

MICHIGAN STATE
UNIVERSITY

**Recommended Medical Screening Protocol For
Workers Exposed to Occupational Allergens**

Background

Except for workers exposed to formaldehyde (Rule 325.51451-.51477), there are no legal requirements to perform medical surveillance on individuals exposed to occupational allergens. See Table I for list of common workplace allergens; a complete list can be found at <http://www.aoecdata.org/ExpCodeLookup.aspx>. The Michigan Occupational Safety and Health Administration's (MIOSHA) Respiratory Protection Standard 1910.34 (e) (1) states that the employer shall provide a medical evaluation to determine the employee's ability to use a respirator, before the employee is fit tested or required to use the respirator in the workplace.

An annual medical examination for individuals who are potentially exposed to an occupational allergen is good medical practice. It has been well documented that the longer an individual remains exposed to an occupational allergen that he/she has become allergic to, the more likely that he/she will have persistent breathing problems even after exposure has ended. The purpose then of an annual medical screening is to identify symptomatic individuals and remove them from exposure soon after they develop symptoms so as to reduce the likelihood of causing a chronic disability.

Studies in the medical literature do not support excluding individuals with an allergic disposition (family or personal history) or cigarette smokers identified in a pre-placement physical, from working around occupational allergens. The dose that an individual inhales from both usual daily exposure and non-routine heavy exposures from spills is the best predictor of who will become symptomatic.

Accordingly, medical surveillance is not a substitute for good dust and chemical control in the workplace. Medical surveillance is a tool that can be used to check on the adequacy of exposure controls. Controlling exposure is the only effective primary prevention strategy.

Protocol

The most important part of the medical exam is the questionnaire and review of the responses by medical personnel familiar with the symptoms of work-related asthma.

1) Questionnaire - A standardized questionnaire should be administered.

A questionnaire should be administered during a pre-placement physical to obtain a baseline and on an annual basis. Since the symptoms from occupational allergens can be intermittent particularly when they first begin, the person may have a completely normal physical examination and breathing test on an annual exam and still be having severe attacks of asthma. Key questions that should be included in a pre-placement and annual examination are shown in Tables 2 and 3, respectively.



**DEPARTMENT OF
MEDICINE**

**Occupational &
Environmental
Medicine**

Kenneth D. Rosenman M.D.
Professor of Medicine

Michigan State University
West Fee Hall
909 Fee Road, Room 117
East Lansing, MI
48824-1315

517 353-1846
Fax 517 432-3606

rosenman@msu.edu

Generally a breathing test is recommended on a periodic basis although some have suggested an annual questionnaire is adequate.

2) Spirometry is done as a baseline and annually. All pulmonary function testing should use equipment and follow the protocol of the American Thoracic Society <http://www.thoracic.org/statements/resources/pfet/PFT2.pdf>. The technician administering the test should have completed an accredited training course such as one approved by the National Institute for Occupational Safety and Health.

It is important not only to evaluate the latest spirometry as to whether it is normal or abnormal, but also to observe excessive loss between successive years. Studies on isocyanate exposure have suggested excessive loss (>25-35 ml per year in the FEV₁) as a potential adverse effect, even in the absence of symptoms of asthma. The American College of Occupational and Environmental Medicine has an evidence based statement on evaluating pulmonary function tests over time

http://www.acoem.org/uploadedFiles/Public_Affairs/Policies_And_Position_Statements/ACOEM%20Spirometry%20Statement.pdf.

Individuals Identified on the Periodic Questionnaire to be Symptomatic or to Have Excessive Loss on Their Breathing Test Results

Individuals who are suspected to have occupational asthma should have the diagnosis confirmed by spirometry testing performed in relationship to work (i.e. end of work week testing compared to testing performed at the end of a week where the individual did not work) or measurement of peak flow every two hours over a two-week period with a portable peak flow meter. Sufficient time off work (two weeks or more) may be necessary to allow recovery and documentation by spirometry or peak flow measurements.

Individuals with confirmed work-related asthma should, whenever possible, be given the option of transfer to areas of non-exposure. Sensitized individuals may react at extremely low levels of exposure. In order for this transfer option to be a realistic alternative, the individuals should be able to maintain his/her pay rate at the new job.

For exposures to some substances, smokers with similar levels of exposure as nonsmokers will develop work-related asthma at higher rates and in a shorter period of time than non-smokers. All individuals should be strongly advised to stop smoking, and if resources are available, to provide assistance to help employees quit smoking.

Attached at the end of this document is a handout from OSHA that you can provide to your employees. The handout is a guide for workers who think they may have work-related asthma, to review and share with their physician.

