1992 - May 1998**

	<b>April 1998</b>	<b>May 1998</b>	<b>Total to Date (3/92 - 5/98)</b>
<b>Asthma</b>	2	8	604
<b>Silicosis</b>	0	0	10
<b>Asbestosis</b>	0	0	118
<b>Chemical Pneumonitis</b>	0	0	14
<b>Total Number of Lung Disease Reports</b>	2	8	746

**Table 3: Industries employing workers with cases of work-related asthma, Massachusetts SENSOR, 1993-1998, n=335\***

INDUSTRY	No.	%
<b>Services</b>	<b>176</b>	<b>52.5%</b>
Hospital	86	25.7%
School	31	9.3%
Other health care	13	3.9%
Dentist	7	2.1%
College	7	2.1%
Autobody	5	1.5%
<b>Manufacturing</b>	<b>81</b>	<b>24.2%</b>
Industrial machinery	11	3.2%
Chemicals	10	3.0%
Measuring devices	8	2.4%
Fabricated metals	8	2.4%
Electronics	8	2.4%
Rubber	5	1.5%
Paper	5	1.5%
Food	5	1.5%
<b>Public Administration</b>	<b>34</b>	<b>10.2%</b>
Regulation of transportation	12	3.6%
Courts	6	1.8%
Fire departments	6	1.8%
<b>Trade (wholesale/retail)</b>	<b>17</b>	<b>5.1%</b>
<b>Construction</b>	<b>13</b>	<b>3.9%</b>
<b>Transportation</b>	<b>8</b>	<b>2.4%</b>
<b>Agriculture</b>	<b>3</b>	<b>1.0%</b>
<b>Finance</b>	<b>1</b>	<b>&lt;1%</b>

**Table 4: Occupations reported for workers with cases of work-related asthma, Massachusetts SENSOR, 1993-1998, n=335.**

OCCUPATION	No.	%
<b>Managerial and Professional</b>	<b>114</b>	<b>34.0%</b>
Nurses	56	16.7%
Teachers	28	8.4%
Managers	8	2.4%
Engineers/scientists	7	2.1%
<b>Technical, Sales, Administrative</b>	<b>81</b>	<b>24.2%</b>
Administration/Office workers	47	14.0%
Health technicians	10	3.0%
Dental hygienists	4	1.2%
Licensed practical nurses	4	1.2%
Sales	4	1.2%
<b>Operators/Laborers</b>	<b>59</b>	<b>17.6%</b>
Painters	8	2.4%
Welders	7	2.1%
Assemblers	5	1.5%
<b>Service</b>	<b>40</b>	<b>11.9%</b>
Health aides	11	3.3%
Cleaning occupations	12	3.6%
Fire fighting	5	1.5%
Hairdressers	4	1.2%
<b>Precision Production Craft and Repair</b>	<b>40</b>	<b>11.9%</b>
Construction workers	6	1.8%
Bakers	5	1.5%
<b>Farming, Forestry, Fishing</b>	<b>4</b>	<b>1.2%</b>
<b>Unknown</b>	<b>1</b>	<b>&lt;1%</b>
<b>Military</b>	<b>0</b>	<b>0.0%</b>

**Table 6. Physician Reports of Patients with Work-Related Asthma from Exposure to Cleaning Solutions, Massachusetts SENSOR, March 1992-March 1998**

<b>INDUSTRY</b>	<b># CASES</b>	<b>OCCUPATION</b>	<b>SUSPECTED AGENTS</b>
Health Care (including hospitals, nursing homes, and dental offices)	40	Nurse (23); Nursing Aide (4); Secretary (3); Janitors (2); Manager; Engineer; Therapist; Plumber; Dental Hygienist; Machine Operator	Bleach; Chlorine; Disinfectants; Misc. Cleaners; Soaps; Floor Stripper; Glutaraldehyde
Misc. Manufacturing	9	Machine Operators (5); Computer Operator; Inspector; Painter; Assembler	Ammonia; Misc. Cleaners; Soaps; Sodium Hydroxide
Education	5	Teacher; Physical Education Teacher; Dental Hygienist (university); Janitor Groundskeeper	Disinfectants, Misc. Cleaners, Floor Stripper
Hotel	4	Housekeeper (3); Waitress	Misc. Cleaners; Bleach; Muriatic Acid
Personal Services (Drycleaners, Hair Salon)	3	Launderer (2); Hair Dresser	Detergents
Other	11	Animal Care Technician (2); Engineer (2); Mason; Seafood Processor; Pet Store Worker; Food Protection Worker; Misc. Laborer; Sewage Treatment Worker; Art Teacher	Ammonia; Disinfectants; Sodium Hydroxide; Bleach

# Products Containing Latex

A wide variety of products contain latex; medical supplies, personal protective equipment, and numerous household objects. Most people who encounter latex products only through their general use in society have no health problems from the use of these products. Workers who repeatedly use latex products are the focus of this Alert. The following are examples of products that may contain latex:

## ***Emergency Equipment***

Blood Pressure Cuffs  
Stethoscopes  
Disposable gloves  
Oral and nasal airways  
Endotracheal tubes  
Tourniquets  
Intravenous tubing  
Syringes  
Electrode pads

## ***Personal Protective Equipment***

Gloves  
Surgical masks  
Goggles  
Respirators  
Rubber aprons

## ***Office Supplies***

Rubber bands  
Erasers

## ***Hospital Supplies***

Anesthesia masks  
Catheters  
Wound drains  
Injection ports  
Rubber tops of multi-dose vials  
Dental dams

## ***Household Objects***

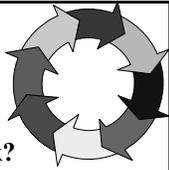
Automobile tires  
Motorcycle and bicycle handgrips  
Carpeting  
Swimming goggles  
Racquet handles  
Shoe soles  
Expandable fabric (wristbands)  
Dishwashing gloves  
Hot water bottles  
Condoms  
Diaphragms  
Ballons  
Pacifiers  
Baby bottle nipples







**Asthma: Is Your Company At Risk?**



## **Risk Management**

Barbara Hickcox, RN, MS  
Asthma Coordinator  
Ohio Department of Health



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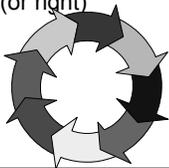
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## **Risk Management Defined**

- Risk = possible adverse effects arising from hazards
- Risk Management = Proactive Decision Making Process to:
  1. Assess what may go wrong (or right)
  2. Prioritize risks
  3. Develop strategies
  4. Implement strategies
  5. Reevaluate



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## **Risk Management:**

- Is a continuous process
- Is a shared vision
- Needs to be driven by management
- Is a team effort
- Often requires modification of processes
- May identify opportunities
- Based on communication
- Looks toward the future



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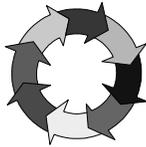
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## Risk Management

- In a disciplined environment RM provides
  - Processes
  - Methods
  - Tools
- Is systematic



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## Sometime you have to change to do Risk Management

- Cultural shift
  - From “Fire Fighting”, “Crisis Management”
  - To Proactively resolving problems before they arise



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## Levels of Function



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## Who Does Risk Management?



### Everyone

- Management
- Risk Manager
- Safety Committee
- Staff

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## Developing a Health and Safety Committee

- Representatives from both management and labor
- Individuals with broad contact with operations areas or people
- Representation from all areas
- Interested members
- Balanced representation



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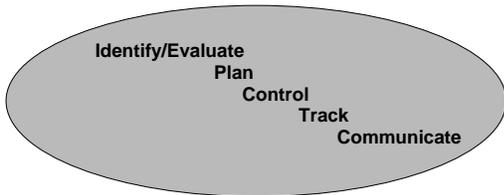
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## Steps in the Risk Management Process



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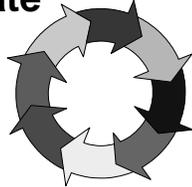
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## Steps One and Two

### Identify/Evaluate



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## Identify and Evaluate OA Risk

- Form health and safety committee
- Conduct medical surveillance
- Perform worksite hazard evaluation
  - Confirm exposure as cause of disease
  - Determine OA risk levels
  - Check for contaminant migration off-site
- Analyze the information
- Evaluate the significance



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## Getting Started

How much of a problem do we have?

- Perform Medical Surveillance
  - Identify
  - Analyze
- Hazard Assessment
  - Identify
  - Analyze



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## Medical Surveillance

The collection, analysis and dissemination of information pertaining to individual disease occurrences and its consequences in terms of morbidity, disability and death



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## Goal of Medical Surveillance



- Detect workers with asthma in early phases
- Institute measures to prevent progression

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## Case Definition WRA

- Immunologically mediated asthma
  - Sensitivity
- Asthma resulting from irritants
  - Non-sensitivity
- Preexisting asthma
  - Either one



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## Medical Surveillance Functions

- Recognize health changes in groups
- Identify hazardous working conditions
- Evaluate effectiveness of exposure controls
- Assure effectiveness of exposure controls
- Prevent future cases



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## Why Do Medical Surveillance?

- It's the right thing to do
- Screening devices with acceptable validity
- Improved prognosis with prompt removal
- Prevention



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## Occupational Asthma Prognosis



- Exposure control leads to full recovery in 15 - 45%
  - Short time between symptoms and diagnosis
  - Less severe findings on FEV1 and AHR
  - Similar for isocyanates, red cedar, crab, aluminum
  - Role for medical monitoring suggested
- Economic outcomes for workers
  - 46% income reduced by 1/2
  - 25% unemployed

Malo '92, Ameille '97, Tarlo '97 Gassert '98,

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## Medical Surveillance Methods

- Questionnaires
- Spirometry
- Tests of NSBH\*
- Immunological Tests



\* Non-specific Bronchial Hyper-reactivity, NSBH, tested with Methacholine challenge most frequently.

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## Medical Surveillance Questionnaires

- Most widely used
- No single questionnaire has been widely adapted or validated for OA
- Burge (Occup Med, 1997)
  - High sensitivity
  - Low specificity




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## Occupational Asthma Screening Questionnaire

*Since your last medical (or in the last 12 months for new starters)*

Have you had episodes of wheeze or chest tightness?	Y	N
Have you taken any treatment for your chest?	Y	N
Have you woken from sleep with cough or chest tightness?	Y	N
Have you had any episodes of breathlessness?	Y	N
Have you had any time off work with chest illness?	Y	N
Have you developed chest tightness or breathlessness after exercise?	Y	N
Have you developed difficulty breathing?	Y	N

*The following additional questions may be asked:*

Have you had irritation or watering of the eyes?	Y	N
Have you had a stuffy nose?	Y	N
Have you had soreness of the nose, lips, or mouth?	Y	N
Have you had itching or irritation of the skin?	Y	N

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## Spirometry

- Not useful in random fashion
- Perform serially as part of Medical Surveillance
- Best when combined with Questionnaire



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## New Devices to measure FEV1

### FEV1

- Reproducible
- Has low coefficient of error
- Simple to perform



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## Tests of NSBH\*

- Impractical for screening worker populations
- No evidence that pre-screening can predict development of OA
- For workers with high risk, use to evaluate for OA while still actively exposed at work



\* Non-specific Bronchial Hyper-reactivity NSBH

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## Immunological Tests

- IgE - skin testing with occupational allergens
- Relevant for HMW agents
- Validated using specific inhalation testing
- Sensitivity equals or approaches 100%



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## What Should Medical Surveillance Look Like?



- Applied to entire exposed population
- Initial questionnaire
- Immunological tests, if warranted
- Further study of those with + findings
- *PEFR*

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## Timing Considerations for MS

### Low Molecular Weight (LMW) Sensitizers

- Before or early after start of employment



### High Molecular Weight (HMW) Sensitizers

- Immediately after onset of exposure
- Spread out over longer time intervals



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## Personal Risk Factors

### HMW

- Atopy
- Smoking and atopy often synergistic
- Some agents: smokers, not atopic, at higher risk



### LMW

- Nonsmokers more frequently affected

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## Medical Surveillance

- If medical surveillance indicates that a worker has become sensitized you should:
  - Remove worker from the work environment
  - Advise worker to seek pulmonology or occupational medicine physician assistance
  - Start the risk management process again

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## Is Medical Therapy + Work OK?

- Many workers cannot change jobs
- If possible reduce exposure to the agent
- 2 small studies
  - 13 patients – treated, continued work, 1 year
  - 20 patients – treated, continued work, 3 years

**Mild to moderate patients**  
No worsening of disease  
2 patients retired – still have asthma

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## Deaths from Continued Exposure

- People have died from continued exposure to the agent
- People in 20 person study
  - Not diagnosed until 13 + years after symptoms started
- Precautionary measures may be appropriate

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## Workplace Hazard Evaluation

1. Define purpose & scope of evaluation effort
2. Become familiar with workplace environment
3. Perform preliminary walkthrough inspection
4. Conduct occupational hygiene field survey
5. Interpret results
6. Summarize results

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## Step Three

- **Plan**
  - **Design & implement risk management strategies**

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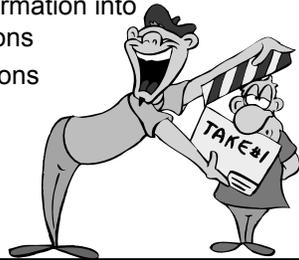
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## Planning for Risk Reduction

- Transform risk information into decisions and actions
- Implement the actions



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## Steps to Planning

- Problem Solving
  - Brainstorming
  - Cause/effect analysis
  - Cost/benefit analysis
  - Goal determination
  - Risk information
- Action List
- Timeframe planning



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## Use the Committee to Plan

- Committee makes decisions
  - From many viewpoints
  - Can work out the bugs before implementing
  - Can work together to get buy-in to the plan
  - Can speak from the viewpoint of both labor and management
  - Many hands make the job smaller



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## Corporate Committee Functions

- Develop toxic substance evaluation & control program
- Right to know education and training
- Evaluation of purchasing practices
- Development and implementation of medical surveillance program
- Respiratory protection programs



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## Site Committee Functions

- Workplace Inspections
- Accident Investigation
- Records Review
- Chemical and Equipment Audit
- Respiratory and Protective Equipment Audit
- Medical Surveillance
- Pre-Occupancy Review of Leased Space



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## Health and Safety Committee Checklist

- Adapted from NJ Guidelines
- Series of questions
- Primarily related to
  - Policies and procedures
  - Management responsibility
  - Systems
  - Specific concerns



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## Step Four

- **Control**
  - **Correct deficiencies**

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## Control Measures

- Once you have identified hazards and assessed the risks involved
- Find a suitable method of control:
  - Increase Ventilation
  - Eliminate/Substitute Redesign Equipment or work process
  - Isolate the hazard
  - Introduce administrative controls
  - Use appropriate personal protective equipment

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## Implementing Controls

- Define responsibilities and roles:
  - Management
  - Supervisors
  - Workers
- Ensure control measures are instituted
  - Whose job?
  - How often



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## Control

- **Correct for:**
  - Variations in plan implementation
  - Variations in outcomes from implementation
- **May require:**
  - Planning
  - Re-analysis of data
  - Additions to the Action List



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## Inform Workers

- Inform workers about:
  - Controls implemented to reduce risks
  - How to use the controls
  - Need to report defects in the system



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## Step Five

- **Track**
  - Continue to monitor



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## Track to Measure Progress

- Monitor both
  - **Risk indicators**
    - Medical Surveillance
    - Workers Comp Costs
    - Insurance Costs
    - Lost Work Days
  - **Actions**
    - Interventions
    - Education
    - Compliance



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## Monitor Effectiveness of Controls



- Make sure that in fixing one problem you have not created another
- Monitor workplace to measure workers' exposure to sensitizers
- Encourage workers to report
- Check within 2 months of implementation

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## Workplace Monitoring

- Done when:
  - there is potential or actual exposure to a sensitizer or irritant
- Done by:
  - Measuring individual worker exposure
  - Usually done by Industrial Hygienist
- If levels are too high, institute new controls



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## Continuous Tracking

- Routine questionnaires and spirometry
  - New hires
  - Periodically for everyone
- System is set up to repetitively evaluate the problem
- Analysis of data occurs periodically
- Evaluation of the system in place
- May alter recommendation with experience



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## Step Six

- **Communicate**
  - **Ensure that all parties understand and have ability to give input**

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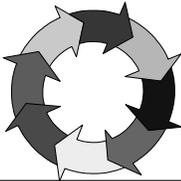
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## Communicate

- Provide feedback and information:
  - To all individuals internally, at all levels
  - To pertinent outside organizations and individuals
- Information may include:
  - What is going to happen
  - Why
  - What has happened
  - Why
- Continuous



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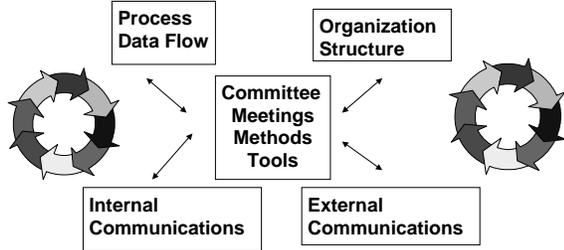
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## Communication Process



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## The Bottom Line

Communication of sampling results to your employees is not simply an option.

...IT'S THE LAW

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## Assistance with Occupational Asthma Interventions

- Consultation
  - Get professional assistance as needed
    - Environmental evaluation and control
    - Study design
    - Diagnosis and treatment of occupational asthma

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## Consultation Involves:

- Sharing of information
  - Employers
  - Workers
  - Workplace health and safety officers and representatives



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## What to Communicate

- Issues relating to:
  - Risk management
  - Information about occupational asthma
  - Training
- Results of Medical Surveillance
  - Health and safety staff
  - Health consultants
  - Maintain medical confidentiality



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## Information and Training

- Inform all workers:
  - Causes of occupational asthma
  - Means of minimizing exposures
- MSDS sheets
- If workers will be exposed:
  - Training about hazardous substance
  - Controls for hazardous substance
  - Other substances that may cause OA



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## Self Reporting



- Develop a procedure for reporting symptoms
- Communicate the procedure
- Report should be done as soon as symptoms are noticed - Don't Wait
- Provide training for managers so people feel comfortable reporting symptoms
- Make retraining opportunities available

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## Case Studies

- Hazardous work places
  - Turkey Farm
  - Body Shop
  - Hospital
  - School
- Use Developing your Workplace Asthma Management Plan – Back of manual



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## Preparing for First Aid



- Tell workers who have asthma to bring their Rescue medications to work - e.g. Ventolin, Proventil
- Have trained first aid personnel train people in the workplace if not available on site

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## Step Two



- Do a Peak Flow reading if possible
- Have person take puffs from their inhaler as directed on Asthma Action Plan
  - Use the spacer if available
  - If using a spacer ask the person to take 4 breaths from the spacer after each puff
  - Take one puff at a time with brief rest after each one (30-90 seconds)

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## Step Three

- Wait 20 minutes
  - Time it on a clock
  - Continue to reassure the person
  - Encourage them to breath slowly and deeply



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## Step Four

- If there is no improvement repeat Steps 2 and 3.
- If there is still no improvement call an ambulance immediately
  - Dial 911
  - Give directions to guide EMTs to you as quickly as possible

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## Implementing Personal Asthma Management Plans in the Workplace

- Identify asthmatics in the workplace
- Provide information to them about:
  - Asthma - particularly its inflammation
  - Control versus Rescue medications
  - Spacers
  - Peak Flow Meters
  - Asthma self management plans



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## Asthma Management Plans

- Suggest they discuss this information with their physician and develop an asthma management plan
- If their physician is unable or unwilling to develop a plan with them, refer to physician you have identified who will work with them



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## What do you do with the plans?

- You have an occupational health department:
  - Keep on file
  - Set up regular checks with asthmatics to:
    - Review plan
    - Review medications
    - Review inhaler technique
    - Review spacer technique
    - Review peak flows

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## If You Don't Have a Health Department?

- Do the education anyway
- Suggest that asthmatics have an asthma management plan
- Identify physicians who provide outstanding asthma care
- Make spacers and peak flow meters available
- Implement an emergency action plan

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## What kinds of activities can you do?

1. Write a letter to your manager/administration outlining major points from the class.
2. Make a presentation to your safety committee about the impact of asthma in the workplace.
3. Make a proposal to your safety committee for them to ID the costs related to asthma in your workplace.
4. Produce an outline with your safety committee of what you will do to monitor asthma in the workplace.
5. Make a proposal to administration to form a safety committee if you do not have one.
6. Arrange for an asthma educator to teach your employees about asthma on work time.
7. Develop an emergency asthma management plan for your company.

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## Summary

- Asthma is a highly controllable lifelong disease
- Occupational asthma affects workers in many settings
- Every employer can save money and decrease risk by having a comprehensive asthma risk management program



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## Occupational Asthma Screening Questionnaire

(Taken from: Burge, S Respiratory symptoms. Occup Med 1997; 47:55-56)

*Since your last medical exam (or in the last 12 months for new employees):*

- Have you had episodes of wheeze or chest tightness?  Yes  No
- Have you taken any treatment for your chest?  Yes  No
- Have you woken from sleep with cough or chest tightness?  Yes  No
- Have you had any episodes of breathlessness?  Yes  No
- Have you had any time off work with chest illness?  Yes  No
- Have you developed chest tightness or breathlessness after exercise?  Yes  No
- Have you developed difficulty breathing?  Yes  No

*The following additional questions may be asked:*

- Have you had irritation or watering of the eyes?  Yes  No
- Have you had a stuffy nose?  Yes  No
- Have you had soreness of the nose, lips, or mouth?  Yes  No
- Have you had itching or irritation of the skin?  Yes  No

*Any positive response should lead to a full history and investigation by a health professional with expertise in the diagnosis of OA. The questionnaire has been designed to be sensitive rather than specific.*

# HEALTH AND SAFETY PROGRAM CHECKLIST FOR COMMITTEES

The following is a health and safety program checklist developed by the British Association of Scientific Technical and Managerial Staffs. While the program is more detailed and comprehensive than many health and safety committees may need, it suggests many important questions that should be asked by committee members about worksite conditions and local health and safety programs. However any such questionnaire must, of course, be adapted to local needs and conditions.

## I. The Policy Statement

1. Does it give a clear, unequivocal commitment to health and safety?
2. Is it authoritative? Is it signed and dated by a director?
3. Is the policy to be regularly reviewed? If so, by whom and how often?
4. Has it been agreed with the union representatives?
5. Are there effective arrangements to draw it to the attention of employees?

## II. The Organization for Health and Safety

1. Is the delegation of duties logical and successive throughout the organization?
2. Is final responsibility placed on the relevant director?
3. Are the responsibilities of senior managers written into the policy or specified in job descriptions?
4. Is the performance of managers an ingredient of their annual review?
5. Are the qualifications of managers where relevant to health and safety considered when making appointments?
6. Do managers understand the nature of their health and safety duties? Have they accepted them?
7. Are key functional managers identified? That is,
  - a. Safety Officer
  - b. Health Officer (or Health and Safety Officer)
  - c. Radiation Safety Officer
  - d. Engineering Manager
  - e. Training and Education officerAre their duties clearly understood?
8. Do managers understand the extent of their discretion to vary from systems and procedures?
9. Do they understand the consequences of failure to implement the policy in their area of responsibility?
10. Are there adequate arrangements for liaison with contractors, managers and others who come onto the site?
11. Are there adequate arrangements for consultation with the workforce?

## III. Health and Safety Activities

### Training

1. Is there a system for the identification of training needs?
2. Is the responsibility for training properly allocated?
3. Does training cover all levels from senior manager to new entrant?
4. Are special risk situations analyzed for training requirements?
5. Are refresher courses arranged?

**Safe systems of work**

1. Are those tasks for which a system of work is required identified?
2. Are identified systems properly catalogued?
3. Are the systems monitored?
4. Are there systems to deal with temporary changes in the work?
5. Are there proper systems of work for maintenance staff?

**Internal Communication**

1. Is the role of health and safety representative agreed upon?
2. Is there a properly constituted health and safety committee?
3. Is the level of management participation appropriate?
4. Is there a system for stimulating and maintaining interest in health and safety?
5. What arrangements are there to advise workers about the standard of the organization's performance in health and safety?
6. Are there adequate means of communication on health and safety matters?
7. Are there efficient arrangements to process action on communication from the enforcing authorities?

**Fire**

1. Who is nominated to coordinate fire prevention activities? Does this person have sufficient authority?
2. What arrangements are there for fire fighting?
3. Is there an adequate fire warning system? Is it regularly checked?
4. Are fire drills held and checked for effectiveness?
5. What arrangements are there to check compliance with fire codes?
6. Are means of escape regularly checked and properly maintained? Are they clearly marked?
7. Is there a proper system to account for staff and visitors in the event of an evacuation of the buildings being required?
8. Are flammable and explosive materials stored and used in compliance with PEOSHA requirements?

**Medical facilities and welfare**

1. Are there adequate facilities for first aid treatment?
2. Are sufficient persons trained in first aid?
3. What arrangements are there for medical advice?
4. Are there adequate facilities to administer proper medical supervision, particularly where this is a statutory requirement?
5. What medical records are needed and are they properly kept?
6. Are the washing and sanitary facilities adequate?

**Records**

1. Are there adequate arrangements for the keeping of statutory records?
2. Are the records checked for accuracy?
3. Is sufficient use made of the information in the records to identify areas of strength and weakness? (e.g., accident and ill health experience or training needs?)
4. Is there sufficient access to records of performance by those with a legitimate interest?
5. Are copies of all the relevant statutory requirements and codes of practice available on site?