For more information or
questions contact:
Kenneth D. Rosenman, M.D.
(517) 353-1846

Table 1. Examples of Agents Capable of Causing Work-Related Asthma

A complete list of agents can be found at: www.aocedata.org/ExpCodeLookup.aspx

| NATURAL PRODUCTS | |
|-----------------------------------------|------------------------------------------|
| vegetable gums | orris root |
| flax seed | flour |
| castor bean | papain |
| soybean | mushroom dust and moldy compost |
| natural glues | wood dusts |
| animal dander and other animal antigens | natural resins |
| coffee bean | animal fat, oil and products |
| insect debris | fish meal and emulsions |
| detergent enzymes | tobacco dust |
| grain dusts and grain products | pancreatic extracts |
| SYNTHETICS | |
| <i>Inorganic</i> | <i>Pharmaceuticals</i> |
| platinum, complex salts | psyllium |
| nickel salts | penicillin |
| chromium salts | ampicillin |
| sodium and potassium persulphates | spiramycin |
| | phenylglycine acid chloride |
| <i>Organic</i> | sulphathiasole |
| Diisocyanates | bromelain |
| toulene | amprolium hydrochloride |
| diphenylmethane | sulphone chloramides |
| hexamethylene | tetracycline |
| Anhydrides | <i>Miscellaneous</i> |
| phthalic | formaldehyde |
| tetrachlorophthallic | piperazine |
| trimellitic | organophosphorus insecticides |
| Amines | pyrolysis products of polyvinyl chloride |
| aminoethyl | alkylaryl polyether alcohol |
| ethanolamine | tartrazine |
| dimethyl ethanolamine | products of heated adhesives |
| ethylene diamine | |
| paraphenylenediamine | |
| diethylene triamine | |
| diethylene tetramine | |

Table 2. Questions to be Included in the Initial Preplacement Medical Exam for Workers Exposed to Occupational Allergens

1. Have you ever seen a doctor regarding:
 - a. Shortness of breath? 1a. No ___ Yes ___ Unknown ___
 - b. If YES, what year? 1b. ___ ___ ___ ___ year
 - c. Sinus problems? 1c. No ___ Yes ___ Unknown ___
 - d. If YES, what year? 1d. ___ ___ ___ ___ year
 - e. Skin rash? 1e. No ___ Yes ___ Unknown ___
 - f. If YES, what year? 1f. ___ ___ ___ ___ year

2. Have you ever had asthma? 2. No ___ Yes ___ Unknown ___

If YES,

 - a. What year? 2a. ___ ___ ___ ___ year
 - b. Was your asthma confirmed by a doctor? 2b. No ___ Yes ___ Unknown ___
 - c. At what age did your asthma start? 2c. ___ ___ age started
 - d. If you no longer have asthma, at what age did it stop? 2d. ___ ___ age stopped

3. Do you currently require medicine or treatment for asthma? 3. No ___ Yes ___ Unknown ___
 - a. IF YES, what type of medicine? _____

4. Have you ever had:
 - a. Allergies? 4a. No ___ Yes ___ Unknown ___
 - b. If YES, what year? 4b. ___ ___ ___ ___ year
 - c. Hayfever? 4c. No ___ Yes ___ Unknown ___
 - d. If YES, what year? 4d. ___ ___ ___ ___ year
 - e. Eczema (skin rash)? 4e. No ___ Yes ___ Unknown ___
 - f. If YES, what year? 4f. ___ ___ ___ ___ year

5. Do any of your blood relatives (father, mother, brothers, sisters) have allergies, hay fever, asthma or eczema (skin rash)? 5. No ___ Yes ___ Unknown ___

Circle all that apply:

| | Father | Mother | Brother(s) | Sister(s) |
|--------------------|--------|--------|------------|-----------|
| Allergies | Yes | Yes | Yes | Yes |
| Hayfever | Yes | Yes | Yes | Yes |
| Asthma | Yes | Yes | Yes | Yes |
| Eczema (skin rash) | Yes | Yes | Yes | Yes |

6. Do or did you ever smoke cigarettes? 6. No ___ Yes ___ Unknown ___

If YES,

 - a. How many packs per day? 6a. ___ ___ packs per day
 - b. If you quit smoking, how old were you? 6b. ___ ___ age quit smoking cigarettes
 - c. Do you carry cigarettes into the workplace? 6c. No ___ Yes ___ Unknown ___

7. Circle how often any of the following symptoms bother you at work:

| Circle the number that corresponds to how often you are bothered by each symptom AT WORK. | | | | | | | |
|-------------------------------------------------------------------------------------------|-------|--------|---------|--------|-------|----------------------|------------|
| | NEVER | SELDOM | MONTHLY | WEEKLY | DAILY | Month & Year Started | PLANT AREA |
| NASAL STUFFINESS | 1 | 2 | 3 | 4 | 5 | | |
| RUNNY NOSE | 1 | 2 | 3 | 4 | 5 | | |
| TEARING, BURNING EYES | 1 | 2 | 3 | 4 | 5 | | |
| EYE REDNESS | 1 | 2 | 3 | 4 | 5 | | |
| FACE SWELLING | 1 | 2 | 3 | 4 | 5 | | |
| HIVES | 1 | 2 | 3 | 4 | 5 | | |
| SORE THROAT | 1 | 2 | 3 | 4 | 5 | | |
| COUGH | 1 | 2 | 3 | 4 | 5 | | |
| WHEEZING | 1 | 2 | 3 | 4 | 5 | | |
| CHEST TIGHTNESS | 1 | 2 | 3 | 4 | 5 | | |
| SHORTNESS OF BREATH | 1 | 2 | 3 | 4 | 5 | | |
| FEVER, SWEATS | 1 | 2 | 3 | 4 | 5 | | |
| CHILLS, SHIVERING | 1 | 2 | 3 | 4 | 5 | | |
| ACHE ALL OVER | 1 | 2 | 3 | 4 | 5 | | |
| UNUSUAL TIREDNESS | 1 | 2 | 3 | 4 | 5 | | |