**Emergency procedures**

1. Are the areas of major hazard identified and assessed by qualified staff?
2. Are there procedures for dealing with the worst foreseeable contingency?
3. Have these procedures been promulgated and tested?
4. Are there adequate arrangements for liaison with other parties who may be affected or whose help may be required?

5. Are there arrangements to protect sensitive installations from malicious damage or hoax threats?
6. Do the above arrangements cover weekend/holiday periods?

#### **Environmental control**

1. Is the working environment made as comfortable as is reasonably practicable?
2. Is sufficient expertise available to identify the problems and reach solutions?
3. Is sufficient instrumentation available?
4. Are there arrangements to monitor the ventilation systems?
5. Are temperature/humidity levels controlled?
6. Is there adequate lighting provided? Are there satisfactory arrangements for replacement and maintenance?

#### **Safe place of work**

1. Are there arrangements to keep workplaces in a clean, orderly and safe condition?
2. Are walkways, gangways, paths and roadways clearly marked?
3. Are there arrangements for clearing hazards (e.g., substances likely to cause slipping) from the floors?
4. Is safe means of access provided to all working areas?
5. Are staircases, landings, and openings in the floor protected?
6. Is storage orderly, safe and provided with easy access?
7. Are flammable, toxic and corrosive substances used safely and without hazard to health?
8. Are permit-to-work systems operated and monitored?
9. Is the work site accessible to disabled individuals?

#### **Machinery and support**

1. Is new machinery checked for health and safety prior to being brought onto site?
2. Is there a system of inspection to identify and safeguard dangerous machinery?
3. Is there a system for checking plant and machinery after modification?
4. Is there a routine check on interlocking devices?
5. Is pressurized equipment subject to inspection and test?
6. Are monitoring systems and alarms tested at regular intervals?
7. Are lifting machines subject to regular inspection and test?

#### **Noise**

1. Are noise risks assessed and danger areas identified?
2. Is there a program of noise reduction/control?
3. Are appropriate types of personal protection provided and worn?
4. Are the requirements of "Occupational Noise Exposure" policies being met? Is there a risk from vibration?

#### **Radiation**

1. Is a competent person nominated to oversee the use of equipment and materials which may pose a radiation hazard?
2. Are records kept in accordance with statutory regulations?

#### **Dust**

1. Do the arrangements for the control of dust meet statutory requirements?

**Toxic materials**

1. Are there adequate arrangements in the purchasing, storage, safety, medical and production departments for the identification of toxic chemicals and specification of necessary precautions?
2. Are storage areas adequately protected?
3. Are emergency procedures for handling spillage/escape established, known and tested?
4. Is the Worker and Community Right to Know Act being complied with?
  - a. Is the Right to Know Survey being completed every year?
  - b. Are all containers properly labeled?
  - c. Are employees receiving RTK education and training, with new employees receiving it within the first month?
  - d. Is the RTK poster posted?
  - e. Are Hazardous Substance Fact Sheets, the Right to Know Survey, and other materials kept in the central file?
5. Are there adequate arrangements for the issue, maintenance and use of respiratory protection where it is found to be necessary?

**Monitoring at the workplace**

1. Is it understood that monitoring will be carried out?
2. Are there sufficient staff with adequate equipment to carry out the monitoring?
3. Are the standards that need to be met known and understood?
4. Is there a system of remedying identified deficiencies within a given timescale?
5. Is the monitoring scheme sufficiently flexible to meet changes in conditions?
6. Are all serious accidents investigated?
7. In the event of an accident is the performance of individuals or groups measured against the extent of their compliance with the safety policy objectives?
8. Is monitoring carded out within the spirit as well as the letter of the written policy document?

Adapted from "Joint Labor/Management Health and Safety Committees", New Jersey Department of Health and Senior Services, Public Employees Occupational Safety and Health Program.

# Health and Safety

## COMMITTEES AT WORK: RUNNING A MEETING

To be effective, health and safety committees must be well organized; and members should come to meetings prepared, with the tasks agreed upon at the previous meeting completed. Here are some tips to guide committees as they prepare to discuss health and safety problems.

### **Step 1: ADVANCE PREPARATION**

To know when an issue is ready, appropriate, and timely for the agenda: 1) gather all relevant facts, and 2) think through one or two possible resolutions or courses of action to recommend at the meeting. The committee may wish to designate someone at the end of the previous meeting to be responsible for preparing an agenda, or the task might alternate between labor and management.

### **Step 2: FORMAT**

At the outset of the meeting, if not beforehand, agenda items should be ordered by importance. If labor and management cannot agree upon the order, a few items can be discussed alternately from each agenda. It is also important to allocate time appropriate to the significance of the item discussed. Committees should avoid excessive discussion of any single item. If a problem cannot be resolved, it can be tabled, with labor and management agreeing to further investigate it. Subsequent meetings should be sure to cover tabled items.

### **Step 3: TAKING MINUTES**

A person should be designed to keep minutes of the meeting. It need not be the same person each time. One does not need to be a stenographer to do this. All that is needed is a record of the major points and final decision or action on each matter discussed.

The task of the minute taker can alternate between labor and management. After the meeting has been concluded, minutes should be typed. The representatives for labor and management should review and sign the minutes.

### **Step 4: INFORMING EMPLOYEES ABOUT COMMITTEE PROGRESS**

It is very nice to resolve problems at a joint committee meeting. However, if only the people who attend the meeting know about it, the meeting's value is severely reduced. Therefore, it is important to communicate the results to employees at the workplace. This can be done with a minimum of effort. One committee member can write up a brief summary of the meeting, outlining the issues discussed and their resolutions, as well as items deferred for future discussions. This report should be signed by representatives from labor and management and posted.

## TIPS ON SUCCESSFUL COMMITTEE FUNCTIONING

- Committees should meet on a regular, monthly basis
- Additional meetings can be called as required
- The entire year's meeting calendar can be set in advance, for purposes of convenience and continuity.
- Meeting time should be adequate to address all agenda items
- Although a non-adversarial atmosphere is ideal, an orderly method for resolving differences between employees and management should be developed, separate from the traditional grievance process.

## LABOR/MANAGEMENT DO'S AND DON'TS

The Federal Mediation and Conciliation Service has suggested these principles as guides for labor/ management committees:

### **Do**

- Do keep the discussion centered on the issue involved
- Do keep personalities from becoming involved
- Do hold all meetings as scheduled. Cancel meetings only in an emergency
- Do be prompt in attending meetings
- Do submit the agenda in advance to allow sufficient time to investigate problems
- Do submit the agenda; identify all items to be discussed
- Do maintain an agreed-to procedure on recording and drafting the minutes, as well as methods of distribution
- Do maintain accurate minutes on subjects discussed at the previous meetings that have been "completed" or "resolved" as well as those items still "open"
- Do be sure the committee concept is explained to and understood by employees and supervisor's

### **Don't**

- Don't start the first meeting with extremely difficult issues. Get accustomed to this problem-solving technique by tackling rather minor problems first
- Don't allow the meetings to become gripe sessions
- Don't deal in generalities. Be specific about the problem and its suggested correction
- Don't anticipate that you know the answer to a question before it has been discussed. Ask questions to get the facts
- Don't treat any issue on the agenda as unimportant. Each item deserves thorough investigation and discussion
- Don't delay in communicating solutions developed for serious problems, or the outcome of issues discussed
- Don't start scheduled meetings late, or drag them on beyond the allotted time. This has often brought failure
- Don't look for immediate results

Adapted from "Joint Labor/Management Health and Safety Committees", New Jersey Department of Health and Senior Services, Public Employees Occupational Safety and Health Program.

# Developing a Workplace Asthma Management Plan

This is a basic plan to begin the process of development of a full-blown Asthma Risk Management Program. Refer to Steps in the Risk Management section for more detail. Remember that true risk management is a continuous process and not a one time exercise.

## Step One:

1. Do you have a functioning Health and Safety Committee?
2. If you have no Health and Safety Committee, form one!  
How often does it meet and who sits on it?  
Is there a health professional?
3. Attend the next meeting and share with them information you obtained at this seminar.  
Review the resources provided so that you will be able to accurately represent the situation. Share your plan for establishing a Workplace Asthma Management Plan.

## Step Two:

1. Gather Information.
3. Devise a plan for preliminary medical surveillance (i.e., questionnaire).  
Questionnaire should be accompanied by a memo or fact sheet from management or union personnel explaining the purpose of the questionnaire.
4. Conduct a preliminary walkthrough of the work areas of your building.  
Identify as many possible sensitizing agents as you can. Also look for conditions that could lead to contamination.
4. Evaluate plans and policies:  
  
Do all chemicals used in your building have an accompanying MSDS?  
  
Are all chemicals safely stored in an organized manner in an accessible area to those who need access to the chemicals?  
  
Do building occupants with asthma have an asthma management plan on file with the health officer or administration of the building?  
  
Do staff and managers receive training on how to recognize and deal with breathing emergencies?  
  
Do staff and managers receive training on how to prevent and control work-related asthma?
5. Identify needed resources in your community.  
If you don't have a health officer on staff, who in your community or nearest to your community would be able to diagnose and treat occupational asthma?  
  
If you don't have an industrial hygienist on staff, who in your community or nearest to your community could provide environmental sampling services? Remember, the sampling strategies needed are extremely complex.

### **Step Three:**

With members of your committee, develop a management plan.

Sample Outline:

- I. Description of the Problem of Work Related Asthma and statement of concern.
- II. Clearly identify a coordinator for the management plan.
- III. Describe your medical surveillance system
- IV. Describe your environmental surveillance system
- V. Identify what will constitute an incident
- VI. Delineate what process will be taken to respond to an incident
- VII. Describe what training staff will have
- VIII. Outline how building occupants can be involved
- IX. Outline how information will be communicated to building occupants

### **Step Four:**

Implement your plan.

### **Step Five:**

Review your plan on at least an annual basis to evaluate whether changes need to be made.

# Case Study 1

The Maumee Valley Turkey Producers is a family owned turkey production operation with an adjoining grain elevator and feed production operation. Grains and meals are mixed and packaged in the feed production area. Levels of dust occasionally obscure visibility and ammonia levels in the turkey barns are often 4-5 times permissible levels. Employee safety and health has not been addressed beyond compliance with OSHA and Department of Agriculture regulations

The father, daughter and youngest son work in the office and the three older sons each work in and manage one of the three production areas. The company employs 48 people. Three employees, two who work in the grain elevator and one who works in the turkey barns have developed asthma and have been told by their doctors that it is a result of workplace exposures to grains, dust and turkey detritus (feathers, skin cells, droppings, etc.). Two have had to go on disability and one has been reassigned to the office.

You are a member of the newly formed safety committee. One member of your committee is the son who manages the turkey barn. This son has been overheard complaining to his older brother in the grain elevator that "We've got to cut costs, our penny per pound profits are shrinking." (Appoint one member to this role.)

1. What are 4 steps that you will take to identify what the problem is?
2. What is the Problem?
3. What kinds of recommendations will you make to management?
4. What will you recommend for workers who have already developed asthma?
5. What parts of your plan will be unique to each of the areas: 1. turkey production, 2. feed and grain operations?
6. What strategies will you use to sell the manager son on the committee that this project is worthwhile?

# Case Study 2

You have purchased a body shop in a small town in Ohio and seriously want to build the business into the best and busiest body shop around and still make the place a better place to work. You believe that if you do the right things for your employees, you will have less turnover and better team work and loyalty. You have not worked in a body shop for 15 years but used to like the work. Since that time you have developed asthma and will limit yourself to overseeing the operation and managing the office and sales. You have hired a shop foreman with whom you worked in the past to manage the actual operation.

You have 10 employees and when you took over and asked them what needed to happen here they gave you an earful. They don't particularly want to tighten up how they do things but they had an older worker get asthma last year whose doctor told him it was due to his workplace exposures. They are concerned that the shop is not safe. They don't know much about protecting themselves. In order to learn more about the problem you took the course "Asthma! Is your Company at Risk?". "

1. What is the Problem?
2. What steps will you need to take to set up a program to protect your workers and your business?
3. Is there anyone you will want to consult?
4. What resources will you use?
5. Who will you involve in this activity?

## **Case Study 3**

**You are members of the safety committee in a 600 bed hospital. This committee has always taken a proactive approach to safety and health issues with the full support of the management. This week you are given a report that 4 people in the radiation oncology department have been diagnosed with asthma in the last 5 months. This is part of a total staff of 20.**

**The chair of the committee tells you that the National Institute of Occupational Safety and Health (NIOSH) has been consulted in the past 2 weeks. They have pointed out that diisocyanates are used in the process of making molds in the radiation oncology department (the molds hold patients in a specific position during their treatments and are specifically made for each patient). Their onsite inspection indicated that although a laboratory fume hood and respiratory equipment is provided, neither was being used in this molding process.**

- 1. What is the Problem?**
- 2. What will you do first?**
- 3. What information will you need?**
- 4. What recommendations will you make to administration?**
- 5. What recommendations will you make to the department?**
- 6. How will you determine if your process is working?**

# Case Study 4

You work at a large high school in Columbus and have been recruited to be on a committee to explore ways to improve the health of people in the school. Several teachers have complained recently that they are having a lot of coughing and only feel good when they are home on the weekend. Three teachers have been identified as developing asthma in the last 2 years.

The building was built in the 1950's, is brick and has had periods when it has not been maintained well. In the last 4 years there have been periodic leaks in the roof and there have been 3 broken pipes that have resulted in some water damage to ceilings and floors. The school is carpeted in the office, library and counselors offices. The rest of the floors are terrazzo or tile.

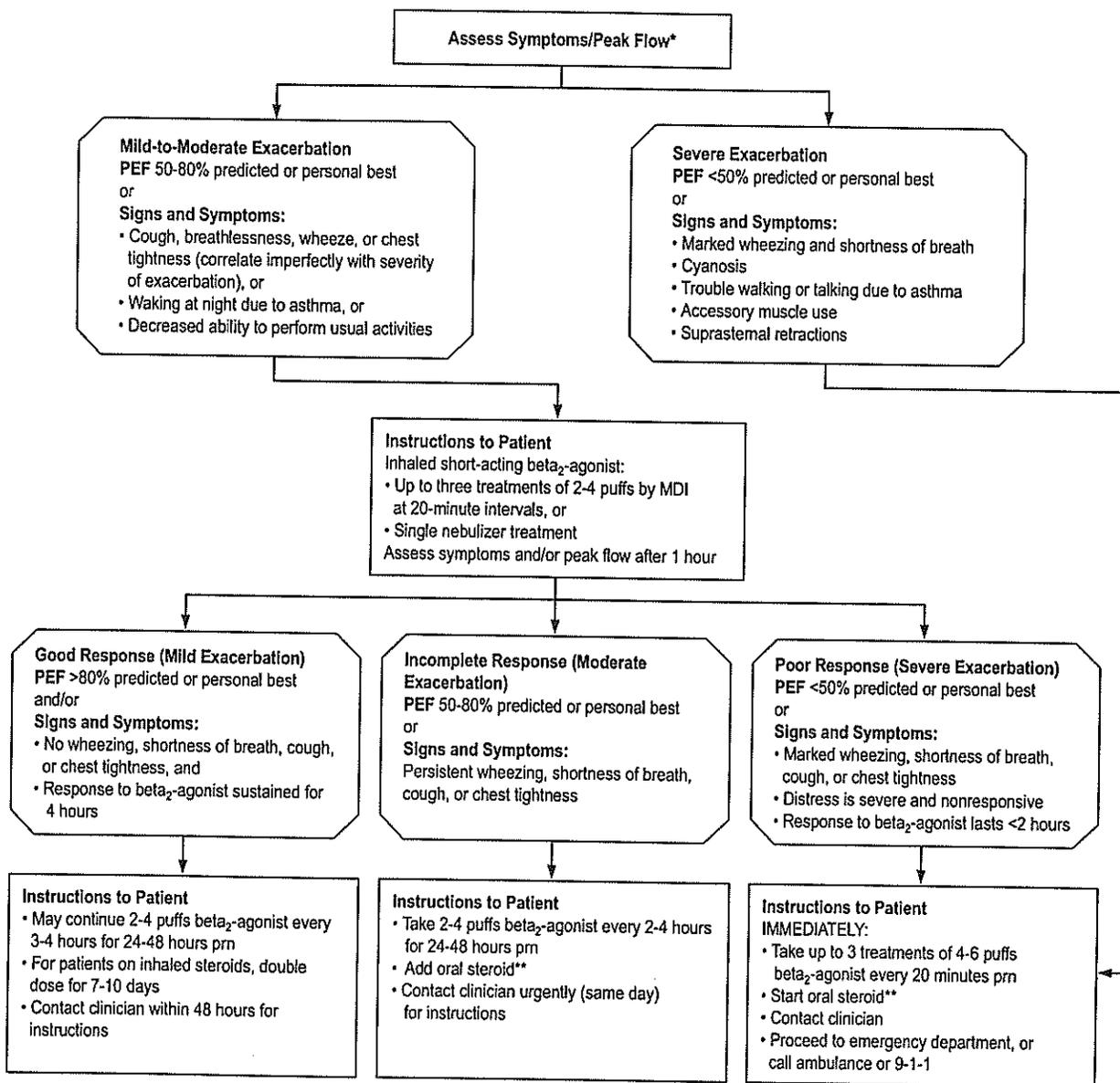
The school nurse tells you that in the last 2 years the number of students coming to the health office for respiratory symptoms has increased. She has also noted an increase in the number of students identified as having asthma.

1. What is the Problem?
2. How will you determine the extent of the problem?
3. List the steps that you need to take to identify the problems with the building?
4. What is the first item of building maintenance that you will check out?
5. What areas might you consider high risk? Why?
6. Describe the ways you will get employee cooperation?
7. Describe the ways you will get the school district's cooperation?

Figure 12.

### Management of Asthma Exacerbations: Home Treatment

Give patients the Asthma Action Plan (page 45), which corresponds to this figure.



\* Patients at high risk for asthma-related death (see box on page 26) should receive immediate clinical attention after initial treatment. More intensive therapy may be required.

\*\* Oral steroid dosages:

Adult: 40-60 mg, single or 2 divided doses for 3-10 days.

Child: 1-2 mg/kg/day, maximum 60 mg/day, for 3-10 days

Home Treatment

## Resources



## Emergency Asthma Care

Knowing what to do ahead of time will potentially prevent an emergency, possibly even save a life. Every emergency can be handled by remembering four things: prevent, prepare, recognize, act.

Quick action can save a life, and the initial minutes after an injury or medical crisis are frequently the most important. The key is to know what to do by remaining calm, and making a decision to act. Calling 9-1-1 is one of the most important things you can do.

When should you call an ambulance instead of driving to the emergency department? Ask yourself the following questions:

- Is the victim's condition life-threatening?
- Could the victim's condition worsen and become life-threatening on the way to the hospital?
- Could moving the victim need the skills or equipment of paramedics or emergency medical technicians?
- Would distance or traffic conditions cause a delay in getting the victim to the hospital?

If the answer to any of these questions is yes, or if you are unsure, it's best to call an ambulance.

### Preventing Asthma Emergencies:

1. Encourage all known asthmatics to have an "Asthma Management Plan" negotiated with their primary physician.
2. Have each asthmatic make a list of the medications they are taking. Keep it handy.
3. Make the workplace as free of causes and triggers as possible.
4. Recommend that asthmatics carry reliever (rescue) inhalers with them at all times.

### Preparing for an Asthma Emergency:

1. Have a first aid kit with:
  - Large volume spacer
  - Peak flow meter
  - Form to record what is done
  - In an occupational health department, keep an Albuterol inhaler in stock
2. Have all asthmatics bring reliever medications to work every day or leave one at work.
3. Train other workers for how to respond to an asthma emergency.
4. Asthma kits should be kept in a standard place.
5. Asthma kits need to be inspected on a regular basis.

### Responding to an Asthma Emergency:

Determine that the asthmatic is having an asthma emergency - **ask!**

#### Mild attack or episode:

- Cough
- Soft wheeze
- Minor difficulty breathing
- No difficulty speaking in sentences

**Moderate attack or episode:**

- Persistent cough
- Loud wheeze
- Obvious difficulty breathing
- Able to speak in short sentences only

**Severe attack or episode**

- Very distressed and anxious
- Gasping for breath
- Unable to speak more than a few words in one breath
- Pale and sweaty
- May have blue lips

***\*All persons requiring use of the Asthma First Aid Kit should be advised to seek medical attention.***

**For Severe Attacks or Episodes:****Step One:**

1. Remove asthmatic from area of identified exposures
2. Have asthmatic sit upright
3. Provide reassurance - remain CALM
4. Do not leave the asthmatic unattended

**Step Two:**

1. Take a peak flow reading
2. Have person take 4 puffs from their inhaler
3. Take one puff at a time with brief rest after each one (30-90 seconds)
4. Use a large volume spacer if available -
  - Ask person to take 4 breaths from the spacer for each puff of medication

**Step Three:**

1. Wait 4 minutes
2. Time it on a clock
3. Continue to reassure the asthmatic
4. Encourage them to breathe slowly and deeply, blowing as much breath out as possible

**Step Four:**

1. Take a peak flow reading
2. If there is no improvement, repeat Steps Two and Three
3. If there is still no improvement, call an ambulance, and repeat Steps Two and Three until help arrives
  - Dial 911
  - Give directions to guide EMT's to you as quickly as possible

\*This procedure is not current practice in the United States where Asthma First Aid is not well developed. This procedure has been taken from the Australia Asthma Campaign and is used throughout the United Kingdom, Australia, New Zealand and in some other European communities. This 4 Step Procedure is not the policy of the Ohio Department of Health or the Bureau of Workers Compensation. It can be used as a template for developing your own procedure.

**Remember: If in doubt - Call 911**

# 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

Massachusetts Department of Public Health, Occupational Health Surveillance Program, 6th floor, 250 Washington Street, Boston, MA 02108, Tel: (617) 624-5632, Fax: (617) 624-5696

January 2000

Dear Health Care Professional,

An important element of public health surveillance is to provide feedback to reporters. As promised, we are devoting the first Bulletin of the year (and century) to the presentation of summary data on cases of work-related asthma reported to Massachusetts SENSOR. The information presented in this issue is an overview of data collected through interviews with 335 cases between 1993 and 1998. A more extensive analysis is underway. To date, since 1992 when mandatory reporting requirements went into effect, 730 cases have been reported to Massachusetts SENSOR. Although this number is believed to be only a small fraction of the total number of work-related asthma cases in the Commonwealth, the data we are collecting provide a picture of the types of industries and occupations where workers are at risk for work-related asthma in Massachusetts.

During the past year, we have noticed a decline in the number of reports we receive each month. Please help us to understand why by completing the enclosed questionnaire. Thank you for your continued cooperation in reporting cases to SENSOR.

Sincerely,  
Catharine Tumpowsky, MPH  
Occupational Lung Disease Surveillance Project

## Work-Related Asthma Cases Massachusetts SENSOR 1993- 1998

Between January 1993 and December 1998, SENSOR received 600 case reports of work-related asthma (WRA). These reports include cases of new-onset occupational asthma, cases of work-aggravated asthma, and cases of RADS. Upon review, 33 cases did not meet the case definition for work-related asthma and were excluded from follow-up activities. Of the remaining 567 cases, interviews were completed with 350 cases (62%). During the interview, 10 cases were determined not to be work-related asthma and 5 cases were excluded because they involved people who were employed outside of Massachusetts. Summary data pertaining to the remaining 335 interviewed cases are described below.

**Table I: Ten most frequently reported occupational allergens associated with cases of WRA, Massachusetts SENSOR, 1993-1998, n=335\*.**

AGENT	No.	%
Poor Indoor Air Quality **	65	19.4%
Cleaning Agents	45	13.4%
Latex	33	9.9%
Mold	32	9.6%
Dust	32	7.8%
Chemicals, NOS	26	6.3%
All Metals	21	5.7%
Smoke, NOS	19	5.4%
Formaldehyde	18	4.5%
Solvents, NOS	15	4.5%

NOS = Not otherwise specified

\*Up to 3 agents were reported for each case.

\*\* Includes cases who report "bad air", "indoor air pollution", "poor ventilation", or "sick building syndrome". More specific agents associated with poor indoor air quality, including dust and mold, are coded separately.

The most commonly reported occupational asthma causing agent is poor indoor air quality. Nurses, teachers, and office workers are the occupations most likely to report problems with poor indoor air quality. Of the 45 cases involving reports of exposure to cleaning agents, nearly half (22), were employed as health care workers. Only 3 of the cases were employed in cleaning occupations. The substantial number of reports of latex-induced, occupational asthma comes primarily from health care workers in hospitals and dental offices. Despite better awareness of latex allergies, this exposure remains a significant concern given the extent of the health care industry in Massachusetts.

## REPORT OCTOBER-DECEMBER CASES NOW

**By January 31st, report all occupational lung disease cases seen for the first time between October and December 1999. If you have NOT seen any cases, it is not necessary to return the report form.**

**Table II: Industries employing workers with cases of work-related asthma, Massachusetts SENSOR,**

*continued on other side*

**1993-1998, n=335.**

INDUSTRY	No.	%
<b>Services</b>	<b>176</b>	<b>52.5%</b>
<i>Hospital</i>	86	25.7%
<i>School</i>	31	9.3%
<i>Other health care</i>	13	3.9%
<i>Dentist</i>	7	2.1%
<i>College</i>	7	2.1%
<i>Autobody</i>	5	1.5%
<b>Manufacturing</b>	<b>81</b>	<b>24.2%</b>
<i>Industrial machinery</i>	11	3.2%
<i>Chemicals</i>	10	3.0%
<i>Measuring devices</i>	8	2.4%
<i>Fabricated metals</i>	8	2.4%
<i>Electronics</i>	8	2.4%
<i>Rubber</i>	5	1.5%
<i>Paper</i>	5	1.5%
<i>Food</i>	5	1.5%
<b>Public Administration</b>	<b>34</b>	<b>10.2%</b>
<i>Regulation of transportation</i>	12	3.6%
<i>Courts</i>	6	1.8%
<i>Fire departments</i>	6	1.8%
<b>Trade (wholesale/retail)</b>	<b>17</b>	<b>5.1%</b>
<b>Construction</b>	<b>13</b>	<b>3.9%</b>
<b>Transportation</b>	<b>8</b>	<b>2.4%</b>
<b>Agriculture</b>	<b>3</b>	<b>1.0%</b>
<b>Finance</b>	<b>1</b>	<b>&lt;1%</b>

More than one third of all cases in this study period were employed in the health care sector. Almost one-half of the cases with "hospital" reported as the industry were exposed to either latex (24) or indoor air pollution (17). An additional 14 cases reported exposure to cleaning products. Of the 31 cases working in schools, 13 cases were exposed to indoor air pollution and 8 cases reported exposure to molds. Four of the eleven cases employed by manufacturers of industrial machinery, reported exposure to isocyanates. Of the public administration cases, 12 cases involved workers at one location (Registry of Motor Vehicles) who were exposed to manmade mineral fibers.

**Age, Gender, and Race of Cases**

The cases range in age from 21 to 83 years with a median age of 42 years. Sixty-three percent of the cases are female. Cases are somewhat older and more likely female than the working population of Massachusetts at large. Most of the cases are white (282, 84%). The remaining cases reported being black (6%), mixed or other races (6%), or Asian (2%). Seven percent (24 cases) reported being of Hispanic origin whereas only 3% of the employed population in Massachusetts is of Hispanic origin.

**Table III: Occupations reported for workers with cases of work-related asthma, Massachusetts SENSOR, 1993-1998, n=335.**

OCCUPATION	No.	%
<b>Managerial and Professional</b>	<b>114</b>	<b>34.0%</b>
<i>Nurses</i>	56	16.7%
<i>Teachers</i>	28	8.4%
<i>Managers</i>	8	2.4%
<i>Engineers/scientists</i>	7	2.1%
<b>Technical, Sales, Administrative</b>	<b>75</b>	<b>22.4%</b>
<i>Administration/office workers</i>	47	14.0%
<i>Health technicians</i>	10	3.0%
<i>Dental hygienists</i>	4	1.2%
<i>Licensed practical nurses</i>	4	1.2%
<i>Sales</i>	4	1.2%
<b>Operators/Laborers</b>	<b>59</b>	<b>17.6%</b>
<i>Painters</i>	8	2.4%
<i>Welders</i>	7	2.1%
<i>Assemblers</i>	5	1.5%
<b>Service</b>	<b>40</b>	<b>11.9%</b>
<i>Health aides</i>	11	3.3%
<i>Cleaning occupations</i>	12	3.6%
<i>Fire fighting</i>	5	1.5%
<i>Hairdressers</i>	4	1.2%
<b>Precision Production Craft and Repair</b>	<b>40</b>	<b>11.9%</b>
<i>Construction workers</i>	6	1.8%
<i>Bakers</i>	5	1.5%
<b>Farming, Forestry, Fishing</b>	<b>4</b>	<b>1.2%</b>
<b>Unknown</b>	<b>1</b>	<b>&lt;1%</b>
<b>Military</b>	<b>0</b>	<b>0%</b>

Eighty-nine cases (27%) are employed as health care workers. "Registered Nurse" is the most frequently reported occupation. The most frequently reported exposures for nurses are: latex (20 cases), poor indoor air quality (15 cases), cleaning products (8 cases). Administrative workers were subjected to a variety of exposures including primarily, poor indoor air quality (11 cases), man-made mineral fibers (10 cases all from one location), mold (5 cases), and smoke (5 cases). Of the 12 cases employed as cleaners, 5 reported unspecified cleaning agents and 3 cases reported floor stripper as the source of exposure.

**Number of Work-Related Asthma Cases Reported to Massachusetts SENSOR, March 1992- September 1999**

July 1999	August 1999	September 1999	Total to Date (3/92-9/99)
3	5	4	723

# 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

Massachusetts Department of Public Health, Occupational Health Surveillance Program, 6th floor, 250 Washington Street, Boston, MA 02108, Tel: (617) 624-5632, Fax: (617) 624-5696

April 2000

Dear Health Care Professional,

In this issue we present the results of two recent surveys conducted by the Occupational Health Surveillance Program (OHSP). Previously, OHSP reported that latex is one of the most commonly reported occupational asthma causing agents among Massachusetts workers. To identify the types of measures used to control latex allergies among health care workers, OHSP conducted a survey of Massachusetts's hospitals.

In addition, we present the results of the health care professional questionnaire that we sent with the last issue of the *Bulletin*.

Sincerely,  
Catharine Tumpowsky, MPH  
Occupational Lung Disease Surveillance Project

## Hospital Latex Allergy Programs in Massachusetts

Recently OHSP conducted a survey of licensed hospitals in Massachusetts to better understand measures taken to prevent latex allergies among healthcare workers and to identify needs for further information and training about latex allergy prevention.

The survey was mailed to infection control practitioners at all 83 acute care hospitals and several chronic care hospitals (n=11) across the state. It included 15 questions regarding hospitals demographics, latex policies and procedures, barriers to creating latex safer environments and needs for further information. The majority of surveyed hospitals (85%) responded.

Most hospitals responding to the survey have taken steps to prevent or reduce employee exposures to latex products. The majority of hospitals reported having latex policies or programs in place. Most programs include the provision of non-latex and powder-free latex gloves, education, training and latex allergy surveillance.

Approximately 40% of the responding hospitals reported a decrease in latex-related symptoms since their policies went into effect. Hospitals with programs in place for more than two years were more likely to see

decreases in symptoms than hospitals with more recently established programs. Some hospitals (8%) reported an increase in latex-related symptoms after establishing latex control programs. This may be due to increased surveillance of latex allergies among employees

Eighty of the 84 responding hospitals (93%) reported having employees whom had experienced latex allergy symptoms during the prior year. The most common symptoms of cases were skin rash/flushing/itching (94%) and nasal/eye/sinus symptoms (51%). Asthma symptoms among employees were reported by 29% of the hospitals. Two cases of anaphylaxis were also reported.

Respondents were generally knowledgeable of latex-allergy symptoms, although there were still knowledge gaps. Over 90% of survey respondents correctly indicated that latex could cause allergic reactions, that latex protein adheres to glove powder and that health problems can be triggered by airborne exposure to latex. However, one third incorrectly identified nausea as a symptom of latex exposure.

The most important barriers to creating a latex safer hospital environment were fit and feel of powder free gloves, concern about infection control, and surgeon resistance. Costs were also identified as an important or very important barrier by most of the hospitals.

Most of the respondents indicated that they would be interested in further information about preventing latex allergies and also resources regarding latex safe products. A majority (59%) indicated that they would be willing to share information regarding their latex programs with other facilities in the state.

In summary, the majority of acute care hospitals in Massachusetts are aware of latex allergy issues and have taken steps to address the problem, however further

**REPORT JANUARY-MARCH CASES NOW**  
**By April 30th, report all occupational lung disease cases seen for the first time between January and March 2000. If you have NOT seen any cases, it is not necessary to return the report form.**

efforts are needed. Gaps continue to exist regarding knowledge of latex allergy symptoms and latex control strategies. The continued incidence of latex allergy symptoms among employees underscores the need for

*continued on other side*

additional efforts. The identified barriers highlight the importance of strategies to overcome employee resistance, including the need for better information about the relative protectiveness of latex alternatives.

The willingness to share strategies and experiences regarding latex allergy control programs presents an opportunity to promote exchange between hospitals. As a follow-up to this survey, the Massachusetts Department of Public Health is planning a meeting in fall, 2000, for Massachusetts's hospitals to discuss successful latex allergy prevention strategies. This meeting is being planned in collaboration with the Massachusetts Hospital Association, the Massachusetts Nurses Association, the Massachusetts Medical Society and the Sustainable Hospitals Project of the University of Massachusetts at Lowell.

If you are interested in a list of Internet resources on latex allergy control and prevention, call OHSP at 617-624-5632.

## Bulletin Readers Report on Occupational Asthma in Their Practices

A brief questionnaire asking physicians about the volume of work-related asthma (WRA) cases in their practice was included with the last issue of the *Bulletin*. Only 104 *Bulletin* readers responded to the questionnaire; a response rate of 11%.

The *Occupational Lung Disease Bulletin* and reporting form is currently sent to over 1000 health care professionals on a quarterly basis. The mailing list is comprised of asthma specialists including all Massachusetts' pulmonologists, allergists, and occupational medicine physicians as well as a small sample (n=300) of primary care physicians. Over the past year, SENSOR staff has noticed a decline in the number of WRA cases reported to SENSOR and wanted to know if health care professionals could explain the decline.

Among physicians who returned a questionnaire, 31% said they were part of a group practice, and 30% were solo practitioners. Fifteen physicians (14%) were part of an occupational health clinic, and the remaining respondents described their practice as "other" (20%) or HMO (4%).

When asked, "On average, how many cases of WRA do you see in a month?", the majority (76%) indicated that they do not see any WRA cases. Eighteen respondents (17%) see between 1-2 WRA patients per month and 6 (6%) see between 3-5 WRA patients per month. One occupational health clinic reported seeing more than 10 WRA patients per month.

We asked if the average number of patients with WRA seen by physicians each month had increased, or decreased, or remained constant over the past year. Seventy-nine physicians responded to this question. The vast majority (87%) felt that the number had remained constant.

The results of this survey confirm our long-standing concern that physicians grossly underreport WRA. Eleven percent (11%) of the health care professionals who receive the *Bulletin* see over 50 cases of WRA each month. While it is possible that survey respondents see more WRA cases than non-respondents do, it is also very possible that health care professionals who receive the *Bulletin* could collectively see hundreds of cases of WRA each month. Yet, on average, SENSOR receives less than 5 case reports each month. Notably, an observed decline in reporting does not appear to be due to a decline in the average number of WRA cases seen each month by physicians.

While underreporting is an ongoing problem, it is perhaps more surprising to learn that three-quarters (76%) of respondents reported seeing no WRA patients in a month. In June 1996, SENSOR staff conducted a similar survey and the percentage of respondents who reported seeing no patients with WRA in a month, was 41%. This finding suggests that patients with WRA are not seeking care by asthma specialists but are increasingly being treated by primary care physicians alone. Education and training concerning the occupational component of asthma should be directed to this group of medical practitioners.

The surveillance of WRA is essential to improving working conditions and preventing future cases of WRA. Please help us to improve the working conditions of your patients and to prevent future cases of WRA by reporting the cases you see each month (confirmed or suspected) to SENSOR. If you have questions about reporting, please call (617) 624-5632.

## Number of Work-Related Asthma Cases Reported to Massachusetts SENSOR, March 1992-December 1999

July 1999	August 1999	September 1999	Total to Date (3/92-9/99)
3	5	4	723

# 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

Massachusetts Department of Public Health, Occupational Health Surveillance Program, 6th floor, 250 Washington Street, Boston, MA 02108, Tel: (617) 624-5632, Fax: (617) 624-5696

April 1999

Dear Health Care Provider:

Laboratory workers, veterinarians and others who work with animals on a regular basis may be at risk for developing allergies and work-related asthma. Because Massachusetts has a large number of research laboratories where animals are used, a substantial worker population in the Commonwealth may be at risk. Since 1992, Massachusetts SENSOR has received 8 case reports of occupational asthma related to exposure to animals in laboratory settings.

Recently, the National Institute for Occupational Safety and Health released its alert, *Preventing Asthma in Animal Handlers*. This month we reprint their recommendations along with a substantial portion of the alert for your review.

Sincerely,  
Catharine M. Tumpowsky, MPH  
Work-Related Asthma Surveillance Project

## Asthma in Animal Handlers

(Adapted from NIOSH Publication No. 97-116 and *Occupational Airways* (newsletter of the Occupational Health & Special Projects Program at the CT Department of Public Health), April 1999)

### Massachusetts Case Reports

*Case 1: A 22 year-old female worked as a lab technician harvesting mice embryos for a research facility. She developed wheezing, cough, and shortness of breath four months after she began working in the job. Her symptoms began gradually. At first they bothered her only when she was in the laboratory but eventually her symptoms stayed with her throughout the day and night. The patient reported that she had asthma as a child but had not experienced any symptoms since she was in her early teens. Her doctor advised her to change jobs. She is out of her job on workers' compensation and reports that her symptoms are now less severe.*

*Case 2: A woman in her late twenties was diagnosed with work-related asthma after working for nine months in a laboratory for a pharmaceutical research facility. Her job duties involved taking blood samples from small animals such as mice, rats, and rabbits. Her symptoms grew worse throughout the work day and work week but improved over the weekends. Following her asthma diagnosis, she learned that she had allergies to dusts, mold, pollen, and cats. Her physician advised her to avoid working with animals*

*indefinitely. She was transferred to an office job within her company where she is no longer exposed to animals.*

Animals or animal products such as dander, hair scales, fur, saliva and body wastes contain allergens that can cause respiratory and skin disorders. The National Institute for Occupational Safety and Health (NIOSH) reports that approximately 33% of animal handlers have allergy symptoms and about 10% have symptoms of animal-induced asthma. Occupations at risk include laboratory workers, veterinarians and veterinary technicians, horse handlers, livestock workers, garment workers (who work with pelts, fur, or textiles made from animal products such as wool, cashmere, alpaca) as well as workers who handle other animal materials such as bedding and feed.

### Common Sources of Exposure

Sources of exposure to animal allergens vary with animal species. For example, the most important allergens have been found in the urine of rats and in the urine, saliva, and pelts of guinea pigs. Rat urine contains significant amounts of a protein that is also found in dust samples from ventilation systems of animal facilities. Other important sources of allergen exposure include rabbit pelts, cat saliva and dander, dog dander, and horse serum and dander.

Exposure to rats, mice and rabbits have frequently been associated with the development of occupational asthma. Species other than mammals have also been reported to cause respiratory symptoms-various insects, for example, and frogs (which are commonly used in science classes). Exposures to birds have been associated with other respiratory diseases, including hypersensitivity pneumonitis. A person who becomes allergic to one animal species may react to other species as well. Even a low exposure to these common sources of animal allergens can result in allergies, but the risk increases as the worker's exposure increases.

**REPORT JAN-MARCH CASES NOW**  
**By April 30th, report all occupational lung disease cases seen for the first time between January and March 1999. If you have NOT seen any cases, it is not necessary to return the report form.**

### Health Effects

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When animal allergens become airborne, the eyes, nose, or skin may be affected. The allergens may also be inhaled directly into the lungs. After a period of time, workers may inhale sufficient quantities of allergens to become sensitized. This period of time varies greatly from worker to worker. In a recent prospective study, symptom onset from the date of employment ranged from a mean of less than one month to 3.75 years. Animal workers who do not become allergic within 3 years of exposure are less likely to develop the problem after longer exposures. However, a study of 16 poultry workers with symptoms of asthma and rhinitis showed that the onset of symptoms can be delayed for up to 10 years.

The diagnosis of animal allergy or sensitization is made using skin-prick tests, blood antibody tests, and other methods. Symptoms vary among workers who have become sensitized to animals. Mild reactions include sneezing and runny nose. More serious reactions to inhaled allergen may result in asthma symptoms such as cough, chest tightness, wheezing, or shortness of breath. The majority of workers with animal allergy present with multiple symptoms including nasal congestion, sneezing, runny nose, and watery, itchy eyes. As many as 50% of workers with these symptoms go on to develop asthma symptoms such as recurrent episodes of coughing, wheezing, chest tightness, and difficult breathing. Nasal symptoms usually develop first; occupational asthma without nasal symptoms is uncommon. Once an individual has become sensitized to animals, allergy symptoms can occur after only a few minutes of exposure, or they may be delayed up to 8 hours or more. In severe cases, anaphylactic reactions (including shock) may develop, although rarely. A worker who had developed asthma symptoms from animal allergies often improves or recovers completely if he or she immediately stops being exposed to dusts containing the animal allergens. However, the longer the exposures continue, the more likely the illness will persist, even after all contact with animals has stopped.

References for this article are available upon request by calling (617) 624-5632.

Copies of this alert are available by calling 800-35-NIOSH or by visiting the NIOSH website at [www.cdc.gov/niosh](http://www.cdc.gov/niosh). Refer to publication 97-116, January 1998.

**\*\*\*\*CONFERENCE ANNOUNCEMENT\*\*\*\***

**Healthy Schools: Designing, Renovating, and Maintaining our School Buildings:** *A statewide conference sponsored by the Massachusetts Public Health Association, Massachusetts Healthy Schools Network, U.S. Department of Education, U.S. Environmental Protection Agency, Massachusetts Medical Society and Massachusetts Teachers Association.*

**Wednesday, June 2, 1999  
8 a.m. - 5 p.m.  
Clark University, Worcester, MA**

For more information, please call the Massachusetts Public Health Association at (617) 524-6696.

## Recommendations for Preventing Asthma in Animal Handlers

NIOSH recommends the following measures to reduce exposures to animal allergens in the workplace and prevent animal-induced asthma and allergies:

1. Modify ventilation and filtration systems:
  - Increase the ventilation rate and humidity in animal-housing areas.
  - Ventilate animal-housing and handling areas separately from the rest of the facility.
  - Direct airflow away from workers and toward the backs of the animal cages.
  - Install ventilated animal cage racks or filter-top animal cages.
2. Perform animal manipulations within ventilated hoods or safety cabinets when possible.
3. Decrease animal density (number of animals per cubic meter or room volume),
4. Avoid wearing street clothes while working with animals. Leave work clothes at the workplace to avoid potential exposure problems for family members.
5. Keep cages and animal areas clean. Take particular care to control exposures during cleaning.
6. Use absorbent pads for bedding. If these are unavailable, use corncob bedding instead of sawdust bedding.
7. Use an animal species or sex that is known to be less allergenic than others.
8. Reduce skin contact with animal products such as dander, serum, and urine by using gloves, lab coats, and approved particulate respirators with faceshields.
9. Provide training to educate workers about animal allergies and steps for risk reduction.
10. Provide health monitoring and appropriate counseling and medical follow-up for workers who have become sensitized or have developed allergy symptoms.

## Number of Lung Disease Cases Reported to MA SENSOR, March 1992-December 1998

	November 1998	December 1998	Total to Date (3/92-12/98)
<b>Asthma</b>	5	2	636
<b>Silicosis</b>	0	0	10
<b>Asbestosis</b>	0		118
<b>Chemical Pneumonitis</b>	0	0	14
<b>Total Number of Lung Disease Reports</b>	5	2	778

# 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

Massachusetts Department of Public Health, Occupational Health Surveillance Program, 6th floor, 250 Washington Street, Boston, MA 02108, Tel: (617) 624-5632, Fax: (617) 624-5696

July 1999

Since 1992, Massachusetts and three other states (California, Michigan and New Jersey) have conducted state-based surveillance and intervention programs for work-related asthma (WRA) as part of the SENSOR program funded by NIOSH. Data collected by these states over a 3 year period were summarized in an article recently published in CDC's *Morbidity and Mortality Weekly Report* (MMWR). In this issue of the Bulletin, key findings from that report are presented.

## Surveillance of Work-Related Asthma in Four U.S. States, 1993-1995

(Adapted from "Surveillance of Work-Related Asthma in Selected U.S. States Using Surveillance Guidelines for State Health Departments - California, Massachusetts, Michigan, and New Jersey, 1993-1995", by Ruth Ann Jajosky, et.al. in CDC Surveillance Summaries, MMWR, June 25, 1999)

### Case Identification and Follow-Up

The primary data source for all four states is physician reports. All four states have mandatory physician reporting of occupational diseases, including work-related asthma (WRA). Physician case reports are actively solicited in Massachusetts, Michigan, and New Jersey. California has a passive surveillance system based on Doctor's First Reports (DFRs) of Occupational Injury or Illness - a long-standing, statewide physician reporting system directly linked to physician reimbursement of medical services. Surveillance staff administer follow-up questionnaires to patients with suspected WRA to collect information about their reported conditions (e.g., the association with workplace exposures and the industry and occupation of the affected person). Surveillance findings are used to direct intervention and prevention activities towards individual workers, physicians, unions and potentially hazardous workplaces. In Michigan and New Jersey, medical records are routinely reviewed for objective physiologic findings to substantiate a WRA diagnosis.

### Case Classification

WRA surveillance case definitions require a health care professional's diagnosis of asthma and an association between symptoms of asthma and work. WRA cases are classified to distinguish between work-related exacerbations of a pre-existing asthma condition (work-aggravated asthma) and asthma induced by workplace exposures (new-onset asthma). The WRA classification system distinguishes between two types of new-onset asthma. - reactive airways dysfunction syndrome (RADS) (i.e., persistent asthma symptoms induced by a one-time, high-level irritant exposure) and occupational asthma (i.e., classic sensitizer-induced asthma and irritant-induced asthma not meeting the RADS criterion).

### Results

From 1993 through 1995, a total of 1,101 cases of WRA were identified by SENSOR surveillance staff in California, Massachusetts, Michigan, and New Jersey. Of these 1,101 cases, 19.1% were classified as work-aggravated asthma, and 80.9% were classified as new-onset asthma. Overall, 123 cases (11.2%) were classified as RADS and 768 cases (69.8%) as occupational asthma. Only 29 case-patients in Michigan and New Jersey (5.2% of the 562 case-patients in these two states) had medical record documentation of pulmonary function testing performed in relationship to work. Of these, 19 of 29 case-patients (65.5%) had medical record documentation of pulmonary function testing that substantiated work-relatedness.

**Table 1. Ten most frequently reported putative agents associated with cases of work-related asthma, both new-onset and work-aggravated - California, Massachusetts, Michigan, and New Jersey SENSOR programs, 1992-1995**

Agent*	New-Onset Asthma		Work-Aggravated Asthma		Total	
	No.	%	No.	%	No.	%
Air pollutants, indoor	67	7.5	19	9.0	86	7.8
Mineral and Inorganic Dust, NOS**	45	5.1	34	16.2	79	7.2
Chemicals, NOS	56	6.3	17	8.1	73	6.6
Lubricants, NOS	55	6.2	2	1.0	57	5.2
Cleaning Materials, NOS	42	4.7	9	4.3	51	4.6
Smoke, NOS	40	4.5	10	4.8	50	4.5
Solvents, NOS	36	4.0	7	3.3	43	3.9
Toluene diisocyanate	41	4.6	-	0.0	41	3.7
Welding fumes, stainless steel	31	3.5	6	2.9	37	3.4
Diisocyanates, NOS	34	3.8	2	1.0	36	3.3

\* Agents are coded according to the Association of Occupational and Environmental Clinics' (AOEC) exposure coding scheme.

\*\* Not otherwise specified.

**REPORT APRIL-JUNE CASES NOW**  
By July 31st, report all occupational lung disease cases seen for the first time between April and June, 1999. If you have NOT seen any cases, it is not necessary to return the report form.

Indoor air pollutants, dusts, cleaning materials, lubricants (e.g., metalworking fluids), and diisocyanates were among the most

*continued on other side*

frequently reported causes of WRA (see Table 1). In addition, SENSOR data played an important role in identifying a well-known cause of occupational asthma - natural rubber latex- in a new work setting, the healthcare industry.

Manufacturing industries and service industries were associated with 41.5% and 31.2% of cases respectively. Manufacturing was the most frequently reported industrial sector cited in Michigan and New Jersey. Transportation equipment manufacturing, the predominant manufacturing industry reported in Michigan, was associated with 43.5% of WRA cases in that state. In California and Massachusetts, service industries were associated with 40.5% and 51.3% of cases respectively. Health services topped the list of service industries in Massachusetts, and health and educational services were associated with 14.6% and 14.4% respectively of cases in California.

The occupational category of operators, fabricators, and laborers was associated with the highest percentage of WRA cases overall (356 cases, 32.3%). The largest number of cases came from Michigan, with 55.4% of state cases coded to this category. The most frequently reported categories associated with WRA in the other three states included technical, sales, and administrative occupations in California (32.1% of cases); managerial and professional specialty occupations in Massachusetts (30.1% of cases); and both the managerial and professional specialty occupations and the operators, fabricators, and laborers category in New Jersey (23.3% of cases in both categories).

### Discussion

Estimates of the proportion of asthma in the adult U.S. population that is work-related range from 2% to 26%. Public health surveillance systems for WRA are needed to effectively plan and implement public health intervention programs through the identification of specific industries, workplaces, and exposures.

More than 250 agents are known to cause WRA. The surveillance findings point to well-recognized causes of asthma (e.g., diisocyanates, latex, glutaraldehyde and epoxy resins) and provide evidence that other less-recognized causes (e.g., cleaning agents and metal working fluids) are also associated with WRA.

Cleaning agents, which can contain strong respiratory irritants (e.g., chlorine, ammonia) or sensitizers (e.g., benzalkonium chloride, chloramine, chlorhexidine, formaldehyde), were frequently reported as putative agents associated with WRA. A total of 62 WRA cases were associated with agents coded as cleaning materials, including, for example, household cleaners, soaps/detergents, and metal polish. Of these 62 cases, 51 were classified as new-onset asthma and 11 as work-aggravated asthma. Additional WRA cases were reported to be associated with cleaning-related processes, including some with putative agents coded as solvents, NOS (e.g., used in graffiti removal), ammonia solution, and bleach. Some of the reported cleaning agent cases involved improper mixing of products or chemicals. These findings suggest the need for enhanced health communications concerning the risks associated with various cleaning materials, as well as the need to target industries and workers at high risk.

Indoor air pollutants were reported as a cause of new-onset and work-aggravated WRA in all four states and represented the most frequent putative cause for WRA cases overall. The types of exposures reported in association with indoor air pollutants included poor ventilation, pesticides, dusts and dirt, molds,

environmental tobacco smoke, paint odors, and other nonspecific building odors. Affected workers included teachers, nurses, secretaries, librarians, computer operators and programmers, technicians, clerks and office workers.

One overall limitation of the SENSOR WRA program is that the data represent an underestimate of the true number of WRA cases because of the under-recognition of asthma work-relatedness and the underreporting of recognized cases. The extent of underreporting varies by state, in part, because of differences in sources used to identify cases. In Massachusetts, physicians were the sole identification source, and a limited number of clinics and physicians reported WRA cases. Although industries and occupations that contribute to WRA were identified, the data are not considered representative or an indicator of the magnitude of WRA in Massachusetts. In California, cases were identified through an administrative system that requires physicians to submit DFRs when seeking reimbursement from workers' compensation insurers. Thus, these data are considered more representative because all types of physicians throughout the state use this mechanism.

SENSOR data indicate that WRA cases commonly lack confirmatory pulmonary function data, an apparent reflection of usual medical practice. Pulmonary function testing plays two major roles in the diagnosis of WRA -confirming the presence of asthma and documenting work-relatedness.

The data collection methods pioneered by the state-based SENSOR WRA programs have many strengths. Data standardization has allowed for aggregation of meaningful data across the participating states. This allows conclusions to be made regarding the nature and extent of WRA in the U.S., which allows public health prevention programs to be developed and guided nationwide. In addition, surveillance systems based on physician reporting provide a vehicle for educational outreach to physicians on asthma work-relatedness. This is important because physicians are critical to WRA prevention. The SENSOR WRA programs also provide a mechanism for workers and physicians to request workplace investigations aimed at primary prevention.

NIOSH and state health department representatives are working to establish a long-term agenda for state-based surveillance of work-related conditions and hazards, including identification of priority conditions for surveillance at the state level. The results from the SENSOR WRA programs described in this report support inclusion of WRA in such a priority condition list and suggest that programs directed at adult asthma should address WRA.

### Number of Work-Related Asthma Cases Reported to Massachusetts SENSOR, March 1992- March 1999

January 1999	February 1999	March 1999	Total to Date (3/92-3/99)
4	3	5	643

# 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

Massachusetts Department of Public Health, Occupational Health Surveillance Program, 6th floor, 250 Washington Street,  
Boston, MA 02108, Tel: (617) 624-5632, Fax: (617) 624-5696

January 1999

Dear Health Care Professional,

Previous issues of the Bulletin have provided information on specific respiratory hazards known to cause asthma. In this issue, we present a case of baker's asthma, an occupational disease recognized since the Roman age. SENSOR programs in Michigan and California as well as our own in Massachusetts, have received case reports of baker's asthma. In Massachusetts, eight cases of baker's asthma have been reported since 1993. The California SENSOR program has undertaken investigations of bagel bakeries to measure levels of wheat flour and cinnamon, both known asthmagens. This information will contribute to the establishment of a recommended guideline, known as a threshold limit value (TLV), for airborne exposure to flour dust in the workplace. Currently, there is no such guideline.

Bulletins which include case studies are generally well-received by the health care professionals on our mailing list. We would like to thank Dr. Verne Backus and Dr. William Patterson for providing this case study and discussion. If you have an interesting case you would like to present in a future issue of the Bulletin, please let us know.

Sincerely,  
Catharine Tumpowsky, MPH  
Project Director, Work-Related Asthma Surveillance Project

## WORK-RELATED ASTHMA IN A BAKER

By Verne Backus, MD, MPH

### Case Description

A 32 year old Brazilian-born immigrant began working three years ago as a baker in a small bakery shop in the greater Boston area. He developed symptoms of asthma approximately one year ago. Because he worked seven days per week, he did not obtain any treatment for the first six months. He was eventually treated at an emergency room for sinusitis and given a beta-agonist inhaler. Over time, his symptoms, including nasal congestion and stuffiness, wheezing, and chest pain worsened. He needed his inhaler upon awakening and several more times during the day. At work he was plagued by a constant rhinorrhea.

He noted that the bakery where he worked has considerable flour dust and minimal ventilation, especially during the heating season when the windows cannot be opened. These conditions precipitated his first visit to the emergency room last winter and this year led to the current evaluation.

During our initial evaluation, results from simple spirometry were within normal limits, however, he had used his inhaler just prior to the appointment. A serum total IgE returned abnormal at 196 and he had 23% eosinophils in his differential. Because he worked seven days per week, pre and post work-week spirometry could not be performed and a baseline could not be established. We asked him to begin a peak-flow diary and to make his next appointment at the end of a work shift after minimizing his medication.

The following week he left his inhaler in his car and experienced an exacerbation causing him to leave work before noon and present to our clinic. Pre and post bronchodilator spirometries showed an FVC of 1.44 liters, which improved to 3.14 liters, and an FEV1 of .99 liters improving to 2.11 liters. His peak flow diary indicated peak flows generally in the 300-320 range, except for one on Saturday when he only worked a half shift and it rose to over 400. He was given samples of Serevent and Allegra and then counseled about the risk of continuing to try to work in this environment.

Four days after our discussion about the risk of progression of disease if he continued to work in this environment, he quit his job at the bakery. Peak flow meter readings immediately jumped up to over 400. They continued to rise to the mid 550 range over the next ten days. Repeat spirometry three days

**REPORT NOV. AND DEC. CASES NOW**  
**By January 31st, report all occupational lung disease cases seen for the first time in November and December, 1998. If you have NOT seen any cases, it is not necessary to return the report form.**

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after quitting work indicated an FVC which had increased to 4.5 liters and an FEV1 of 3.5 liters. He no longer required any beta agonist once removed from the exposure and began decreasing dependency on the other medicines. Ten days after leaving the bakery he felt much better and stated that for the first time in over a year, his sense of smell returned. The patient was advised to look for new work in an environment that does not have flour exposure and preferably one that has low dust levels as well. He continues to be alert for any other exposures which may precipitate symptoms. A baker's RAST test is pending.

### Discussion

Workers exposed to flour are known to be at risk for developing allergic respiratory diseases, especially rhinitis, bronchitis, and asthma. Studies indicate that the prevalence of asthma in bakery workers is around 10% although this number is an underestimate due to selective self removal of affected workers. This occupational hazard has long been recognized. During Roman times, miller and baker slaves were required to wear masks and gloves when in contact with flour. Furthermore, Baker's Asthma was well described by Ramazzini in 1700.

Generally, it is believed that outside of individual predisposition factors, duration and intensity of exposure to antigens in the flour are responsible for IgE-mediated allergy sensitization. The level of flour dust generated in the work environment is an important factor. Many antigens have been identified in flour made from wheat, rye, barley, and oats as well as other baking additives such as amylase, hemicellulose, and papain. In addition, contaminants in flour and yeast such as molds, weevil, and mites are common allergens. Of interest are the similarities of some wheat flour allergens with those of common grass pollen and the fact that some belong to a family of seed specific inhibitors of insect and mammalian alpha amylases used as a biological defense against insect parasitization. Many water insoluble glutenins and gliadins are also implicated emphasizing the diversity of allergens.

Skin prick tests have not been sensitive and inhalation challenge tests may have more risk than necessary for the diagnosis that can be made from the peak flow diary and pre and post shift spirometry.

In this case, the diagnosis was made from the history, the dramatically responsive beta agonist challenge after decreased medicine use at work, the patient's peak flow diary, and his serum IgE levels. Though his seven day work week prevented the collection of pre and post work-week spirometry, his diagnosis was supported by peak flow measurements which improved over 50% after

removal from exposure and his dramatically improved FEV1 (by 2.5 liters).

The patient was counseled that though we could treat him medically, his disease might progress in spite of medication if he continued to work in this environment. We stressed the disease was reversible early on but with continued exposure the likelihood of irreversible progression was very real. He was given a letter recommending medical removal for his employer. Most important was his symptomatic improvement, "I can smell for the first time in a year", and his ability to wean off the medicines.

*This article was written by Verne Backus, MD, MPH, Resident, Occupational and Environmental Medicine Harvard School of Public Health. The patient was seen at Massachusetts Respiratory Hospital with Dr. Howard Hu as attending. Consultation with Dr. William Patterson, Occupational Health and Rehabilitation, Inc.*

**Editor's note: This case underscores the importance of early recognition of occupational asthma and cessation of exposure to asthma causing agents. Fortunately, this worker's health improved after he left his job. Often, asthma symptoms persist and may worsen despite removal from exposure. Unfortunately, this worker developed a serious occupational disease which resulted in his losing his job. This case highlights the human and economic burden that can be caused by occupational disease and the need for primary prevention.**

**Number of Lung Disease Cases Reported to MA SENSOR, March 1992-October 1998**

	September 1998	October 1998	Total to Date (3/92-10/98)
<b>Asthma</b>	5	3	6290
<b>Silicosis</b>	0	0	10
<b>Asbestosis</b>	0	0	118
<b>Chemical Pneumonitis</b>	0	0	14
<b>Total Number of Lung Disease Reports</b>	5	3	771

# 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

Massachusetts Department of Public Health, Occupational Health Surveillance Program, 6th floor, 250 Washington Street,  
Boston, MA 02108, Tel: (617) 624-5632, Fax: (617) 624-5696

April 1998

Dear Health Care Provider:

Surveillance findings from several states identify cleaning agents as a potential cause of work-related asthma. Her in Massachusetts, more than 10% of the work-related asthma cases reported to SENSOR, list cleaning products as the suspected agent. The Michigan SENSOR program recently summarized data on over 50 cases of work-related asthma involving cleaning compounds. In this issue we present several case reports and highlight some of the frequently reporting cleaning products associated with breathing problems.

The term "cleaning agents" encompasses a very broad category of products. During the next year, SENSOR staff plan to conduct more intensive follow-up of cases associated with cleaning products to see if we can identify specific product components which may cause asthma. We will be making efforts to obtain Material Safety Data Sheets on specific products identified by cases. We encourage you to consider exposures to cleaning agents when talking to patients about potential workplace exposures that cause breathing problems and to urge patients to obtain specific product information. We would be happy to work with you and your patients to obtain relevant Material Safety Data Sheets. Please call us if you have questions or need assistance.

Sincerely,

Catharine M. Tumpowsky, MPH

Occupational Asthma Surveillance Project

## Case Two

A woman in her late 20s who worked as a laboratory technician performing surgical procedures on research animals, developed wheezing, cough, chest tightness and shortness of breath one year after she began working for her employer. Her symptoms began after she started using a disinfectant which contained hydroxyacetic acid to clean her work area after surgical procedures. Although she had a history of allergies and had been diagnosed with asthma when she was eighteen, she had been symptom-free for more almost 10 years prior to using this product. Once, after she used this product, she was taken to the emergency room for treatment. She has since stopped using this chemical but her breathing problems persist.

## Case Three

A 46 year old woman who worked as a hotel housekeeper developed breathing problems within 3 hours of being exposed to muriatic acid. The muriatic acid was being used to clean the pool area and the housekeeper was cleaning the adjacent hallway. She was treated in the emergency room. Since the incident, her symptoms have persisted and she was diagnosed with asthma one year later. Prior to the incident, she had no history of asthma or allergies. She continues to work for the same employer and although she is no longer exposed to muriatic acid, she finds that many chemicals at home and work trigger her symptoms.

## Cleaning Products and Risk of Asthma

### Case One

A 38 year old woman who worked as a lab technician in a hospital developed wheezing, cough, chest tightness and shortness of breath within 10 minutes of exposure to a floor cleaner which was applied to an adjacent work area. She was seen in the emergency room and admitted to the ICU after this incident. The woman had a history of asthma and allergies but reports that her symptoms have become more severe since this incident despite the fact that she is no longer exposed to the floor cleaner.

Because of the widespread use of cleaning agents in the workplace, workers, regardless of their occupation, may be exposed frequently. Several cleaning agents have been described as causes of occupational asthma, while others have been reported in the literature as causing chemical pneumonitis, pulmonary edema, or contact dermatitis.

**REPORT JANUARY-MARCH CASES NOW**  
By April 30th, report all occupational lung disease cases seen for the first time in January - March 1998. If you have NOT seen any cases, it is not necessary to return the report form.

*continued on other side*

Acute high level exposures to cleaning compounds containing ammonia or bleach have been associated with reactive airways dysfunction syndrome (RADS.) The mixture of bleach and ammonia produces chloramine gas whose toxic fumes cause tearing, rhinorrhea, cough, dyspnea and nausea. These fumes may be lethal. Pulmonary function testing after exposure to chloramine gas has revealed both restrictive and obstructive respiratory diseases.

Cases of work-related asthma involving sensitization to cleaning products are not as well documented. Disinfectant cleaners may contain known allergens such as: benzylkonium chloride, chloramine, chlorhexidine, formaldehyde or glutaraldehyde. Aliphatic polyamides are commonly found in cleaning compounds. Members of this chemical group associated with work-related asthma are ethylene diamine, diethylene triamine, and triethylene tetramine. Similarly the ethanolamines, mono and

triethanolamine, also found in cleaning solutions have been associated with work-related asthma.

Since 1992, 72 cases of work-related asthma have been reported to Massachusetts SENSOR involving exposure to cleaning agents (see Table 1.) In most cases, the individual was the one using the chemical but in some cases, individuals who enter an area where a cleaner has recently been used, have developed sensitization and asthma.

Identifying the specific agent which caused the reaction is difficult. Often workers do not know the names or ingredients of the products they are using or to which they are exposed. It is important to encourage patients to obtain this information from product labels.

*Thank you to Drs. William Patterson and David Christiani for reporting the featured cases to SENSOR.*

**Table 1. Physician Reports of Patients with Work-Related Asthma from Exposure to Cleaning Solutions, Massachusetts SENSOR, March 1992-March 1998.**

INDUSTRY	# CASES	OCCUPATIONS	SUSPECTED AGENTS
Health Care (including hospitals, nursing homes, and dental offices)	40	Nurse (23); Nursing Aide (4); Secretary(3); Janitors (2); Manager; Engineer; Therapist; Plumber; Dental Hygienist; Machine Operator	Bleach; Chlorine; Disinfectants; Misc. Cleaners; Soaps; Floor Stripper; Glutaraldehyde
Misc. Manufacturing	9	Machine Operators (5); Computer Operator; Inspector; Painter; Assembler	Ammonia; Misc. Cleaners; Soaps; Sodium Hydroxide
Education	5	Teacher; Physical Education Teacher; Dental Hygienist (university); Janitor; Groundskeeper	Disinfectants, Misc. Cleaners, Floor Stripper
Hotel	4	Housekeeper (3); Waitress	Misc. Cleaners; Bleach; Muriatic Acid
Personal Services (Drycleaners, Hair Salon)	3	Launderer (2); Hair Dresser	Detergents
Other	11	Animal Care Technician (2); Engineer (2); Mason; Seafood processor; Pet Store Worker; Food Production Worker; Misc. Laborer; Sewage Treatment Worker; Art Teacher;	Ammonia; Disinfectants; Sodium Hydroxide; Bleach

References:

Burge PS, Richardson MN. Occupational Asthma Due to Indirect Exposure to Laurel Dimethyl Benzyl Ammonium Chloride Used in a Floor Cleaner. *Thorax* 1994; 49:842-843.

Flyvholm MA. Contact Allergens in Registered Cleaning Agents for Industrial and Household Use. *British Journal of Industrial Medicine* 1993; 50:1043-1050.

NG TP, Lee HS, Malik MA, Chee CBE, Cheong TA, Wang YT. Asthma in Chemical Workers Exposed to Aliphatic Polyamines. *Occupational Medicine* 1995; 45: 45-48.

Savonius B, Keskinen H, Tuppurainen M, Kanerua L. Occupational Asthma Caused by Ethanolamines. *Allergy* 1994; 49:877-881.

Pascuzzi TA, Storrow AB. Mass Casualties from Acute Inhalation of Chloramine Gas. *Military Medicine* 1998, 163, 2:102.

**Number of Lung Disease Cases Reported to MA SENSOR, March 1992-December 1997**

	Oct. 1997	Nov. 1997	Dec. 1997	Total to Date (3/92-12/97)
<b>Asthma</b>	4	20	11	564
<b>Silicosis</b>	0	0	0	12
<b>Asbestosis</b>	0	0	0	123
<b>Chemical Pneumonitis</b>	0	0	0	15
<b>Total Number of Lung Disease</b>	4	20	11	714

# 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

Massachusetts Department of Public Health, Occupational Health Surveillance Program, 6th floor, 250 Washington Street,  
Boston, MA 02108, Tel: (617) 624-5632, Fax: (617) 624-5695

July 1998

Dear Health Care Provider:

In this issue of the *Occupational Lung Disease Bulletin*, we include a summary of a recent study of work-related asthma among members of a Massachusetts HMO. In this study the authors define "asthma attributable to occupational exposures" to include new onset of asthma induced by exposure to irritants as well as sensitizers, and new onset of clinically significant symptoms in people with quiescent asthma who have been free of a need for significant asthma medications for a year. In a recent editorial, Wagner and Wegman\* point out that this broad concept of work-related asthma has important implications for prevention. "While sensitizer-induced asthma is the best known cause of occupational asthma, prevention of occupational asthma should not be limited to considerations of initial sensitization alone. Rather, it is essential to see the much larger goal of preventing all acute and chronic asthma-related conditions in all workers potentially at risk."

This broad definition of "asthma attributable to occupational exposures" is consistent with the guidelines for reporting work-related asthma in Massachusetts. The guidelines specify reporting of all individuals with a physician's diagnosis of asthma who have symptoms related to work. These include not only individuals with new onset asthma caused by workplace exposures but individuals with pre-existing asthma exacerbated by exposures at work.

We appreciate your efforts in reporting these cases to the Department. Milton et al point out the benefits of early diagnosis and treatment for the individual affected. Reporting cases to the surveillance system can benefit the population at large as it helps provide the information necessary to target primary prevention efforts.

Sincerely,

Elise Pechter Morse MPH, CIH  
Industrial Hygienist  
Occupational Asthma Surveillance Project

\* Wagner GR and Wegman DH. *Occupational Asthma: Prevention by Definition. Am J Ind Med 33:427-429 (1998)*

## Risk and Incidence of Asthma Attributable to Occupational Exposures Among HMO Members

Estimates of the annual incidence of occupational asthma have ranged from 0.9 to 15 cases per 100,000 adults based on surveillance data. Findings from a recent study of a community-based HMO population suggest that the incidence may be much higher and that physicians often fail to ask the questions necessary to assess whether asthma may be work-related.

Milton et al. conducted a study of 79,204 HMO members between the ages 15 and 55 at risk of asthma, following them for a three month period. Computerized files, medical records and telephone interviews were used to identify and characterize asthma cases. Evidence for work causation was determined from work-related symptoms and work histories which were evaluated independently by two industrial hygienists who rated potential exposures to sensitizers and irritants.

The authors identified 74 persons with onset of clinically significant asthma during the study period. These included persons with new onset asthma and persons with mild asthma who had not required treatment in the previous 12 months. The annual incidence rate of clinically significant asthma was 1.3/1,000 increasing to 3.7/1,000 when cases of reactivation of previously quiescent asthma were included.

Of the 66 asthma cases who were interviewed, 14 (21%) had moderate to strong evidence that asthma was attributable to occupational exposures giving an incidence rate for work-related asthma of 71 per 100,000. Three of these cases were individuals who developed Reactive Airways Dysfunction Syndrome (RADS) - with symptoms following high level exposures to irritants in the workplace. None of these 14 cases had been diagnosed by their treating physicians as having occupational asthma nor were services billed to workers' compensation.

**REPORT JUNE AND JULY CASES NOW**  
**By July 31st, report all occupational lung disease cases seen for the first time in June and July, 1998. If you have NOT seen any cases, it is not necessary to return the report form.**

*continued on other side*

Based on chart reviews of 67 asthma cases, the authors found that physicians had documented asking about work-related symptoms in only 10 (15%) of the cases. Pulmonologists and allergists were much more likely to ask about workplace triggers than other physicians. In only 2 of the 14 cases that the authors identified as likely attributable to occupational exposure, had the treating physicians asked about work.

Physicians used physiologic testing sparingly; of the 67 cases seven had peak expiratory flows, seven underwent spirometry (including five with response to bronchodilator) and none had methacholine challenge testing.

The study population included eighteen subjects between the ages of 15 and 18, most of whom were employed at the time of interview.

The authors conclude that the incidence of asthma attributable to occupational exposures is significantly higher than previously reported and accounts for a sizable proportion of adult-onset asthma. Given that approximately 20% of adult onset asthma cases may be work-related, failure to diagnose these cases and bill workers' compensation implies a significant loss of revenue to the HMO. More importantly, prompt diagnosis is essential because early cessation of exposure and early anti-inflammatory treatment may improve the prognosis of occupational asthma.

*The complete article "Risk and Incidence of Asthma Attributable to Occupational Exposures Among HMO members" by DK Milton, GM Solomon, RA Rosiello and RF Herrick, can be found in the American Journal of Industrial Medicine 33:1-10 (1998).*

## NE Regional Latex Allergy Symposium

The Massachusetts Nurses Association is sponsoring a NE Regional Latex Allergy Symposium in conjunction with the Massachusetts Dental Society, Massachusetts Medical Society, Massachusetts Department of Public Health, Massachusetts Emergency Nurses Association and New Hampshire Electrolysis Association. The program is scheduled for:

September 16, 1998

8:00am - 4:30pm

& Dinner Lecture - Legal Aspects

6:00pm - 8:30pm

Merrimack Hotel & Conference Center  
Merrimack, NH

For more information regarding registration, continuing education and directions or to obtain a brochure, contact Susan Clish at the Massachusetts Nurses Association at (781) 830-5723. There is a 10% discount for registrations received prior to August 25, 1998.

## Number of Lung Disease Cases Reported to MA SENSOR, March 1992-May 1998

	April 1998	May 1998	Total to Date (3/92-5/98)
<b>Asthma</b>	2	8	604
<b>Silicosis</b>	0	0	10
<b>Asbestosis</b>	0	0	118
<b>Chemical Pneumonitis</b>	0	0	14
<b>Total Number of Lung Disease Reports</b>	2	8	746

## OSHA INTRODUCES NEW RESPIRATORY PROTECTION STANDARD

OSHA revised its respiratory protection standard, effective April 8, 1998, affecting 1.3 million employers in general industry, construction, shipyards, longshoring and marine terminals. After 16 years under the old provisions, OSHA expects the new standard, 29CFR1910.139, to save 932 deaths from cancer and other chronic diseases each year, as well as prevent more than 4,000 injuries and illnesses, and save \$94 million in related costs annually.

The new standard protects five million workers by requiring that employers implement respirator programs that provide the right respirator for the hazards encountered on the job and supervise their use. Elements required include:

- fit-test on each person annually
- medical evaluation for fitness to wear a respirator
- training each year about the use, maintenance and limitations of respirators
- hazard evaluation to characterize respiratory hazards and conditions of work
- written respirator program specific for the workplace
- tightening of requirements for respirators to be used in conditions that are immediately dangerous to life or health (IDLH), including firefighting.

The American College of Occupational and Environmental Medicine (ACOEM) submitted a petition to the US Court of Appeals, Seventh Circuit, requesting the court to set aside the provision which allows non-physicians to make medical evaluations without physician supervision.

The OSHA Respirator Standard may be accessed at:  
[http://www.osha-slc.gov/OshStd\\_data/1910\\_0134.html](http://www.osha-slc.gov/OshStd_data/1910_0134.html)

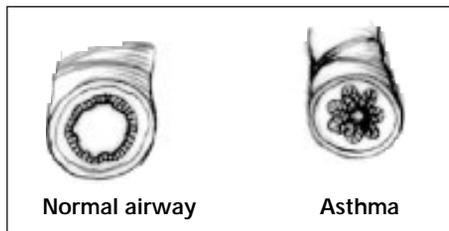
# Controlling Your Asthma

If you have asthma, you are not alone. More than 14 million people in the United States have this lung disease. Of these, almost 5 million are children. Asthma is a problem among all races. But the asthma death rate and hospitalization rate for blacks are three times the rate of whites. Proper asthma care could prevent these problems for all.

This booklet can help you learn how to control your asthma or help a friend or family member with asthma.

## Asthma Is a Serious Lung Disease

Asthma makes the sides of the airways in your lungs inflamed or swollen all the time. See the drawing below. Your airways react to things like smoke, dust, pollen, or other things. Your airways narrow or become smaller and you get common symptoms like those listed in the box.



Asthma that is not well controlled can cause many problems. People miss work or school, go to the hospital, or even die

because of their asthma. But you do not have to put up with the problems asthma can cause.

## Your Asthma Can Be Controlled With Proper Care

With your doctor's help, you can control your asthma and become free of symptoms most of the time. **But your asthma does NOT go away when your symptoms go away.** You need to keep taking care of your asthma.

Your asthma cannot be cured—having asthma is a part of your life. So you need to make taking care of your asthma a part of your life. This is true even if your asthma is mild.

### Common Symptoms of Asthma

You may have all of these symptoms, some of them, or just one. Symptoms can be mild or severe.

- Coughing
- Wheezing (a whistling noise when you breathe)
- Chest tightness (the feeling that someone is squeezing or sitting on your chest)
- Shortness of breath



## How To Take Care of Your Asthma

1. **Work with your doctor and see him or her at least every 6 months.**

*See:*

“How To Work With Your Doctor” (on this page)

2. **Take your asthma medicines exactly as your doctor tells you.**

*See:*

“Taking the Right Medicines at the Right Times” (page 3)

“How To Use Your Metered-Dose Inhaler the Right Way” (page 6)

“Asthma Action Plan” (page 7)

3. **Watch for signs that your asthma is getting worse and act quickly.**

*See:*

“Asthma Action Plan” (page 7)  
(The action plan gives you some signs that your asthma is getting worse and says when to take medicines.)

“How To Use Your Peak Flow Meter” (page 8)

4. **Stay away from or control things that make your asthma worse.**

*See:*

“How To Control Things That Make Your Asthma Worse” (page 10)

## How To Work With Your Doctor

- **Agree on clear treatment goals with your doctor.** Your goal is to be able to say “no” to all the questions in the box on page 3 titled, “Is Your Asthma Under Control?”

- **Agree on what things you need to do. Then do them.**

—Ask questions until you feel you know what your doctor wants you to do, when you should do it, and why. Tell your doctor if you think you will have trouble doing what is asked. You can work together to find a treatment plan that is right for you.

—Write down the things you are supposed to do before you leave the doctor’s office, or soon after.

—Put up reminders to yourself to take your medicine on time. Put these notes in places where you will see them.

- **See your doctor at least every 6 months to check your asthma and review your treatment.** Call for an appointment if you need one.

## Prepare a day or two before each doctor’s visit:

- **Answer the questions in “Is Your Asthma Under Control?”** on page 3. Talk to your doctor about your answers. Also, talk about any changes in your home or work that may have made your asthma worse.
- **Write down questions and concerns to discuss with your doctor.** Include ALL of your concerns, even those you think are not a big deal.
- **Bring your medicines and written action plan to each visit.** If you use a peak flow meter, bring it to each visit.

“The doctor would ask me at each visit how little Jimmy’s asthma was. I always forgot to mention some symptoms or other problems. Now it’s different. Before we visit the doctor, I write down when Jimmy had symptoms in the past 2 weeks. I also write down all the questions I have. Now when I leave the doctor’s office, I feel happy that I got all my issues addressed.”

*Deborah, mother of a child with asthma*

## Is Your Asthma Under Control?

Answer these questions by checking “yes” or “no.” Do this just before each doctor’s visit.

### In the past 2 weeks:

1. Have you coughed, wheezed, felt short of breath, or had chest tightness:

- During the **day**? \_\_\_\_\_ yes \_\_\_\_\_ no
- At **night**, causing you to wake up? \_\_\_\_\_ yes \_\_\_\_\_ no
- During or soon after **exercise**? \_\_\_\_\_ yes \_\_\_\_\_ no

2. Have you needed more “quick-relief” medicine than usual? \_\_\_\_\_ yes \_\_\_\_\_ no

3. Has your asthma kept you from doing *anything* you wanted to do? \_\_\_\_\_ yes \_\_\_\_\_ no

If yes, what was it?

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4. Have your asthma medicines caused you any problems, like shakiness, sore throat, or upset stomach? \_\_\_\_\_ yes \_\_\_\_\_ no

### In the past few months:

5. Have you missed school or work because of your asthma? \_\_\_\_\_ yes \_\_\_\_\_ no

6. Have you gone to the emergency room or hospital because of your asthma? \_\_\_\_\_ yes \_\_\_\_\_ no

### What Your Answers Mean

**All “no” answers?—Your asthma is under control.**

Read this guide to help you keep your asthma under control.

**One or more “yes” answers?—Something needs to be done.**

Read this guide and talk to your doctor to find out how to get your asthma under control.

## Taking the Right Medicines at the Right Times

There are two main kinds of medicines for asthma: (1) those that help with the **long-term control** of asthma and (2) those that give short-term **quick relief** from asthma symptoms. See the list of brand and generic names for asthma medicines on page 5.

### Long-Term-Control Medicines Are Taken Every Day To Control Asthma

**Long-term-control medicines will prevent symptoms and control asthma.** But it often takes a few weeks before you feel the full effects of this medicine.

### Ask your doctor about taking daily long-term-control medicine if you:

- Have asthma symptoms three or more times a week, or
- Have asthma symptoms at night three or more times a month.

If you need a long-term-control medicine, you will need to **keep taking your medicine each day, even when you feel well.** This is the only way you can keep your asthma under control.

Make taking your long-term-control medicine a part of your daily routine—just like eating, sleeping, and brushing your teeth.

### The Long-Term-Control Medicines

The most effective long-term-control medicines are those that reduce swelling in your airways (inflammation). These medicines include inhaled steroids, cromolyn, and nedocromil.

- **Inhaled steroids and steroid tablets or liquids are the strongest long-term-control medicines.** The steroids used for asthma are NOT the same as the unsafe steroids some athletes take to build muscles.

— **Inhaled steroids** are used to prevent symptoms and control mild, moderate, and severe asthma. **Inhaled steroids are safe when taken at recommended doses.** This is because the medicine goes right to your lungs where you need it. This reduces the amount of medicine you need and the chance of any side effects.

— **Steroid tablets or liquids** are used safely for short times to quickly bring asthma under control. They are also used longer term to control the most severe asthma.

- **Cromolyn and nedocromil** are often the choice of medicine for children with mild asthma.

- **Inhaled long-acting beta<sub>2</sub>-agonists** are used to help control moderate-to-severe asthma and to prevent nighttime symptoms. Long-acting beta<sub>2</sub>-agonists do not reduce inflammation. Therefore, patients taking this medicine also need to take inhaled steroids. Inhaled long-acting beta<sub>2</sub>-agonists should not be used for quick relief of asthma attacks.

- **Sustained-release theophylline or sustained-release beta<sub>2</sub>-agonist tablets** can help prevent nighttime symptoms. These medicines are used with inhaled steroids, nedocromil, or cromolyn. Theophylline is sometimes used by itself to treat mild asthma. The dose for theophylline must be checked over time to prevent side effects.

- **Zileuton and zafirlukast** are a more recent type of long-term-control medicine. Studies so far show that it is used mainly for mild asthma in patients 12 years of age and older.

### Quick-Relief Medicines Are Taken Only When Needed

**Inhaled quick-relief medicine quickly relaxes and opens your airways and relieves asthma symptoms.** But it only helps for about 4 hours. Quick-relief medicine cannot keep symptoms from coming back—only long-term-control medicines can do that.

**Take quick-relief medicine when you first begin to feel symptoms**—like coughing, wheezing, chest tightness, or shortness of breath. Your doctor may tell you to use a peak flow meter to help you know when to take your inhaled quick-relief medicines.

Do not delay taking your quick-relief medicine when you have symptoms. This can keep you from having a really bad asthma attack.

Tell your doctor if you notice you are using more of this medicine than usual. This is often a sign that your long-term-control medicine needs to be changed or increased.

### Make an Action Plan With Your Doctor

Ask your doctor to help you fill out the “Asthma Action Plan” on page 7. Be sure you know when to take your medicine and what to do when your asthma gets worse.

**“I always thought if you had asthma you should expect to have asthma symptoms. My new doctor disagreed. She told me to take an “inhaled steroid” every day for my asthma. Well, I did not feel anything at first. But after about 3 weeks, my symptoms came less often. Now, after a few months on this medicine, I can see my doctor was right. Asthma can really be controlled.”**

*Glen, a long-time asthma patient*

## Asthma Medicines: Brand and Generic Names, 1997\*

### Asthma Long-Term-Control Medications

Generic name	Brand name
--------------	------------

#### Steroids: Inhaled

beclomethasone	Beclovent® Vanceril®, Vanceril®—Double
Strength	
budesonide	Pulmicort Turbuhaler®
flunisolide	AeroBid®, AeroBid-M®
fluticasone	Flovent®
triamcinolone	Azmacort®

#### Cromolyn and Nedocromil: Inhaled

cromolyn sodium	Intal®
nedocromil sodium	Tilade®

#### Leukotriene Modifiers: Tablets

zafirlukast	Accolate®
zileuton	Zyflo®

#### Long-Acting Beta<sub>2</sub>-Agonists

salmeterol (inhaled)	Serevent®
albuterol	Volmax®
(extended release tablet)	Proventil Repetabs®

#### Theophylline: Tablets or liquid

Aerolate® III
Aerolate® JR
Aerolate® SR
Choledyl® SA
Elixophyllin®
Quibron®-T
Quibron®-T/SR
Slo-bid®
Slo-Phyllin®
Theo-24®
Theochron®
Theo-Dur®
Theolair®
Theolair®-SR
T-Phyl®
Uni-Dur®
Uniphyll®

### Asthma Quick-Relief Medications

Generic name	Brand name
--------------	------------

#### Short-Acting Beta<sub>2</sub>-Agonists: Inhaled

albuterol	Airet® Proventil® Proventil HFA® Ventolin® Ventolin® Rotacaps
bitolterol	Tornalate®
pirbuterol	Maxair®
terbutaline	Brethaire® Brethine® (tablet only) Bricanyl® (tablet only)

#### Anticholinergics: Inhaled

ipratropium bromide	Atrovent®
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#### Steroids: Tablets or liquids

methylprednisolone	Medrol®
prednisone	Prednisone Deltasone® Orasone® Liquid Pred® Prednisone Intensol®
prednisolone	Prelone® Pediapred®

\* This glossary is a complete list of brand names associated with the appropriate generic names of asthma medications, as listed in the United States Pharmacopeial Convention, Inc., *Approved Drug Products and Legal Requirements*, Volume III, 17th edition, 1997, and the USP DI *Drug Information for Health Care Professionals*, Volume I, 17th edition, 1997. **This list does not constitute an endorsement of these products by the National Heart, Lung, and Blood Institute.**

# HOW TO USE YOUR METERED-DOSE INHALER THE RIGHT WAY

Using an inhaler seems simple, but most patients do not use it the right way. When you use your inhaler the wrong way, less medicine gets to your lungs. (Your doctor may give you other types of inhalers.)

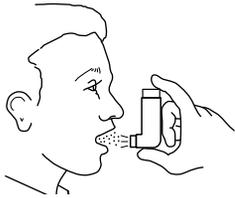
For the next 2 weeks, read these steps aloud as you do them or ask someone to read them to you. Ask your doctor or nurse to check how well you are using your inhaler.

Use your inhaler in one of the three ways pictured below (A or B are best, but C can be used if you have trouble with A and B).

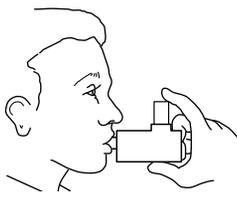
## Steps for Using Your Inhaler

- |                   |   |
|-------------------|---|
| Getting ready     | <ol style="list-style-type: none"> <li>1. Take off the cap and shake the inhaler.</li> <li>2. Breathe out all the way.</li> <li>3. Hold your inhaler the way your doctor said (A, B, or C below).</li> </ol>  |
| Breathe in slowly | <ol style="list-style-type: none"> <li>4. As you start breathing in <b>slowly</b> through your mouth, press down on the inhaler <b>one</b> time. (If you use a holding chamber, first press down on the inhaler. Within 5 seconds, begin to breathe in slowly.)</li> <li>5. Keep breathing in <b>slowly</b>, as deeply as you can.</li> </ol> |
| Hold your breath  | <ol style="list-style-type: none"> <li>6. Hold your breath as you count to 10 slowly, if you can.</li> <li>7. For inhaled quick-relief medicine (beta<sub>2</sub>-agonists), wait about 1 minute between puffs. There is no need to wait between puffs for other medicines.</li> </ol>  |

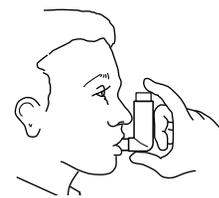
- A. Hold inhaler 1 to 2 inches in front of your mouth (about the width of two fingers).



- B. Use a spacer/holding chamber. These come in many shapes and can be useful to any patient.



- C. Put the inhaler in your mouth. Do not use for steroids.



## Clean Your Inhaler as Needed

Look at the hole where the medicine sprays out from your inhaler. If you see "powder" in or around the hole, clean the inhaler. Remove the metal canister from the L-shaped plastic mouthpiece. Rinse only the mouthpiece and cap in warm water. Let them dry overnight. In the morning, put the canister back inside. Put the cap on.

## Know When To Replace Your Inhaler

**For medicines you take each day (an example):**  
Say your new canister has 200 puffs (number of puffs is listed on canister) and you are told to take 8 puffs per day.

8 puffs per day  $\overline{25 \text{ days}}$  200 puffs in canister

So this canister will last 25 days. If you started using this inhaler on May 1, replace it on or before May 25.

You can write the date on your canister.

**For quick-relief medicine take as needed** and count each puff.

Do not put your canister in water to see if it is empty. This does not work.

From: *Facts About Controlling Asthma*, National Asthma Education and Prevention Program, National Heart, Lung, and Blood Institute, NIH Publication No. 97-2339 A Reproducible Handout

Doctor's Phone Number \_\_\_\_\_ Hospital/Emergency Room Phone Number \_\_\_\_\_ Doctor's Name \_\_\_\_\_

**GREEN ZONE: Doing Well**

- No cough, wheeze, chest tightness, or shortness of breath during the day or night
- Can do usual activities

**And, if a peak flow meter is used,**  
**Peak flow:** more than \_\_\_\_\_  
 (80% or more of my best peak flow)

My best peak flow is: \_\_\_\_\_

Before exercise  2 or  4 puffs 5 to 60 minutes before exercise

Medicine	How much to take	When to take it

**YELLOW ZONE: Asthma Is Getting Worse**

- Cough, wheeze, chest tightness, or shortness of breath, or
- Waking at night due to asthma, or
- Can do some, but not all, usual activities

**-Or-**

**Peak flow:** \_\_\_\_\_ to \_\_\_\_\_  
 (50% - 80% of my best peak flow)

**ADD: Quick-Relief Medicine - and keep taking your GREEN ZONE medicine**

**FIRST**  \_\_\_\_\_  
 (short-acting beta<sub>2</sub>-agonist)

**SECOND**  2 or  4 puffs, every 20 minutes for up to 1 hour  
 Nebulizer, once

**if your symptoms (and peak flow, if used) return to GREEN ZONE after 1 hour of above treatment:**

- Take the quick-relief medicine every 4 hours for 1 to 2 days.
- Double the dose of your inhaled steroid for \_\_\_\_\_ (7-10) days.

**-Or-**

**if your symptoms (and peak flow, if used) do not return to GREEN ZONE after 1 hour of above treatment:**

- Take: \_\_\_\_\_  2 or  4 puffs or  Nebulizer  
 (short-acting beta<sub>2</sub>-agonist)
- Add: \_\_\_\_\_ mg. per day For \_\_\_\_\_ (3-10) days  
 (oral steroid)
- Call the doctor  before/  within \_\_\_\_\_ hours after taking the oral steroid.

**RED ZONE: Medical Alert!**

- Very short of breath, or
- Quick-relief medicines have not helped, or
- Cannot do usual activities, or
- Symptoms are same or get worse after 24 hours in Yellow Zone

**-Or-**

**Peak flow:** less than \_\_\_\_\_  
 (50% of my best peak flow)

Take this medicine:

- \_\_\_\_\_  4 or  6 puffs or  Nebulizer  
 (short-acting beta<sub>2</sub>-agonist)
- \_\_\_\_\_ mg.  
 (oral steroid)

Then call your doctor **NOW**. Go to the hospital or call for an ambulance if:

- You are still in the red zone after 15 minutes AND
- You have not reached your doctor.

**DANGER SIGNS**

- Trouble walking and talking due to shortness of breath
- Lips or fingernails are blue

**NOW!**

Take  4 or  6 puffs of your quick-relief medicine **AND**  
 Go to the hospital or call for an ambulance ( \_\_\_\_\_ ) **NOW!**

# HOW TO USE YOUR PEAK FLOW METER

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A peak flow meter helps you check how well your asthma is controlled. Peak flow meters are most helpful for people with moderate or severe asthma.

This guide will tell you (1) how to find your personal best peak flow number, (2) how to use your personal best number to set your peak flow zones, (3) how to take your peak flow, and (4) when to take your peak flow to check your asthma each day.

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## Starting Out: Find Your Personal Best Peak Flow Number

To find your personal best peak flow number, take your peak flow each day for 2 to 3 weeks. Your asthma should be under good control during this time. Take your peak flow as close to the times listed below as you can. These times for taking your peak flow are only for finding your personal best peak flow.

- Between noon and 2:00 p.m. each day

- Each time you take your quick-relief medicine to relieve symptoms (measure your peak flow after you take your medicine)
- Any other time your doctor suggests

Write down the number you get for each peak flow reading. The highest peak flow number you had during the 2 to 3 weeks is your personal best.

Your personal best can change over time. Ask your doctor when to check for a new personal best.

To check your asthma each day, you will take your peak flow in the morning. This is discussed on the next page.

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## Your Peak Flow Zones

Your peak flow zones are based on your personal best peak flow number. The zones will help you check your asthma and take the right actions to keep it controlled. The colors used with each zone come from the traffic light.



**Green Zone** (80 to 100 percent of your personal best) signals **good control**. Take your usual daily long-term-control medicines, if you take any. Keep taking these medicines even when you are in the yellow or red zones.



**Yellow Zone** (50 to 79 percent of your personal best) signals **caution: your asthma is getting worse**. Add quick-relief medicines. You might need to increase other asthma medicines as directed by your doctor.



**Red Zone** (below 50 percent of your personal best) signals **medical alert!** Add or increase quick-relief medicines and call your doctor **now**.

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## Ask your doctor to write an action plan for you that tells you:

- The peak flow numbers for your green, yellow, and red zones. Mark the zones on your peak flow meter with colored tape or a marker.
- The medicines you should take while in each peak flow zone.

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## How To Take Your Peak Flow

1. Move the marker to the bottom of the numbered scale.
2. Stand up or sit up straight.
3. Take a deep breath. Fill your lungs all the way.
4. Hold your breath while you place the mouthpiece in your mouth, between your teeth. Close your lips around it. Do not put your tongue inside the hole.
5. Blow out as hard and fast as you can. Your peak flow meter will measure how fast you can blow out air.
6. Write down the number you get. But if you cough or make a mistake, do not write down the number. Do it over again.
7. Repeat steps 1 through 6 two more times. Write down the highest of the three numbers. This is your peak flow number.
8. Check to see which peak flow zone your peak flow number is in. Do the actions your doctor told you to do while in that zone.

Your doctor may ask you to write down your peak flow numbers each day. You can do this on a calendar or other paper. This will help you and your doctor see how your asthma is doing over time.

---

## Checking Your Asthma: When To Use Your Peak Flow Meter

- **Every morning** when you wake up, before you take medicine. Make this part of your daily routine.
- **When you are having asthma symptoms or an attack.** And after taking medicine for the attack. This can tell you how bad your asthma attack is and whether your medicine is working.
- Any other time your doctor suggests.

If you use more than one peak flow meter (such as at home and at school), be sure that both meters are the same brand.

---

## Bring to Each of Your Doctor's Visits:

- Your peak flow meter.
  - Your peak flow numbers if you have written them down each day.
- Also, ask your doctor or nurse to check how you use your peak flow meter—just to be sure you are doing it right.

# HOW TO CONTROL THINGS THAT MAKE YOUR ASTHMA WORSE

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You can help prevent asthma attacks by staying away from things that make your asthma worse. This guide suggests many ways to help you do this.

**You need to find out what makes your asthma worse. Some things that make asthma worse for some people are not a problem for others. You do not need to do all of the things listed in this guide.**

Look at the things listed in dark print below. Put a check next to the ones that you know make your asthma worse. Ask your doctor to help you find out what else makes your asthma worse. Then, decide with your doctor what steps you will take. Start with the things in your bedroom that bother your asthma. Try something simple first.

## **Tobacco Smoke**

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- If you smoke, ask your doctor for ways to help you quit. Ask family members to quit smoking, too.
- Do not allow smoking in your home or around you.
- Be sure no one smokes at a child's day care center.

## **Dust Mites**

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Many people with asthma are allergic to dust mites. Dust mites are like tiny "bugs" you cannot see that live in cloth or carpet.

### **Things that will help the most:**

- Encase your mattress in a special dust-proof cover.\*
- Encase your pillow in a special dust-proof cover\* or wash the pillow each week in hot water. Water must be hotter than 130°F to kill the mites.
- Wash the sheets and blankets on your bed each week in hot water.

### **Other things that can help:**

- Reduce indoor humidity to less than 50 percent. Dehumidifiers or central air conditioners can do this.
- Try not to sleep or lie on cloth-covered cushions or furniture.
- Remove carpets from your bedroom and those laid on concrete, if you can.
- Keep stuffed toys out of the bed or wash the toys weekly in hot water.

## **Animal Dander**

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Some people are allergic to the flakes of skin or dried saliva from animals with fur or feathers.

### **The best thing to do:**

- Keep furred or feathered pets out of your home.

### **If you can't keep the pet outdoors, then:**

- Keep the pet out of your bedroom and keep the bedroom door closed.
- Cover the air vents in your bedroom with heavy material to filter the air.\*
- Remove carpets and furniture covered with cloth from your home. If that is not possible, keep the pet out of the rooms where these are.

## **Cockroach**

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Many people with asthma are allergic to the dried droppings and remains of cockroaches.

- Keep all food out of your bedroom.
- Keep food and garbage in closed containers (never leave food out).
- Use poison baits, powders, gels, or paste (for example, boric acid). You can also use traps.
- If a spray is used to kill roaches, stay out of the room until the odor goes away.

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**Vacuum Cleaning**

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- Try to get someone else to vacuum for you once or twice a week, if you can. Stay out of rooms while they are being vacuumed and for a short while afterward.
- If you vacuum, use a dust mask (from a hardware store), a double-layered or microfilter vacuum cleaner bag,\* or a vacuum cleaner with a HEPA filter.\*

**Indoor Mold**

- Fix leaky faucets, pipes, or other sources of water.
- Clean moldy surfaces with a cleaner that has bleach in it.

**Pollen and Outdoor Mold**

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**What to do during your allergy season** (when pollen or mold spore counts are high):

- Try to keep your windows closed.
- Stay indoors with windows closed during the midday and afternoon, if you can. Pollen and some mold spore counts are highest at that time.
- Ask your doctor whether you need to take or increase anti-inflammatory medicine before your allergy season starts.

**Smoke, Strong Odors, and Sprays**

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- If possible, do not use a wood-burning stove, kerosene heater, or fireplace.
- Try to stay away from strong odors and sprays, such as perfume, talcum powder, hair spray, and paints.

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**Exercise, Sports, Work, or Play**

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- You should be able to be active without symptoms. See your doctor if you have asthma symptoms when you are active—like when you exercise, do sports, play, or work hard.
- Ask your doctor about taking medicine before you exercise to prevent symptoms.
- Warm up for about 6 to 10 minutes before you exercise.
- Try not to work or play hard outside when the air pollution or pollen levels (if you are allergic to the pollen) are high.

**Other Things That Can Make Asthma Worse**

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- Flu:** Get a flu shot.
- Sulfites in foods:** Do not drink beer or wine or eat shrimp, dried fruit, or processed potatoes if they cause asthma symptoms.
- Cold air:** Cover your nose and mouth with a scarf on cold or windy days.
- Other medicines:** Tell your doctor about all the medicines you may take. Include cold medicines, aspirin, and even eye drops.

---

\*To find out where to get products mentioned in this guide, call:

Asthma and Allergy Foundation of America  
(800-727-8462)

Allergy and Asthma Network/Mothers of  
Asthmatics, Inc. (800-878-4403)

American Academy of Allergy, Asthma, and Immunology  
(800-822-2762)

National Jewish Medical and Research Center  
(Lung Line®) (800-222-5864)

From: *Facts About Controlling Asthma*, National Asthma Education and Prevention Program, National Heart, Lung, and Blood Institute, NIH Publication No. 97-2339 A Reproducible Handout

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to learn more about  
asthma:**

National Asthma Education  
and Prevention Program  
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301-251-1222  
Internet:  
[http://www.nhlbi.nih.gov/nhlbi/  
nhlbi.htm](http://www.nhlbi.nih.gov/nhlbi/nhlbi.htm)

Allergy and Asthma Network/  
Mothers of Asthmatics, Inc.  
800-878-4403  
Internet:  
<http://www.podi.com/health/aanma>

American Academy of Allergy,  
Asthma, and Immunology  
800-822-2762  
Internet: <http://www.aaaai.org>

American College of Allergy,  
Asthma, and Immunology  
800-842-7777  
Internet: <http://allergy.mcg.edu>

American Lung Association  
800-586-4872  
Internet: <http://www.lungusa.org>

Asthma and Allergy Foundation  
of America  
800-727-8462  
Internet: <http://www.aafa.org>

National Jewish Medical and  
Research Center (Lung Line®)  
800-222-5864  
Internet: <http://www.njc.org>

U.S. DEPARTMENT OF HEALTH  
AND HUMAN SERVICES

Public Health Service  
National Institutes of Health  
National Heart, Lung, and Blood Institute

NIH Publication No. 97-2339  
Originally printed 1990  
Revised September 1997

## Symposium

Third of three articles  
on asthma

# Occupational asthma

'My job is making me sick!'

### Preview

**Patients whose symptoms improve over the weekend or during vacation may realize that their asthma is related to the work environment. However, the list of agents that have been implicated in asthmatic responses is very long and growing, so the specific cause may be less than obvious. Dr Bernstein provides an overview of mechanisms, causes, and diagnosis of occupational asthma, with emphasis on the best treatment (ie, relocation to avoid the inciting agent).**

Jonathan A. Bernstein, MD

❖ Well over 200 agents found in the workplace are known to be capable of inducing asthma.<sup>1</sup> As industrial technology becomes more sophisticated, this list will grow and so will the need to recognize workers who are at risk for occupational asthma.

Worldwide prevalence statistics for occupational asthma range from 2% to 15%.<sup>2</sup> Unfortunately, accurate figures are not available in the United States because only a few prospective studies have evaluated occupational asthma, and no definitive

conclusions have been drawn as yet. Much of the US prevalence data has been derived from cross-sectional surveys of workers in specific industries. This information may not be entirely accurate, since symptomatic workers often leave their job before they seek medical evaluation.<sup>2</sup>

Thus, occupational asthma probably affects more people than the numbers indicate. Experts in the field are just beginning to formulate a standardized approach to evaluation and monitoring of workers at risk for this disease.<sup>3</sup> A better understanding of the pathoimmunogenesis of

occupational asthma will allow better recognition, diagnosis, and prevention. Unrecognized, occupational asthma can have a devastating impact on both workers and employers.

### Mechanisms and causes

An international panel of experts in occupational asthma recently defined it as a "disease characterized by variable airflow limitation and/or airway hyperresponsiveness due to causes and conditions which are attributable to a particular occupational environment and not to stimuli encountered outside the workplace."<sup>4</sup> They classified subtypes by required latency period and according to the presence or absence of immune mechanisms (table 1).

Many agents used in numerous types of work have been implicated in occupational asthma. They include agents used in such industries as pharmaceutical, textile, and automobile manufacturing; food processing; hair care; printing; farming; smelting; soldering; metal plating; tanning; and brewing.<sup>5</sup> Table 2 summarizes these agents and categorizes them by pathophysiologic mechanism.

**NONIMMUNOLOGIC MECHANISMS**—Direct injury to respiratory epithelial cells (ie, reactive airways dysfunction syndrome)

*continued*

**Both high- and low-molecular-weight compounds can induce the classic IgE-mediated immune responses that cause occupational asthma.**

**Table 1. Classification of mechanisms of occupational asthma**

<p><b>Nonimmunologic mechanisms</b>          Reflex bronchoconstriction          Irritant bronchoconstriction (ie, reactive airways dysfunction syndrome)          Pharmacologically induced bronchoconstriction</p> <p><b>Immunologic mechanisms</b>          Immediate hypersensitivity response (IgE mediated)            High-molecular-weight allergens            Low-molecular-weight allergens            Mixed (immunologic and nonimmunologic) allergens          IgG antibody and/or immune (antigen-antibody) complex response          Complement pathway activation          Cell-mediated response</p>
---

*Adapted from Bernstein et al, eds.<sup>4</sup>*

is one proposed explanation for how low-molecular-weight irritants (eg, ammonia, environmental pollutants such as ozone or sulfur dioxide) induce occupational asthma. Such injury permits easier access of chemicals to the lamina propria.<sup>5</sup> Irritant response and other nonimmunologic mechanisms may involve stimulation of smooth muscle receptors and/or afferent nerves, resulting in neurogenic inflammation. In several occupations, activation of the classic or alternative complement pathway system has been demonstrated; this results in production of anaphylatoxins that are capable of causing mast cell release of bioactive mediators.<sup>5</sup> Nonimmu-

nologic "pharmacologic" asthma may be induced by such compounds as organophosphate insecticides, which have anticholinesterase activity that is capable of inducing hypercholinergic, bronchospastic airway responses.<sup>5</sup>

**IMMUNOLOGIC MECHANISMS**  
 —Both immune and cellular sensitization may result in occupational asthma.<sup>6</sup> In many cases, classic IgE-mediated immune responses have been noted and have been induced by both high- and low-molecular-weight compounds.

High-molecular-weight (ie, 10 to 38 kd) substances that have been shown to directly induce responses include organic animal and plant proteins, polysaccha-

rides, glycoproteins, and peptides. Low-molecular-weight (ie, less than 10 kd) organic and inorganic chemicals induce an IgE-mediated response only after they form a conjugate with an endogenous protein carrier (eg, human albumin).<sup>1</sup> Such hapten-protein conjugates are immunogenic and are capable of initiating an IgE-mediated immune response.<sup>2</sup> Diisocyanates, anhydrides, western red cedar dust, and metal salts are prime examples of low-molecular-weight compounds that may induce an IgE-mediated response in this manner.<sup>2</sup>

Increased IgG antibody is often found in patients with occupational asthma, but the role of this isotype in the pathogenesis of the disease is unknown.

#### **Diagnosis and patient evaluation**

The main objective in diagnosing occupational asthma is to determine whether the patient's responses are related to the work environment. A pertinent differential diagnosis (table 3) should always be formulated to exclude other possible causes.<sup>5</sup> As in diagnosing any medical disorder, detailed history taking is essential. For occupational asthma, this should include a thorough past medical history, family history of allergies or asthma, and special

**Occupational asthma symptoms may begin immediately after exposure or after a latency period. Some patients have a dual response involving immediate and late symptoms.**

emphasis on the work history. Several questionnaires have been designed to elicit an unbiased occupational history, but no standardized questionnaires are yet available. However, suitable questionnaires, which have yielded reproducible and reliable information, are evolving,<sup>3</sup> and some have been validated by repeated use in different occupational settings.

There is no classic presentation of a worker manifesting occupational asthma. Symptoms may consist of dyspnea, chest tightness, wheezing, or cough with or without sputum production, and upper airway symptoms (eg, rhinorrhea, nasal congestion, pruritus of the eyes and nose) are often present.<sup>2</sup>

Onset of symptoms may begin immediately after exposure (ie, early airway response, occurring within 1 to 2 hours) or after a latency period of several hours (ie, late airway response, occurring 4 to 8 hours after exposure). A third pattern, dual airway response, is also possible: Symptoms occur immediately after exposure, followed by a recovery phase and recurrence of symptoms several hours later.

In occupational asthma, symptoms typically improve when the patient is away from work (ie, on weekends and vacations) but re-

*continued*

**Table 2. Causes of occupational asthma**

**Reflex bronchoconstriction**

Aluminum  
Cold air  
Exercise  
Fluorocarbon propellants  
Sulfur dioxide gas  
Talc and lactose dust  
Tobacco smoke

**Irritant bronchoconstriction**

Ammonia, chlorine, and fluorine gas  
Smoke fumes  
Solvents  
Sulfa and nitrogen dioxide gas

**Pharmacologically induced bronchoconstriction**

Cotton, flax, sisal, jute, and hemp dust  
Diisocyanates (ie, diphenylmethane diisocyanate, hexamethylene diisocyanate, and toluene diisocyanate)  
Organophosphates  
Polyvinyl chloride vapor

**High-molecular-weight organic compounds**

Animal enzymes (eg, subtilisin, trypsin)  
Animal proteins (eg, birds, fish [glue], sea squirts, grain weevils and mites)  
Plant enzymes (eg, papain, bromelain)  
Plant proteins (eg, grain dust, legumes, cotton seed, tobacco leaf, teas, psyllium)  
Vegetable gums (eg, karaya, acacia, arabic)

**Low-molecular-weight inorganic and organic compounds**

Anhydrides (eg, phthalic, tetrachlorophthalic, trimellitic anhydrides)  
Antibiotics (eg, penicillins, tetracyclines, spiramycin [Rovamycin] powders)  
Diisocyanates (ie, diphenylmethane diisocyanate, hexamethylene diisocyanate, and toluene diisocyanate)  
Dyes (eg, azo, anthraquinone, paraphenyl diamine)  
Fluxes (eg, colophony, stainless steel welding fumes)  
Metals (eg, platinum, nickel, chromium, aluminum salts)  
Miscellaneous chemicals (formaldehyde, ammonium thioglycolate, monoethanolamine, hexamethylenamine, extract of henna)  
Other pharmacologic agents (piperazine, methyldopa [Aldomet], sulfonechloramide)  
Wood dust (eg, western red cedar)

*Adapted from Bernstein.<sup>5</sup>*

**Peak expiratory flow rate meters can be used to demonstrate fluctuations in airway limitation during and away from work.**

**Table 3. Factors to consider in differential diagnosis of occupational asthma**

Preexisting asthma
Chronic obstructive pulmonary disease
Industrial bronchitis (ie, exposure to irritants)
Endotoxin-induced pulmonary syndromes (eg, "grain fever," byssinosis)
Bronchiolitis obliterans

*Adapted from Bernstein.<sup>5</sup>*

cur on return to the work environment. Determining whether coworkers are experiencing similar symptoms is always an important aspect of the occupational asthma evaluation.<sup>2</sup>

**HISTORY TAKING**—By federal law, Material Safety Data Sheets must be accessible to employees in their work areas. This information should be carefully reviewed to determine whether the patient is exposed to materials or agents that could be causing asthma, and the work process should be thoroughly investigated to determine the extent of exposure. Industrial hygienists are often a useful resource. They may help

explain the work process and exposure thresholds to various chemical agents and can provide air sampling measurements from different areas of the work site, which are mandated by Occupational Safety and Health Administration regulations.<sup>2</sup>

**PHYSICAL EXAMINATION**—Although a thorough examination should be performed, results are often normal (depending on how long the patient has been exposed).<sup>2</sup>

**OBJECTIVE TESTING**—Such evaluation is essential in confirming a diagnosis of occupational asthma. Skin testing for common environmental aeroallergens should be performed to document whether a patient is atopic, especially if the occupational exposure is to high-molecular-weight compounds, such as animal and plant proteins. In some instances, radioallergosorbent testing or enzyme-linked immunosorbent assays are useful in measuring specific IgE or IgG responses to low-molecular-weight hapten-protein conjugates.<sup>3</sup> However, these tests only document an immune response and may be positive in exposed, asymptomatic workers.

Pulmonary function testing can be very useful, especially if it is performed over a period of several work days at the work site

before and after exposure. Few companies have medical facilities equipped with spirometers. However, peak expiratory flow rate meters are inexpensive, portable, and easy to operate and can demonstrate fluctuations in airway limitation during and away from work.<sup>2,3</sup> Ideally, at least a 2-week period of monitoring peak expiratory flow rates is necessary to obtain accurate trends.<sup>3</sup> Patients should be instructed to document their medication use during the monitoring period.

Methacholine chloride (Provocoline) challenge testing may be necessary to document nonspecific bronchial hyperreactivity in patients with normal baseline forced expiratory volume in 1 second or without significant reversal of this volume after bronchodilator administration. Methacholine challenge may also be used to monitor patients' bronchial hyperresponsiveness after they have left the work environment.<sup>2,3</sup>

If the diagnosis is still in doubt, a specific bronchoprovocation challenge may be necessary. Such tests must be performed in a controlled outpatient hospital setting where emergency care is readily available. Because these tests are fraught with technical difficulties, they should be performed only by professionals who are experi-

*continued on page 117*

**When occupational asthma is diagnosed, patients must be removed from the work environment to avoid long-term exposure.**

**Table 4. Diagnostic approach to occupational asthma**

History taking and physical examination
Skin testing if appropriate antigens are available
Radioallergosorbent test and enzyme-linked immunosorbent assays for specific IgE and IgG antibodies
Pulmonary function testing (preferably at work, before and after working a normal shift)
Peak expiratory flow rate monitoring over a 2-week period during and away from work
Methacholine chloride (Provocholine) challenge testing to document nonspecific bronchial hyperreactivity
Specific bronchoprovocation challenge testing for offending agent

*Adapted from Chan-Yeung and Lam,<sup>1</sup> Bernstein and Bernstein,<sup>2</sup> and Bernstein and Cohn.<sup>3</sup>*

enced with the proper techniques and protocol.<sup>3</sup> Specific bronchoprovocation challenges are usually reserved for demonstrating the causal effect of an occupational agent that has not been previously documented in the medical literature or for medicolegal purposes in a worker who is eligible for workers' compensation or disability benefits because of occupational asthma.<sup>1-3</sup> These challenges have been particularly useful in evaluating low-molecular-weight compounds, such as diisocyanates.<sup>2</sup> Table 4 summa-

rizes the overall diagnostic approach to occupational asthma.

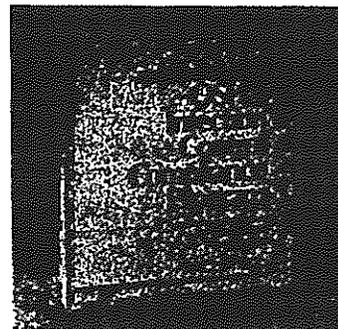
#### **Treatment and prevention**

When occupational asthma has been diagnosed, patients must be removed from the work environment to avoid long-term exposure. In some cases, they may be able to relocate to a work area where they are not at further risk for exposure.

Treatment of acute asthmatic flares or chronic asthma induced by work exposure is similar to that of conventional asthma.

*continued*

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**Jonathan A. Bernstein, MD**

Dr Bernstein is an instructor of clinical medicine, division of immunology, department of internal medicine, University of Cincinnati College of Medicine. His research interests include occupational asthma, human seminal plasma hypersensitivity, and allergic disorders in patients with human immunodeficiency virus infection.

Beta<sub>2</sub> agonists, theophylline preparations, cromolyn sodium (Intal), and inhaled and systemic corticosteroids have all been useful in various combinations, depending on the severity of symptoms. However, medications should not be used in lieu of avoidance measures.<sup>1,2</sup> In general, masks and respirators used by workers who remain at the work site have not prevented

the progression of occupational asthma.<sup>1,2</sup>

Ideally, occupational asthma is prevented through cooperation of management and labor in organizing comprehensive screening programs capable of detecting and monitoring workers who are exposed to known problematic agents. No host factors have been shown to consistently predispose to occupational asthma, but atopic patients are more readily sensitized to high-molecular-weight compounds than are non-atopic persons. However, in many cases, atopy does not pose an increased risk of occupational asthma in persons exposed to low-molecular-weight agents.<sup>1</sup> A past or existing history of smoking is a variable risk factor for occupational asthma. For example, one study<sup>4</sup> of occupational asthma induced by western red cedar dust found that the disease was significantly *more* likely to occur in nonsmokers than in smokers.

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#### Summary

**Future well-organized epidemiologic studies may enhance our understanding of the risk factors, prognosis, and natural course of asthma caused by a variety of inciting agents found in the workplace. Until such studies are completed, employees should be educated regarding exposure to hazardous chemicals, and strict safety measures should be enforced to prevent large spills of chemicals and other unnecessary risks. PCMA**

---

Earn credit on this article.



See CME Quiz.

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Address for correspondence: Jonathan A. Bernstein, MD, Division of Immunology, Department of Internal Medicine, University of Cincinnati College of Medicine, 231 Bethesda Ave, Mail Location 563, Cincinnati, OH 45267-0563.

## How can I protect my Lungs?

**STOP** Read warning labels and follow them!

**STOP** Wear gloves to keep your skin safe from burns. Sometimes skin contact with a chemical can cause allergies.

**STOP** Leave windows and doors open, or use a fan to keep the air fresh.

**STOP** Keep cleaners in the containers they came in.

**STOP** Read the MSDS (Material Safety Data Sheets) for the chemicals you work with.

**STOP** Watch out for small rooms, confined spaces and poor ventilation/air flow!

### Watch Out for These

**Warning Signs!**  
*Warning Signs!*  
**Warning Signs!**

If you have **ANY** of these problems, talk to your doctor. These breathing problems are not normal!

-  **WHEEZING**
-  **CHEST TIGHTNESS**
-  **COUGH**
-  **SHORTNESS OF BREATH**

## What Can My Doctor Do . . . To Check My Lungs?

-  Breathing Tests at the Doctor's office
-  Peak Flow Meter you use to test your own breathing

### How Can I . . . Get More Information?

Call your doctor.

Read the MSDS.

Go to [www.getastmahelp.com](http://www.getastmahelp.com) or call

**1.866.EZ LUNGS (1.866.395.8647)**

### Keep This Number Handy . . . In Case Of An Emergency



Poison Control:

**1.800.222.1222**

### IT'S ALWAYS BETTER TO BE SAFE

If you have any doubt about a chemical you are working with or were exposed to, even if you weren't the person doing the cleaning, contact your doctor.

**It's better to protect your lungs now, than having to live with breathing problems for the rest of your life.**



**Asthma & Cleaning Agents**  
what you need to know!



MICHIGAN STATE  
UNIVERSITY

MICHIGAN STATE UNIVERSITY  
COLLEGE OF HUMAN MEDICINE  
DEPARTMENT OF MEDICINE

117 West Fee Hall ■ East Lansing, MI 48824  
[www.chm.msu.edu/oem](http://www.chm.msu.edu/oem)

## Can Cleaners Cause Asthma?

**YES, they can!**

You might not expect it, but chemicals we use to clean at work can cause asthma. This is what happened to some people in their jobs:

**A Cashier** had trouble breathing about two hours after she cleaned up a spill of drain cleaner at the supermarket where she worked. She had to stay at the hospital for 3 days to get her breathing under control. The Doctors told her she got asthma from that spill. **One year later she still had asthma.**



**A Housekeeper** at a hotel noticed she had trouble breathing when she used window cleaner, bathroom cleaner or bleach. Her Doctor told her she had asthma from her job. Sometimes her breathing was so bad she had to go to the emergency room and once she had to stay at the hospital.

**Three years later she still had asthma.**

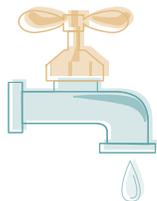
**A Hospital Worker** got asthma about two years before she started her new job as an anesthesia aide. Four months after starting her new job, her breathing became worse, especially when she was around floor wax, sterilizing chemicals, bleach, deodorizers and air fresheners. Her main job was cleaning the tools used by the

anesthesiologists in a small room with poor air flow. She had to go to the emergency room more than 20 times the year she had that job. Her doctor told her to quit her job and a year later she did. **She still had asthma after she quit, but her breathing trouble was not as bad.**

**Here is how to avoid getting sick from using cleaners:**

**DO NOT USE** different products together—watch out for left-over cleaner in buckets, on rags and on sponges.

**DO NOT USE** a cleaner at **Full Strength** when the instructions say to **DILUTE** with water. It's important to always read the label.



Sometimes, a person can get an allergy to a cleaner just by using it regularly.

### **NEVER MIX CLEANERS**

Mixing Bleach and Ammonia  
or  
Mixing Bleach and Acid

**MAKES POISONOUS FUMES**



**Who Can Be Affected?**

All sorts of workers use cleaners, like janitors, office workers, and hospital workers. We need cleaners to disinfect surfaces and control mold and dust. But some people who work with those same cleaners, or work in areas where cleaners are used can get breathing problems from them.

**Here are some jobs where you might be exposed to cleaners:**

#### **TYPE OF CLEANER**

#### **TYPE OF JOB**

Carpet Cleaner,  
Floor Wax  
Stripper

Janitor, Teacher,  
Office Worker,  
Health Care Worker,  
Maid

Disinfectant

Nurse, Restaurant  
Worker

Toilet Cleaner,  
Glass Cleaner

Housekeeper,  
Hotel Maintenance,  
Janitor

# TRUCK BED LINERS WORKER PROTECTION

## WORKER PROTECTION

Truck bed lining products have protected vehicles from wear and tear over many years through the application of polyurethane, polyurea or polyurea hybrid systems. This brochure addresses worker protection during the application of spray-on truck bed liners. Though the spray application of these products protects the truck bed, the actual spraying of the truck bed liner requires specific handling and care.

Whether it is polyurethane or polyurea, virtually all these products use MDI (methylene diphenyl diisocyanate), a material that belongs to the class of chemicals known as diisocyanates. Diisocyanates such as MDI have been known to cause irritation of the eyes, nose, throat, lungs and skin. They can also cause allergic reactions (sensitization) of the skin and lungs. The Material Safety Data Sheet (MSDS) of the product will provide a list of potential health effects and their symptoms. When atomized or heated, the potential for exposure to MDI is higher.

The potential exists for developing occupational asthma if over-exposed when working with MDI. Symptoms of asthma include wheezing, shortness of breath, tightness of chest and coughing. If you experience any of the mentioned symptoms, and you work with spray-on truck bed linings, continued exposure to diisocyanates may be very harmful to your health. For instance, authorities in Michigan recently investigated the death of a worker in his mid-forties who died from an acute asthmatic attack after applying a diisocyanate-containing spray-on truck bed liner to the interior of a van. If you have health concerns, stop work immediately. In some circumstances, OSHA regulations require that you see a doctor to determine if your health is at risk. Under these OSHA regulations, your employer must provide or pay for this examination.



\* These precautions are not all-inclusive, and do not identify all the safety measures or legal requirements that may apply at your particular worksite. Consult the supplier's MSDS, the websites provided in this pamphlet, and the laws that apply to your worksite for additional information.

This bulletin was developed by the Alliance for the Polyurethanes Industry (API), a business unit of the American Plastics Council. It is intended to briefly summarize the current state of health hazard and safety information associated with the application of polyurethane truck bed liners. It is not intended to provide specific legal or technical advice, nor to endorse specific polyurethane proprietary products or processes, and is made WITHOUT WARRANTY, EXPRESSED OR IMPLIED AS TO MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, OR ANY OTHER MATTER. Persons applying polyurethane truck bed liners should consult with their own technical and legal advisors and other appropriate sources of safety and handling information, including information from product suppliers, product labels, technical bulletins, MSDSs, and other sales literature.

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## WORKER PROTECTION CONT.

During the examination, tell your doctor about the symptoms and let him or her know that you have been working with or are intending to work with a diisocyanate-containing product. If diisocyanate sensitization or occupational asthma is diagnosed, or if your doctor does not clear you to work with diisocyanates due to poor respiratory function, any contact with diisocyanates, even very small amounts, may create a serious risk to your health.

Contact with very small amounts of MDI can cause an asthmatic reaction in those who are sensitized. If you become sensitized and continue to work with MDI or other diisocyanates, your underlying asthma may worsen and at some point may become life-threatening, even if you use a respirator or use an inhaler to temporarily relieve asthma symptoms.

Anyone who is not asthmatic or sensitized to diisocyanates and is cleared by a physician to work with these materials can help minimize the potential risks of exposure to MDI by keeping in mind a few simple precautions.



## SAFETY PRECAUTIONS\*

1. Carefully read and follow all safety precautions listed on the product label and Material Safety Data Sheet (MSDS). The MSDS will describe proper first aid procedures in case of accidental exposure.
2. OSHA regulations require employers to provide respirators where necessary to protect the health of employees. (see 29 CFR 1910.134). Supplied-air respirators can protect employees from exposure to MDI during spray application and may in fact be necessary to meet OSHA or other governmental workplace requirements.
3. To prevent contact of the product with your skin or eyes, you should wear gloves, eye protection, and other protective clothing when appropriate or required (e.g., under OSHA regulations).
4. Appropriate ventilation can help minimize risks:
  - a. Use of ventilated enclosures helps contain any exhaust spray mists and vapors developing during spraying. Exhaust filters and stacks help minimize exposure to people outside the building.
  - b. A regular ventilation system preventive maintenance program will help you change filters regularly and maintain airflows.
  - c. Ventilated enclosures, when properly maintained and operated at the appropriate air flow rates, help to control airborne diisocyanate concentrations inside the enclosure and help prevent the escape of vapors and mists into the surrounding work area.
5. Testing the air after application will help determine when you can enter the enclosure without being exposed to potentially harmful levels of MDI.
6. As applicable, comply with training and other OSHA Hazard Communication Standard (29 CFR 1910.1200) requirements.  
<http://www.osha.gov/SLTC/hazardcommunications/standards.html>
7. Setting up a spill clean-up plan will help you quickly clean up the product if a spill or leak occurs. Protecting people first, then minimizing environmental releases and protecting property and product, will help prevent people from being exposed to potentially harmful levels of MDI.
8. Keep in mind that inhaling smoke or vapors from welding, torch-cutting or any other hot process that blisters, chars or burns the bed lining, whether freshly applied or fully cured, may be dangerous to your health.
9. Remember that resealing the diisocyanate container when it has become contaminated with moisture could cause the container to swell and potentially rupture with explosive force.
10. Periodic medical monitoring of workers, including pulmonary function testing, will help determine medical fitness to continue working with MDI.
11. Be aware that there may be other federal, state and local regulations that apply to the operations at your worksite beyond those mentioned in this document.

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# WOOD DUST AND OCCUPATIONAL ASTHMA



## WOOD DUST CAN BE HAZARDOUS

Thousands of Californians work with wood every day. Exposure to wood dust is common in many industries. For example, you may be exposed to wood dust if you work in a furniture or cabinet-making shop, construction, logging, a sawmill, a paper mill, or a plant that makes plywood, particle board, or fiberboard.

Breathing wood dust can cause a variety of health problems. One of the most serious is occupational asthma. Asthma is a lung condition that causes chest tightness, breathing difficulty, cough, and wheezing. It can be disabling and, on rare occasions, fatal. When caused by conditions on your job, it's called *occupational* asthma.

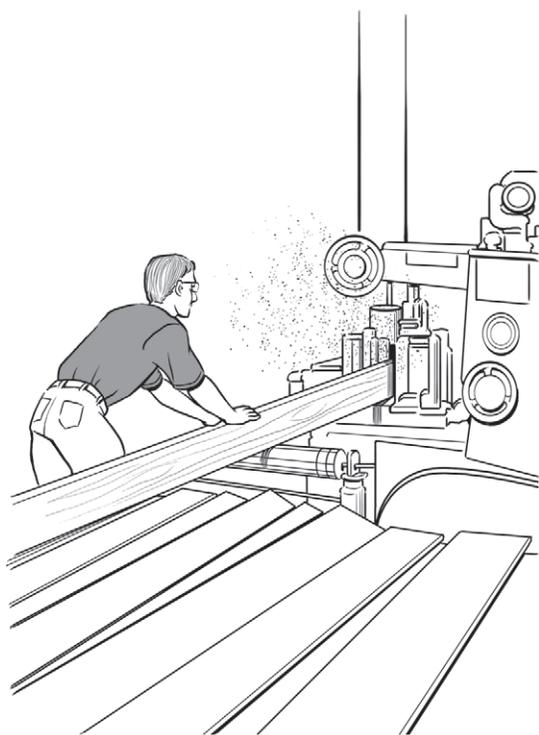
Occupational asthma is preventable. If you work with wood, the key is to keep your exposure to wood dust as low as possible. This factsheet will show you how.

Besides occupational asthma, wood dust also has other hazards which are not covered here. Dust from woods such as oak, mahogany, or ash can cause nasal cancer as well as irritate your skin and eyes. Wood dust is also combustible and may explode if exposed to heat or flames.

### What's Inside?

- Symptoms of Asthma
- Woods That Cause Asthma
- Preventing Exposure
- Respirators
- Cal/OSHA
- Your Right To Know
- Exposure Limits
- Other Hazardous Substances
- Information and Help

## ONE WORKER'S STORY



A mill worker developed occupational asthma after working with California redwood for five years. His regular job was to work redwood with a planing machine and stack the wood.

Eventually he began to experience wheezing and shortness of breath. These symptoms often cleared up during weekends and vacations, but became worse during the work week.

Not only was the mill worker exposed to dust directly when cutting wood, but his entire work area also had a lot of wood dust around. Ventilation was poor. He was never trained about the health hazards of wood dust and how to protect himself.

After the mill worker was diagnosed with asthma, he underwent seven months of medical treatment. However, he still was not able to work around wood dust.

## SYMPTOMS OF ASTHMA

You may have occupational asthma if you work around wood dust and develop these symptoms:

- Wheezing
- Tightness in the chest
- Cough
- Shortness of breath.

Symptoms can show up within a few months after you are exposed to wood dust, or they may not appear until you have been exposed for several years. You may first notice symptoms after you leave work each day. Often the symptoms clear up before you return to work the next day. They usually worsen during the work week and get better or disappear during weekends and vacations.

If you have any of these symptoms, talk to your employer, union, or doctor right away. In some cases, your doctor may limit your exposure or tell you that you can no longer work around wood dust.

Workers with occupational asthma may have severe symptoms if they come in contact with even a tiny amount of wood dust. Early diagnosis of occupational asthma and removal from exposure can prevent your asthma from getting worse.

## DOES ALL WOOD DUST CAUSE ASTHMA?

Most types of wood dust can irritate your lungs and cause other breathing problems. Sometimes wood dust can cause asthma or make it worse. Some woods contain chemicals that make allergic reactions like asthma more likely. A few common examples are California redwood, teak, Western red cedar, oak, and ash.

Wood from some parts of a tree can be especially hazardous. The chemicals known to cause asthma are generally found in the inner parts of the tree, called the heartwood.

The hazard depends on the amount of wood dust that gets in the air, the size of the dust particles, the type of wood, the levels of asthma-causing substances in the wood, the additives in the wood, how long you are exposed to the dust, and your own body's resistance.

Unfortunately, even with woods that are known to cause asthma, there is very little information about how much exposure can make you sick. With many imported woods (such as those from Africa, South America, and Asia) there is even less information about health hazards. Therefore, protection from these wood dusts is especially important because we don't fully understand their ability to cause asthma.

## WHAT TASKS EXPOSE WORKERS TO WOOD DUST?

You are at risk of breathing large amounts of wood dust whenever wood is being cut, worked, or finished. The dust particles released are so fine they can easily be inhaled.

For example, dust can be a problem when:

- Sawing
- Routing
- Turning
- Planing
- Drilling
- Sanding
- Repairing machines.

You can also be at risk when:

- Cleaning with compressed air
- Dry sweeping
- Disturbing dust on machines during maintenance work.



# PREVENTING EXPOSURE IS BEST

The best protection from wood dust is to keep it out of the air in the first place. The law says that your employer must take steps like these to reduce your exposure:

**Substitution.** If feasible, use woods that are less likely to cause asthma.

**Enclosure.** Run machines inside an enclosure to decrease dust in the air.

**General ventilation.** Install good room ventilation. To be effective, ventilation systems must be designed and installed by trained professionals. Ventilation equipment such as filters and ducts must be checked often and properly maintained. If there is no ventilation system, see if there is a way to work outdoors.

**Local exhaust ventilation.** Equip woodworking machines, portable hand tools, and portable power tools with vacuum or exhaust systems that capture the dust at the source, before it can reach your breathing zone. Vacuum attachments with high efficiency particulate air (HEPA) filters are available for many tools.

**Proper tool maintenance.** Keep cutting tools sharp. As they become dull, they may release more dust particles into the air.

**Good work practices.** Be aware of how much dust is being produced. You may need more protection when you are working wood at high speed or perpendicular to the grain. For example, machine sanding causes more dust exposure than hand sanding because a larger area can be sanded in the same time. Cutting perpendicular to the grain produces more dust than cutting parallel to the grain.

**Good housekeeping.** Keep surfaces and floors free of wood chips and dust. Don't just brush off your clothing, skin, or surfaces or dry sweep floors. Don't use compressed air either. This will put more dust into the air. Instead, use wet clean-up methods (for example, wipe surfaces with a wet rag). Or use a vacuum cleaner with a HEPA filter.

**Good personal hygiene.** Wash up thoroughly and clean clothing after exposure to wood dust. Vacuum dust from your body and clothing when washing facilities are not available.

**Proper waste disposal.** Bag and seal wood dust waste since the dust can easily be released into the air.

**Training.** Train workers in the correct use and maintenance of equipment.



## UNDERSTANDING RESPIRATORS

If you work in an area with high levels of wood dust, you may need a respirator. A respirator is a facepiece that provides you with clean air when you work around dust or chemicals. If your respirator fits well and works right, it can greatly reduce the amount of dust that you breathe.

For wood dust, you will probably be given a respirator that uses filters to clean the air. These respirators come in two styles. A half-face respirator just filters the air. A full-face respirator also provides eye protection.

Filters are not all the same. It is your employer's responsibility to give you the right respirator and filter for the job. Use only respirators and filters that have been approved by the National Institute for Occupational Safety and Health (NIOSH). Nonapproved paper dust masks (also called comfort masks) provide little protection. However, some approved half-face respirators look similar to nonapproved dust masks. Always look on the respirator for the NIOSH label.

Some respirators are disposable, but with others you can just replace the filter cartridges. If you have trouble breathing through your respirator, it may be clogged. Change the filters or the entire respirator immediately.



HALF-FACE



FULL-FACE

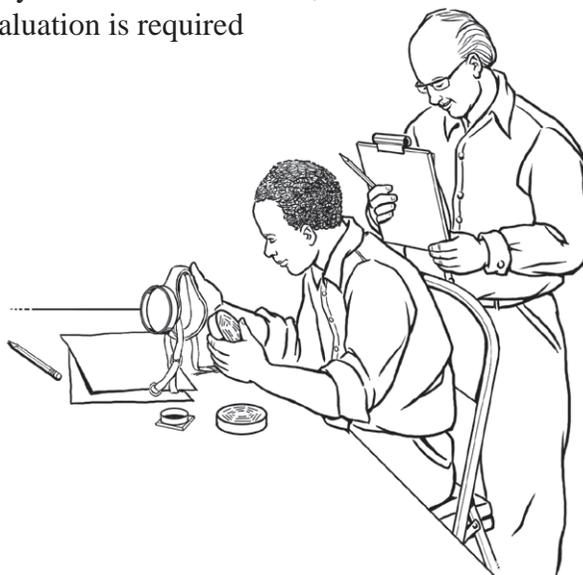
## WEARING A RESPIRATOR

You should wear a respirator only as a last resort if other safety measures don't give enough protection. If you are given a respirator to use, the law says you must also be given:

**A medical evaluation.** Respirators are not safe for some people. They can make your lungs and heart work harder. This can be dangerous for anyone with heart trouble, asthma, or other breathing problems. A medical evaluation is required to make sure you can wear a respirator safely.

**A fit test.** A trained person must make sure your respirator is the right size, fits tightly to your face, and doesn't leak.

**Training.** Your employer must explain what type of respirator you have been given, what it does, and how to put it on. You must be shown how to inspect your respirator for damage, how to clean it, and how to store it properly so it is not crushed.



# WHAT IS CAL/OSHA?



California law says that every worker has the right to a safe and healthy workplace. The Division of Occupational Safety and Health, usually called Cal/OSHA, is the state agency that enforces this law. It covers most workers in California, including those in private industry and those who work for state, county, and city governments.

Cal/OSHA has many workplace health and safety regulations, which are called standards. For example, there are standards that require employers to:

- Provide necessary personal protective equipment and training.
- Limit workers' exposure to chemicals, noise, and other hazards.
- Keep machines safe and in good condition.
- Set up an Injury and Illness Prevention Program (IIPP).
- Take steps to prevent repetitive strain injuries (RSIs) and other ergonomic problems.

If you think there is a health and safety hazard on your job, ask your employer about it first. You can also contact Cal/OSHA or your union (if you have one) to get information or make a complaint. Cal/OSHA will not tell your employer who made the complaint. The law says you can't be fired or punished for making a complaint.

Cal/OSHA may send an inspector to your workplace. If there are violations, your employer will be required to correct them and may have to pay a fine.

Employers with questions about wood dust or other workplace hazards can get advice from the Cal/OSHA Consultation Service.

## YOUR RIGHT TO KNOW

According to Cal/OSHA, you have the **right to know** about any hazardous substances on your job. All wood dust, regardless of type, is considered hazardous and is covered by Cal/OSHA's Hazard Communication standard (Title 8, California Code of Regulations §5194). The standard can be viewed on the web at [www.dir.ca.gov](http://www.dir.ca.gov).

Under this standard, your employer must give you information and training about wood dust, its health effects, and how to protect yourself. Your employer may also have a **Material Safety Data Sheet (MSDS)** for wood dust. The MSDS gives information about the hazards of the dust. You have the right to see the MSDS and to make a copy. Unfortunately, MSDSs may be hard to read and may have incomplete or inaccurate information.

If you have any questions about wood dust, you can also ask your employer, your union, or your company health and safety representative.

## EXPOSURE LIMITS

Cal/OSHA sets a limit on the amount of wood dust in the air at work. Your employer must make sure your exposure does not exceed five milligrams of wood dust per cubic meter of air (5 mg/m<sup>3</sup>). This is called the **Permissible Exposure Limit (PEL)**. It refers to average exposure over an eight-hour work day. Therefore, your exposure may be above the PEL at times, but only if it is below the PEL at other times. There is a special PEL for Western red cedar (2.5 mg/m<sup>3</sup>) because it is considered more toxic than many other types of wood. Cal/OSHA also has other exposure limits for wood dust.

Keeping exposure below the PEL will protect the health of most people, but not everyone. For example, it may be unsafe for you to be exposed to even very small amounts of wood dust if you already have asthma or certain other medical conditions.

The only reliable way to know your exposure level is to measure the amount of dust in the air while you are working. This is called air monitoring. You can't accurately judge your exposure just by looking at the amount of dust around. Some dust particles are very small and almost invisible. And you can't judge your exposure by how hard it is to breathe. You might have high exposure without noticing any immediate breathing trouble.

In many cases, your employer is required to do air monitoring. You have the legal right to see and copy the monitoring results. The air monitoring must be done by a qualified person.

## OTHER HAZARDOUS SUBSTANCES

You may be exposed to many other hazardous substances while working with wood. These grow on wood or are used to treat or finish it. They include:

- Molds and fungi
- Resin binders
- Pesticides
- Paint stripper
- Glues and adhesives
- Waterproofing compounds
- Paints, lacquers, and varnishes
- Sealants, dyes, and bonding agents.

Some of these substances can cause skin, eye, and lung irritation, allergic reactions, and other health problems. Some can also cause occupational asthma. Your employer must train you about the health hazards of these substances and appropriate work practices. Your employer must also give you the proper protective equipment such as safety goggles, gloves, and a respirator.



# INFORMATION AND HELP

**Occupational Health Branch (OHB).** This program, a part of the California Department of Health Services, provides information on workplace health hazards to workers, employers, and health professionals in California. OHB has many publications on work-related hazards.

Office phone: (510) 622-4300 [www.dhs.ca.gov/ohb](http://www.dhs.ca.gov/ohb)

**Hazard Evaluation System and Information Service (HESIS).** This unit in OHB has many free publications available. Call and leave a message to request publications or information on specific chemicals and other workplace health hazards.

Hazard Helpline: (510) 622-4317 [www.dhs.ca.gov/ohb/hesis](http://www.dhs.ca.gov/ohb/hesis)  
Publications: (510) 622-4328

**Cal/OSHA.** This agency gives information, responds to confidential health and safety complaints, and inspects workplaces. To make a complaint, contact your local Cal/OSHA enforcement office. The Cal/OSHA Consultation Service offers free advice to employers (not related to enforcement).

Complaints: Check local phone book [www.dir.ca.gov/dosh](http://www.dir.ca.gov/dosh)  
Consultation: (800) 963-9424

**Labor Occupational Health Program (LOHP).** This program at the University of California, Berkeley issues publications, gives free advice, and has a library open to the public.

Office phone: (510) 642-5507 [www.lohp.org](http://www.lohp.org)

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This booklet was developed by staff of the Occupational Health Surveillance and Evaluation Program (OHSEP), Occupational Health Branch, California Department of Health Services (Jacqueline Chan, M.S., M.P.H., Project Industrial Hygienist and Robert Harrison, M.D., M.P.H., Chief, OHSEP) and Labor Occupational Health Program (LOHP), Center for Occupational and Environmental Health, School of Public Health, University of California, Berkeley (Elaine El-Askari, M.P.H., Project Director and Robin Baker, M.P.H., LOHP Director).

We thank the numerous others who assisted with preparation of this publication by providing valuable input and review.

First edition, January 2004. This publication may be copied in its entirety for free educational use, provided full credit to the authors and publishers is given.

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# Removing Graffiti Safely



## About This Booklet

This is a booklet for workers who use chemicals to remove graffiti. Many workers in California use graffiti removal products daily. They may be painters, laborers, custodians, bus cleaners, phone booth cleaners, or others. Some workers remove graffiti as one small part of their jobs, but others do so for the entire work day. The products used to remove graffiti, and the job conditions, can be hazardous to your health and safety.

This booklet will help you understand these hazards. It was prepared by the Occupational Health Branch of the California Department of Health Services and the Labor Occupational Health Program at the University of California, Berkeley.

### What's Inside?

- Chemicals Can Be Hazardous
- Health Effects of Chemicals
- Chemicals in Graffiti Removers
- Your Right To Know
- Other Hazards
- Respirators
- Personal Protective Equipment
- Cal/OSHA
- Information and Help
- Checklist

## One Worker's Story

A school custodian developed occupational asthma from using cleaning products to remove graffiti. He had been using these products up to four hours every day. Sometimes he worked in tight spaces, such as bathroom stalls and stairways, where there was not much airflow. After a while, he began to have symptoms such as wheezing, coughing, and tightness in his chest.

Now that he has asthma, the custodian cannot use any graffiti removal product without getting very sick. He can no longer work removing graffiti. He had never been told what chemicals were in the cleaning products, their health effects, or how to use them safely.

## Chemicals Can Be Hazardous

Most products used to remove graffiti contain harmful chemicals. These products may be liquids or solids. Liquids include cleaning solutions in bottles, in sprays, or in special towels that come pre-soaked with chemicals. Solids used to remove graffiti are usually in the form of a paste.

## How Chemicals Get Into Your Body

Chemicals can get into your body in four main ways:

### Breathing (Inhalation)

Chemicals can get into the air from a product you are using. You then breathe their vapors or fumes. You may be breathing chemicals even if you can't see or smell them.

From your lungs, chemicals can get into your blood. They then travel to many organs in your body, where they can cause damage.

You may remove graffiti in confined areas with little air movement, such as inside buses. It is easier for chemicals to increase to a harmful level in the air inside an enclosed area.





in

You may accidentally get chemicals on your skin. Even if you wear gloves or protective clothing, they can get soaked with chemicals, which can get through to your skin. Chemicals can also get onto your skin when you are removing wet gloves or clothing.

Chemicals can be absorbed into your body through your skin. Some chemicals go through the skin very fast, and others slowly. Your blood then carries the chemicals throughout your body. Some chemicals can hurt your skin itself. They can cause irritation or serious burns.

## Eyes

Your eyes can be seriously injured by chemicals. Chemicals may splash into your eyes, or you may accidentally touch your eyes when you have chemicals on your hands. Chemical vapors in the air can also harm your eyes. If you remove graffiti outside and it's windy, the wind can blow chemicals into your eyes. If you remove graffiti overhead, chemicals can drip into your eyes.



## Swallowing (Ingestion)

Sometimes people swallow chemicals that have gotten into their food or drink, or onto their cigarettes. You may swallow chemicals if you eat, drink, or smoke without washing your hands.

### Can You Tell By the Smell?

**NO!** Don't depend on smell to tell you if a product is safe or unsafe. Many chemicals are very toxic even though they have no odor or smell good. Other chemicals have a strong smell but are fairly harmless.

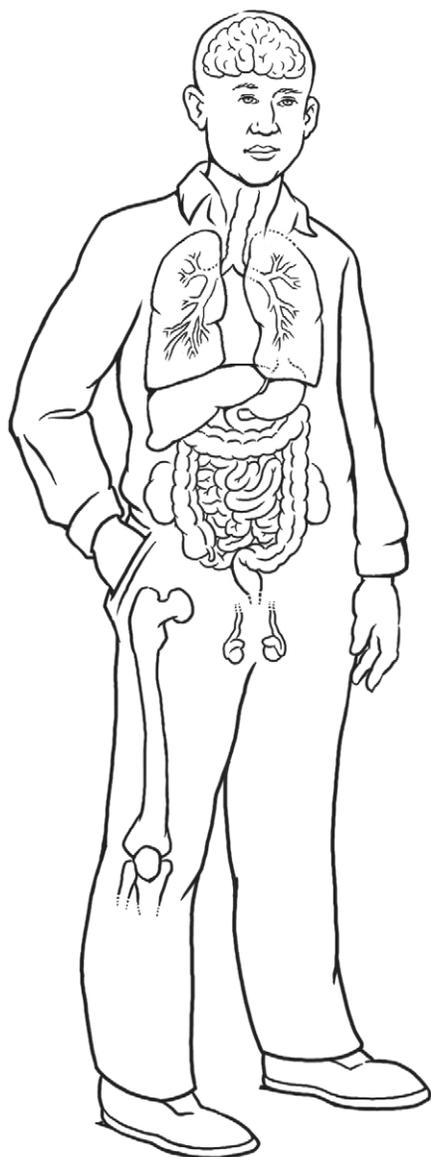
Some people have a better sense of smell than others. Also, you may get used to the odor. You may lose your ability to smell certain chemicals if you are around them for a while.

# What Can Chemicals Do To You?

Many chemicals can hurt your body. With some chemicals, a small amount can harm you. These chemicals are said to be very toxic. With other chemicals, it takes a much larger amount to harm you. These are said to be less toxic.

Effects of chemicals can be either **short term** or **long term**. Some chemicals cause symptoms right away (like a burn or a cough). Other chemicals damage your health slowly. You can use them for months, or even years, before symptoms show up.

Graffiti cleaners can harm many different parts of your body, depending on the particular chemicals they contain. Here are a few examples. Some of the symptoms listed here may be warning signs of more serious health problems. If you feel these effects, get medical advice.



**Brain and Nervous System.** Vapors of some chemicals can cause headache, dizziness, drowsiness, lack of coordination, or nausea.

**Eyes.** Some chemicals can burn your eyes or cause redness, watering, or itching.

**Skin.** If you get certain chemicals on your skin, they can cause redness, itching, dryness, cracking, flaking, or burns.

**Nose, Throat, and Lungs.** Some chemical vapors can cause a runny nose, scratchy throat, coughing, or shortness of breath. A few can cause asthma and other allergies. If you become allergic to a particular chemical, you may have an allergic reaction every time you use it.

**Blood-Forming System.** One class of chemicals, ethylene glycol ethers, can damage the bone marrow, where blood cells are formed. They can also damage the red blood cells themselves. This can cause anemia.

**Liver and Kidneys.** A few chemicals can cause permanent liver and kidney damage.

**Reproductive System.** Some chemicals can damage eggs and sperm, or cause birth defects. This is not common.

**Cancer.** Certain chemicals, such as methylene chloride, can cause cancer.

## Some Dangerous Chemicals in Graffiti Removers



**D-limonene.** Can cause eye, nose, and throat irritation, skin allergies, and dermatitis.

**Ethylene Glycol Ethers.** Can damage sperm, cause birth defects, and harm the blood-forming system. Easily absorbed through the skin. Can also cause nose and throat irritation. Other glycol ethers are much less harmful.

**Isocyanates.** Found in some anti-graffiti coatings. May cause nose and throat irritation. Powerful cause of asthma and skin allergies.

**Methylene Chloride.** Can cause cancer. Can cause eye, nose, throat, and skin irritation, headache, loss of balance, and other brain effects. High exposure can cause liver and kidney damage. Changes to carbon monoxide in the blood, lowering the blood's ability to carry oxygen.

**Methyl Ethyl Ketone (MEK).** Can cause eye, nose, and throat irritation, headache, loss of balance, and other brain effects.

**N-methylpyrrolidone.** Suspected to cause reproductive problems and harm unborn children. Skin contact can cause swelling, blistering, and burns.

**Toluene.** Can cause eye, nose, and throat irritation, skin irritation and dermatitis, headache, loss of balance, and other brain effects.

## Your Right To Know

How can you find out what chemicals are in a product? According to California health and safety regulations, you have the **right to know** about the chemicals you work with. Your employer must, by law, give you information about these chemicals, their health effects, and how to protect yourself.

Whenever you work with chemicals, your employer must give you training about their hazards and must make sure that all containers are labeled with chemical names and hazard warnings. Your employer must also have a **Material Safety Data Sheet (MSDS)** for each chemical product used. An MSDS gives information about the ingredients and hazards of the product. You have the right to see the MSDS and to make a copy.

Unfortunately, MSDSs can be hard to read and may have incomplete or inaccurate information. Sometimes manufacturers don't list all ingredients because they consider them "trade secrets." Also, MSDSs can quickly get outdated because product formulas change. Make sure you have the most recent MSDS.

For other sources of information on chemical products, see "Information and Help" on page 9.

## Other Hazards

Besides chemicals, you can face other hazards when removing graffiti. Here are a few.

**Repetitive Stress Injuries (RSIs).** When you remove graffiti, you may spend a lot of time standing, bending, reaching, scrubbing, and repeating the same motions over and over. These activities can cause fatigue, pain, numbness, or tingling in your hands, wrists, elbows, shoulders, neck, back, feet, and legs.

Over time, you may develop a painful RSI, which can even cause permanent disability.

You can often prevent RSIs by using better equipment, such as longer handles or padded grips. Also try working in a better position or taking frequent breaks to stretch.



**Fall Hazards.** Graffiti is often located on the sides of buildings, on freeway overpasses, or in other areas that are hard or dangerous to reach. Even working on a ladder can pose a serious fall hazard.

Sometimes you may need fall protection. This can include another person working with you, a safety belt, harness, and lifeline.

You must be trained to work with fall protection equipment before starting the job. State regulations also require your employer to use only approved equipment and to keep it in good condition.

**Lead.** Before you remove graffiti from painted surfaces, your employer should test the underlying paint to find out if it contains lead. If lead is present, it is illegal to disturb the paint without special precautions and special training. Some removal methods, such as sanding, soda blasting, and pressure washing are especially dangerous.

**Noise.** To remove graffiti you may use soda blasting or hot water pressure washing. The high noise levels from these machines can damage your hearing. You may not notice hearing loss right away because it usually happens slowly over a period of time. You should wear hearing protection if you work in noisy conditions.

**Heat.** Working in hot temperatures puts you at risk of heat stroke and related problems. Your employer should train you in how to respond to the symptoms of heat-related illness. There should always be enough drinking water available.

# Understanding Respirators

For some graffiti removal work, you may need a respirator. A respirator is a face mask that provides you with clean air when you work around chemicals. If your respirator fits well and works right, it reduces the chemical vapors and dusts that you breathe.



**HALF-MASK**



**FULL-FACE**

If you need a respirator for graffiti work, you will probably be given one that filters air with cartridges. These respirators come in two styles. A half-mask respirator just filters the air. A full-face respirator also provides eye protection.

Cartridges come in different colors. Different colored cartridges protect you from different chemicals. For graffiti removal, you probably will use a black organic vapor cartridge.

# Wearing a Respirator

The law requires your employer to give you a respirator if you need one for the job. The employer must supply the right type of respirator and cartridge.

If you are given a respirator to use, the law says you must also get:

- ◆ A medical evaluation. Respirators are not safe for some people. They can make your lungs and heart work harder. This can be dangerous for anyone with breathing problems or heart trouble.
- ◆ A fit test. A trained person must make sure your respirator is the right size, fits tightly to your face, and doesn't leak. Facial hair can sometimes prevent a good fit.
- ◆ Training. Your employer must explain what type of respirator you have been given, what it does, how to put it on, and how to clean it.



## Are Dust Masks OK?

**NO!** A dust mask doesn't protect you from chemical vapors at all. Chemicals go right through the mask.

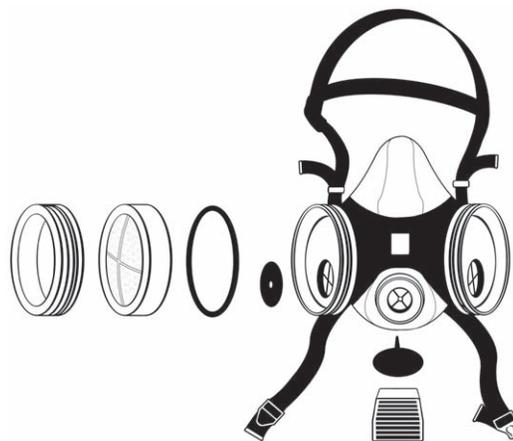
If the vapors are hazardous, you need a respirator with chemical cartridges.



## Caring for Your Respirator

Know how to take care of your respirator and cartridges. For example, they:

- ◆ Shouldn't be stored in direct sunlight, in a toolbox, or anywhere they could be crushed.
- ◆ Should be replaced when they are damaged or worn out.
- ◆ Should be cleaned before re-use, especially if they have been in contact with chemicals.



**PARTS OF A RESPIRATOR**

## Personal Protective Equipment

In addition to respirators, other personal protective equipment (PPE) can help keep you safe when you work. Because graffiti removal is done in many different ways, your employer should study each job and **must give** you the right PPE. You may need:

**Eye Protection.** If you spray or pour chemicals you should wear chemical goggles, not just safety glasses. Goggles seal the whole area around your eyes. Safety glasses only shield your eyes from objects like particles or dust.



**Face Protection.** A face shield can give even more protection to your face when spraying chemicals. Wear the face shield over your chemical goggles.



**Hand Protection.** Use special gloves that protect your hands against chemicals. Many chemicals can go right through ordinary gloves, such as latex, household, cotton, and leather gloves. Your employer must give you gloves that provide proper protection for the chemicals you are using. Change gloves when they become torn, cracked, soaked, discolored, or worn out.



**Hearing Protection.** Soda blasters and pressure washers produce high noise levels. You may need to use earplugs or other hearing protection. Your employer must train you on the proper way to use hearing protection. Hearing protection that doesn't properly seal your ears won't protect you from the noise.



Depending on where and how you are working, your employer may also need to provide:

- ◆ Safety shoes
- ◆ Fall protection (safety belt, harness, and lifeline)
- ◆ Coveralls
- ◆ An emergency eye wash
- ◆ A hard hat
- ◆ Training in how to use your PPE.

## What Is Cal/OSHA?

California law says that every worker has the right to a safe and healthy workplace. The Division of Occupational Safety and Health, usually called Cal/OSHA, is the state agency that enforces this law. It covers nearly every worker in California, including those in private industry and those who work for state, county, and city governments.

Cal/OSHA has many workplace health and safety regulations, which are called standards. For example, there are standards that require employers to:

- ◆ Provide necessary PPE, safety equipment, and training at no cost.
- ◆ Limit workers' exposure to chemicals, noise, and other hazards.
- ◆ Set up an Injury and Illness Prevention Program (IIPP).
- ◆ Take steps to prevent RSIs and other ergonomic problems.



If you think there is a health and safety hazard on your job, ask your employer about it first. You can also contact Cal/OSHA to get information or make a complaint. Cal/OSHA will not tell your employer who made the complaint. The law says you can't be fired or punished for making a complaint. Cal/OSHA may send an inspector to your workplace. If there are violations, your employer will be required to correct them and may have to pay a fine.

## Information and Help

**Occupational Health Branch (OHB).** This program, a part of the California Department of Health Services, provides information on workplace health hazards to workers, employers, and health professionals in California. OHB has many publications on work-related hazards.

Office phone: (510) 622-4300 [www.dhs.ca.gov/ohb](http://www.dhs.ca.gov/ohb)

**Hazard Evaluation System and Information Service (HESIS).** This unit in OHB provides information by phone on specific chemicals and other workplace health hazards.

Question line: (510) 622-4317 [www.dhs.ca.gov/ohb/hesis](http://www.dhs.ca.gov/ohb/hesis)

**Cal/OSHA.** This agency gives information, responds to confidential health and safety complaints, and inspects workplaces. To make a complaint, contact your local Cal/OSHA enforcement office. The Cal/OSHA Consultation Service offers free advice to employers (not related to enforcement).

Complaints: Check local phone book [www.dir.ca.gov/dosh](http://www.dir.ca.gov/dosh)  
Consultation: (800) 963-9424

**Labor Occupational Health Program (LOHP).** This program at the University of California, Berkeley has factsheets and other publications, gives free advice, and has a library open to the public.

Office phone: (510) 642-5507 [www.lohp.org](http://www.lohp.org)

# Staying Safe--A Checklist

There **are** hazards in graffiti removal work. Use this checklist to make sure you understand how to work safely. Review the checklist before each job.

Check the box if the answer is YES.



**Is there a safer product?**

There are many graffiti cleaners on the market. Some are safer than others. There may be a safer product that works just as well as a hazardous one for removing graffiti. It's your employer's responsibility to provide a safe product.

**Do you know what chemicals are in the product you are using?**

You have the right to know what hazardous chemicals a product contains and how to protect yourself from them. Your employer must have a Material Safety Data Sheet (MSDS) for each product and let you read it. You must also be given training about chemical hazards.

**Are you using as little of the product as possible?**

Use the smallest amount of a product that will effectively remove the graffiti. The less chemical exposure, the better.

**Is there good ventilation?**

When you remove graffiti inside a building, use a fan or similar ventilation device to move chemicals out of your work area and bring in fresh air. If you can't get good ventilation, limit the time of your exposure. When you work outdoors, position yourself so the wind is blowing chemicals away from you, not toward you.

**Do you need a respirator?**

In some situations, you may need a respirator. It depends on the chemical, how much you are using, how long you may be exposed, and the amount of ventilation. If you use a respirator, you must be given a medical evaluation, a fit test, and training.

**Do you have the right personal protective equipment (PPE)?**

Use PPE every time you need it—don't cut corners just because you're in a hurry. Use the right PPE for the type of work you are doing and the particular chemicals involved. You may need a respirator, chemical resistant gloves, goggles, a face shield, and an apron or coveralls. Sometimes you may also need fall protection.

Your employer is responsible for providing all of this equipment and training you in how to use it.

**Are there special conditions that could increase your chemical exposure?**

Chemicals can build up in enclosed areas with little air movement, like bathroom stalls, buses, and phone booths. If you are cleaning graffiti overhead, chemicals can drip on you. If you are working outdoors and it's windy, the wind can blow chemicals into your eyes.

**Is the surface lead-free?**

If you remove graffiti from a surface that has lead paint, special precautions and special worker training are necessary. Some removal methods, such as sanding, soda blasting, and pressure washing are especially dangerous. Your employer must find out if there is lead in the paint and tell you.

**Do you practice good hygiene at work?**

Change your clothes right away if they get wet with chemicals or covered with paint dust. Never bring contaminated clothing or shoes home. They can expose your family to chemicals.

When working around chemicals or dust, always wash your hands before you eat, drink, or smoke. No one hand cleaner is best for all chemicals. The best thing is to prevent chemicals from getting on your skin in the first place.

**Are people nearby given warning?**

There should be a system to warn pedestrians and others nearby when workers are using chemicals. In some cases access to the immediate work area should be restricted.

**Do you practice good housekeeping?**

Keep your work area free of objects that might make people trip or fall. Clean up slippery areas frequently. Clean up any chemical spills right away.

**Are chemicals stored safely?**

Graffiti removal products should be stored in tightly closed, labeled containers in a cool, well-ventilated area. They should never be kept near sparks and other fire sources. Containers should be stored securely so they can't fall and break. A locked cabinet is best. Don't store PPE near chemicals.

**Are used chemicals disposed of properly?**

In some cases, chemical products, bottles, dirty rags, dropcloths, and other items you have used when removing graffiti may be considered hazardous waste. This waste should be labeled and stored in sealed containers. Your employer should dispose of it according to local and state hazardous waste regulations. The MSDS has disposal information.

Be especially careful if you transport these waste materials in a vehicle. Some chemical waste that is not tightly sealed can give off fumes inside a vehicle.

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We thank the numerous others who assisted with preparation of this publication by providing valuable input and review.

First edition, 2003. This publication may be copied in its entirety for free educational use, provide full credit to the authors and publishers is given.

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Printing: University of California Printing Services

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# Asthma-like symptoms, atopy, and bronchial responsiveness in furniture workers

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**OBJECTIVES:** To study the role of individual and occupational risk factors for asthma in furniture workers. **METHODS:** 296 workers were examined (258 men, 38 women) with a questionnaire of respiratory symptoms and diseases, baseline spirometry, bronchial provocative test with methacholine, and skin prick tests. Non-specific bronchial hyperreactivity was defined as when a provocative dose with a fall of 20% in forced expiratory volume in 1 second (PD<sub>20</sub>FEV<sub>1</sub>) was < 0.8 mg and atopy in the presence of at least one positive response to skin prick tests. Workers were subdivided into spray painters (exposed to low concentrations of diisocyanates and solvents), woodworkers (exposed to wood dusts), and assemblers (control group). **RESULTS:** The prevalences of attacks of shortness of breath with wheezing and dyspnoea were higher in spray painters (13.5% and 11.5% respectively) than in woodworkers (7.7% and 6.3%) or in assemblers (1.6% and 1.6%); prevalences of chronic cough, asthma, and rhinitis were also slightly but not significantly higher in spray painters and in woodworkers than in assemblers. The difference in the prevalence of respiratory symptoms among the job titles was due to the atopic subjects, who showed a higher prevalence of chronic cough, wheeze, shortness of breath with wheeze, dyspnoea, and asthma in spray painters than in the other groups. The prevalence of non-specific bronchial hyperreactivity in subjects who performed bronchial provocative tests was 17.7%, with no significant difference among groups. Asthma symptoms were significantly associated with non-specific bronchial hyperreactivity. Asthma-like symptoms plus non-specific bronchial hyperreactivity was found in 4% of assemblers, 10% of woodworkers, and 13.3% of spray painters (chi<sup>2</sup> = 2.6, NS). Multiple logistic analysis taking into account individual (smoke, atopy, age) and occupational (job titles) risk factors confirmed that spray painters had higher prevalence of chronic cough than assemblers, and a trend in increasing the prevalence of shortness of breath with wheeze, dyspnoea, and asthma. **CONCLUSIONS:** Painters in the furniture industry, particularly atopic subjects, are at higher risk of asthma-like symptoms than other job titles. In these workers asthma-like symptoms are more sensitive than non-specific bronchial hyperreactivity in detecting a negative effect of the occupational exposure.

# Asthma Resources

## USEPA - <http://www.epa.gov/asthma/index.html>

- **Asthma Home Environment Checklist** – The checklist contains questions and action steps to assist in the identification and management of environmental asthma triggers commonly found in the home.
- **Tools for Schools** – an environmental management program for schools. In Ohio local health departments assist schools with implementation of this comprehensive program with consultation from Ohio Department of Health, Indoor Environments Section.
- **Managing Asthma in the School Environment** – This is a companion to the Tools for Schools kit and specifically addresses trigger management in a school environment.
- **World Asthma Day Event Packet** – [http://www.event\\_planning\\_kit\\_2004.pdf](http://www.event_planning_kit_2004.pdf) (a 1.4MB adobe acrobat PDF file), contains many helpful suggestions for planning a World Asthma Day Event locally, regionally or statewide.
- **Goldfish campaign** – A video and audio tape public service announcement plus posters are available for launching your own public awareness campaign for asthma.
- **Dusty The Asthma Goldfish and His Asthma Triggers Funbook** – Based on the graphics in the public awareness campaign, this is a useful and fun way to teach children about asthma and triggers.
- **Controlando los Factores del Asma**, new Spanish language asthma video. To order your copy, call 1-800-438-4318
- **Clearing the Air: 10 Steps to Making Your Home Asthma-Friendly** – a one page fact sheet with tips to control asthma triggers.
- **Asthma Fact Sheet** – a two page fact sheet with data, and resources documented.
- **America's Children and the Environment website** <http://www.epa.gov/envirohealth/children/> The website has lots of environmental information about how children are affected by the environment.
- **Take the smoke-free home pledge on line (in coordination with AAAAI)** <http://www.epa.gov/smokefree/pledge/index.html> - The smoke-free homes pledge is a method of eliminating second hand smoke from children's environments. Many communities have used this as a promotional tool to encourage reduction of second hand smoke.
- **The Asthma Health Outcomes Project- [www.asthma.umich.edu](http://www.asthma.umich.edu)** - The primary goal of AHOP is to identify successful asthma management programs and analyze the factors that contribute to their success.
- **Clear Your Home of Asthma Triggers: Your Children will Breathe Easier** – a simple, low literacy brochure available free from USEPA.
- **Indoor Air Hotline sponsored by USEPA – 1-800-438-4318** – use this number for questions about indoor air issues and to order USEPA publications.

## **NAEPP - <http://www.nhlbi.nih.gov/health/public/lung/index.htm>**

### **[http://www.nhlbi.nih.gov/health/prof/lung/asthma/asth\\_sch.htm](http://www.nhlbi.nih.gov/health/prof/lung/asthma/asth_sch.htm)**

- One page checklists for looking at the triggers in the childcare and school settings.
  - **How Asthma-Friendly is Your Child-Care Setting?**
  - **How Asthma-Friendly is Your School?**
- **Asthma and Physical Activity in the School** – A booklet for anyone involved with children with asthma doing physical activity.
- **Students with Chronic Illness: Guidance for Families, Schools and Students** – a one page information sheet that has recommendation for all settings.
- **Asthma Awareness Curriculum for the Elementary School Classroom** – this curriculum is intended for all children and staff to raise general awareness.

### **<http://www.nhlbi.nih.gov/health/prof/lung/index.htm#asthma>**

- **Facts About Controlling Your Asthma** – an 8 page booklet with comprehensive (English/Spanish) information on managing asthma
- **Living With Asthma: Special Concerns of Older Adults** – very helpful information specifically about the differences of managing asthma in an older body and some possible consequences.
- **Your Asthma Can Be Controlled: Expect Nothing Less** – a pamphlet with worksheets and information that covers the broad range of self management of asthma.
- **Your Metered-Dose Inhaler Will Be Changing** - Metered-dose inhalers are in the process of being transitioned from those propelled by liquefied chlorofluorocarbons (CFCs) to CFC-free delivery systems. This brochure for asthma patients explains the reasons behind the change and how it might affect patients
- **Key Clinical Activities for Quality Asthma Care** - This report is a companion to the National Asthma Education and Prevention Program (NAEPP) Expert Panel Reports. It identifies a core set of 10 key clinical activities essential for ensuring that health care delivered to patients with asthma emphasizes the prevention aspect of care and addresses the components of care recommended in the Expert Panel Reports. The action steps listed for each key clinical activity suggest specific ways to accomplish the respective activity.
- **Asthma Management in Minority Children** -This document provides a mechanism for sharing the experiences of five investigators in developing asthma management interventions.
- **Diagnosing and Managing Asthma in the Elderly** - Addresses interaction among the effects of aging, asthma, coexisting diseases, and the use of multiple medications. Offers help with differential diagnosis of asthma and COPD. Discussed four components of managing asthma in the elderly: patient education, objective assessment of lung function, environmental control, and pharmacologic therapy.
- **Is the Asthma Action Plan Working?--A Tool for School Nurse Assessment** - This brief assessment tool offers guidance to school nurses in determining how well an asthma action plan is working for a student. It includes information about good asthma control and a checklist of assessment items. This tool can also be used by asthma educators, primary care providers and asthma specialists.

## **Clinical Guidelines - <http://www.nhlbi.nih.gov/guidelines/asthma/index.htm>**

- Guidelines for the Diagnosis and Management of Asthma – 1997, 2002 Update
- Quick Reference to NAEPP Expert Panel Report 2002
- See also clinical references and guides for nurses, pharmacists and respiratory therapists.

## **CDC - <http://www.cdc.gov/nceh/airpollution/asthma/default.htm>**

- General information
- Data and Surveillance
- Effective Interventions
- Asthma legislation and policy through National Congress of State Legislatures
- Speaker's Kit
- **NIOSH** – Work Related Asthma Program - <http://www.cdc.gov/niosh/topics/asthma/>

## **Non-Governmental Resources:**

**[www.aanma.org](http://www.aanma.org)** – **Allergy and Asthma Network – Mothers of Asthmatics** - a national nonprofit network of families whose desire is to overcome, not cope with, allergies and asthma. The AANMA promotes policy and legislation, provides information to individuals with asthma, publishes a magazine, *Allergy & Asthma*, and a newsletter, *MA*.

**[www.aafa.org](http://www.aafa.org)** – **Asthma and Allergy Foundation of America** - a patient organization dedicated to improving the quality of life for people with asthma and allergies and their caregivers, through education, advocacy and research. In Ohio there is no chapter of AAFA but Healthy Child Care Ohio has contracted to use the course, *Asthma & Allergy Essentials for Child Care Providers*© in Ohio.

**[www.lungusa.org](http://www.lungusa.org)** – **The American Lung Association** – Asthma is one focus of the ALA which supports research centers around the country and provides organizational support to many asthma efforts nationally and locally. In Ohio, the American Lung Association of Ohio (ALAO) is one of the two founding members of the Ohio Asthma Coalition – <http://www.ohiolung.org> .

**[www.aaaai.org](http://www.aaaai.org)** – **The American Academy of Allergy, Asthma and Immunology** – This is the website for the professional organization of allergists. Find very consumer and child friendly resources plus professional information. See the “Just for Kids” section under “Patients and Consumers”.

**<http://www.njc.org>** - **National Jewish Medical and Research Center** – A recognized center of excellence in asthma care, National Jewish Medical Center in Denver, CO, has developed a very consumer friendly website that answers a lot of questions and provides interactive tools that will teach children as they learn. Try out the Asthma Wizard.

**<http://www.asthmaeducators.org/>** - **Association of Asthma Educators** – a professional website to provide information and access to Asthma Educators – Certified.

**<http://www.nasn.org/>** - **National Association of School Nurses** – Website provides many resources for addressing asthma in school nursing and with school activities.

## **Asthma Coalition Websites:**

**<http://www.getastmahelp.org/>** - **Asthma Initiative of Michigan** – website has every topic covered and provides information on a wide variety of asthma topics. Excellent resource on work related asthma.

**[http://www.chicagoasthma.org/site/epage/12588\\_41\\_0.htm](http://www.chicagoasthma.org/site/epage/12588_41_0.htm)** - **Chicago Asthma Consortium** –

The Chicago Asthma Consortium is among the oldest asthma coalitions in the country. The Chicago Asthma Consortium is a coalition of medical and public health professionals, business leaders, government agencies, community activists, and others dedicated to improving the quality of life for people with asthma through information sharing, networking and advocacy.

**<http://www.sph.umich.edu/aaa/about/>** - **Allies Against Asthma** – Funded by the Robert Wood Johnson Foundation, Allies Against Asthma has sponsored coalitions around the country. These coalitions are actively pursuing local level asthma interventions. Located at the University of Michigan, Allies Against Asthma is actively involved in developing a resource bank of asthma tools and interventions, and provides consultation and evaluation resources to coalitions.

**<http://www.mnasthma.org/mnasthma/>** - **Minnesota Asthma Coalition** – This site is linked to all the state and local coalition activities in the state. Many resources are available both on the website and through links.

## **Other Resources:**

**<http://www.health.state.mn.us/divs/hpcd/cdee/asthma/>** - **Minnesota Department of Health Asthma Program** site – The major interest for professionals on this site is an Asthma Action Plan that can be downloaded to a PC and completed online. Then the whole thing prints out. The major challenge for Ohio practitioners is that the formularies are from Minnesota health plans. Ohio is working at adapting to Ohio formularies.

**<http://ctb.ku.edu/>** - **Community Toolbox** – This is a comprehensive resource for coalition development that contains useful and practical ideas and concepts.

**<http://www.chestnet.org/>** - **The American College of Chest Physicians** - Chest sponsors a coalition symposium as part of its annual meeting each fall. They also have resources for asthma coalitions.

**<http://www.ehw.org>** – **Environmental Health Watch** – This is a not for profit organization in Cleveland that works closely with many asthma projects including the Trigger Committee of the Greater Cleveland Asthma Coalition. This site has very concrete suggestions for trigger management and covers all the bases. Also, it is an excellent resource for healthy homes information.

**<http://www.hud.gov/offices/lead/hhi/hhiresources.cfm>** - **United States Housing and Urban Development**. Healthy Homes Issues: Asthma. 2001. – This website is full of healthy homes information.

**<http://airohio.epa.state.oh.us/>** - **Ohio Environmental Protection Agency** - Air quality information and data is located on the AirOhio website.

**<http://onlinedocs.andersonpublishing.com/oh/lpExt.dll?f=templates&fn=main-h.htm&cp=PORC>** - **Anderson's Ohio Law Online, Asthma Inhaler Law** – Links for school inhaler laws in Ohio.

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- <http://www.lungusa.org/asthma/astoccasthm.html> - American Lung Association: information on occupational asthma.
- <http://www.state.ma.us/dph/bhsre/ohsp/sensor/SRINDEX.HTM> - Massachusetts SENSOR (occupational lung disease surveillance) information.
- [http://www.getastmahelp.org/main\\_worksites.asp](http://www.getastmahelp.org/main_worksites.asp) - Michigan's Asthma web page has very good occupational asthma information.
- <http://www.ccohs.ca/oshanswers/diseases/asthma.html> - Canadian guide to occupational asthma
- <http://www.sei.cmu.edu/programs/sepm/risk/index.html> - Carnegie Mellon Risk Management website
- <http://www.state.nj.us/health/eoh/peoshweb/jlmib.htm> - New Jersey Department of Health and Senior Services website on forming Joint Labor/Management Health and Safety Committees.
- <http://www.whs.qld.gov.au/guide/gde51.pdf> - Occupational Asthma Guide for Employers from Queensland, Australia
- <http://www.whs.qld.gov.au/guide/gde52.pdf> - Occupational Asthma Guide for Workers from Queensland, Australia

## Resources Available from the Division of Safety & Hygiene (DSH) Libraries

(800) 644-6292 (614) 466-7388

[library@bwc.state.oh.us](mailto:library@bwc.state.oh.us)

[www.ohiobwc.com](http://www.ohiobwc.com)

### Safety training:

- Safety talks, outlines and scripts - DSH Safety leader's discussion guide, Training Center's One-hour safety presentations, reference books, web resources
- Videos – hundreds of safety and health topics
- Books and articles on training techniques

### Machine and equipment safety:

- Safety standards (ANSI, NFPA, CGA)
- Books and articles on power presses, material handling equipment, lockout/tagout, etc.

### Sample written programs:

- DSH program profiles and sample written programs
- Reference books
- Internet resources

### Illness and injury statistics:

- Statistics from the U.S. Bureau of Labor Statistics
- National Safety Council's *Injury Facts*
- National Institute of Occupational Safety & Health (NIOSH) studies

### Hazard communication and chemical safety:

- Chemical safety information
- Material safety data sheets (MSDSs)
- Sample written programs
- Videos
- Internet resources

### Safety standards

- American National Standards Institute (ANSI) standards (including standards for construction, machinery and equipment, personal protective equipment)
- National Fire Protection Association (NFPA) fire codes (including the Life Safety Code and the National Electrical Code)
- Compressed Gas Association (CGA) standards

### Other topics of interest (books, articles, magazines, videos and standards):

- Confined spaces
- Electrical safety
- Job safety analysis
- New employee orientation
- Powered industrial trucks
- Respiratory protection
- Safety culture
- Scaffolds

Directories and lists of vendors of safety equipment

Occupational Safety & Health Administration (OSHA) regulations

*Manual of Uniform Traffic Control Devices (MUTCD)*

Recommendations of useful Internet sites

BWC publications

## **Saving You Time and Research**

Requests for copies of OSHA standards, information on starting a safety committee, a video on accident investigation techniques -- these are some of the thousands of inquiries BWC's Division of Safety & Hygiene (DSH) libraries receive each year.

### **DSH has two libraries to serve you:**

- The central library in the William Green Building in downtown Columbus;
- The resource center and video library located at the Ohio Center for Occupational Safety and Health (OCOSH) in Pickerington.

Both libraries are open 8 a.m. to 4:45 p.m., Monday through Friday. Your need for information does not require a visit to the library. You can phone, fax, or e-mail your requests and receive a quick response.

**The central library** provides free information services on the topics of occupational safety and health, workers' compensation and rehabilitation.

**The OCOSH resource center** provides similar services for those who visit OCOSH for meetings and training center classes.

Students from the DSH training center can use the services and collections of the libraries to assist with the completion of their course **follow-up activities**. The librarians have recommended a variety of resources for the follow-up activities and are available to answer questions and provide assistance.

**The video library** offers an extensive collection of videotapes to supplement your organization's safety and health training program. It is a convenient and popular source for Ohio employers to borrow quality occupational safety- and health-related training aids.

Visit our Web site at **[www.ohiobwc.com](http://www.ohiobwc.com)**.

Central Library  
30 W. Spring St., Third Floor  
Columbus OH 43215-2256  
**1-800-OHIOBWC**  
(614) 466-7388  
(614) 644-9634 (fax)  
[library@bwc.state.oh.us](mailto:library@bwc.state.oh.us)

OCOSH Resource Center  
13430 Yarmouth Drive  
Pickerington OH 43147  
**1-800-OHIOBWC**  
Resource center (614) 728-6464  
Video library (614) 644-0018