8. Have you ever had emphysema/Chronic Obstructive Pulmonary Disease (COPD)? 8. No ___ Yes ___ Unknown ___

If YES,

a. Was your emphysema/COPD confirmed by a breathing test that your doctor gave you? 8a. No ___ Yes ___ Unknown ___

b. At what age did your emphysema/COPD start? 8b. ___ age started

9. Does your chest ever sound wheezy or whistling: 9a. No ___ Yes ___ Unknown ___

a. When you have a cold? 9b. No ___ Yes ___ Unknown ___

b. Occasionally apart from colds? 9c. No ___ Yes ___ Unknown ___

c. Most days or nights? 9d. ___ # of years

d. IF YES to a, b or c for how many years has this been present?

10. Have you ever had an attack of wheezing that has made you feel short of breath? 10. No ___ Yes ___ Unknown ___

If YES,

a. How old were you when you had your first such attack? 10a. ___ age

b. Have you had 2 or more such episodes? 10b. No ___ Yes ___ Unknown ___

c. Have you required medicine or treatment for these attacks? 10c. No ___ Yes ___ Unknown ___

d. Is there a chemical, substance or job at work which you think causes these attacks? 10d. No ___ Yes ___ Unknown ___

IF YES, please describe: _____

11. Do you bring up phlegm or mucus most days of the week (4 out of 7 days) for a period of 3 months straight? Count phlegm or mucus with first smoke or on first going out-of-doors. Do not count phlegm or mucus from your nose. 11. No ___ Yes ___ Unknown ___

If YES,

a. How many years have you brought up phlegm or mucus? 11a. ___ # of years

**Table 3. Questions to be Included in Periodic Medical Exam for
Workers Exposed to Occupational Allergens**

1. In the past year, have you seen a doctor regarding:

- | | |
|-------------------------|--------------------------------|
| a. Shortness of breath? | 1a. No ___ Yes ___ Unknown ___ |
| b. Sinus problems? | 1b. No ___ Yes ___ Unknown ___ |
| c. Skin rash? | 1c. No ___ Yes ___ Unknown ___ |

2. In the past year, have you had asthma? 2. No ___ Yes ___ Unknown ___

- If YES,
- | | |
|-------------------------------------------|--------------------------------|
| a. Was your asthma confirmed by a doctor? | 2a. No ___ Yes ___ Unknown ___ |
|-------------------------------------------|--------------------------------|

3. Do you currently require medicine or treatment for asthma? 3. No ___ Yes ___ Unknown ___

- a. IF YES, what type of medicine? _____

4. Circle how often any of the following symptoms have bothered you at your current job. Note area of the plant which you suspect may cause or make symptoms worse.

| | NEVER | SELDOM | MONTHLY | WEEKLY | DAILY | Month & Year Started | PLANT AREA |
|-----------------------|-------|--------|---------|--------|-------|-------------------------|------------|
| NASAL STUFFINESS | 1 | 2 | 3 | 4 | 5 | | |
| RUNNY NOSE | 1 | 2 | 3 | 4 | 5 | | |
| TEARING, BURNING EYES | 1 | 2 | 3 | 4 | 5 | | |
| EYE REDNESS | 1 | 2 | 3 | 4 | 5 | | |
| FACE SWELLING | 1 | 2 | 3 | 4 | 5 | | |
| HIVES | 1 | 2 | 3 | 4 | 5 | | |
| SORE THROAT | 1 | 2 | 3 | 4 | 5 | | |
| COUGH | 1 | 2 | 3 | 4 | 5 | | |
| WHEEZING | 1 | 2 | 3 | 4 | 5 | | |
| CHEST TIGHTNESS | 1 | 2 | 3 | 4 | 5 | | |
| SHORTNESS OF BREATH | 1 | 2 | 3 | 4 | 5 | | |
| FEVER, SWEATS | 1 | 2 | 3 | 4 | 5 | | |
| CHILLS, SHIVERING | 1 | 2 | 3 | 4 | 5 | | |
| ACHE ALL OVER | 1 | 2 | 3 | 4 | 5 | | |
| UNUSUAL TIREDNESS | 1 | 2 | 3 | 4 | 5 | | |

5. In the past year, have you had an attack of wheezing that has made you feel short of breath? 5. No ___ Yes ___ Unknown ___

- If YES,
- | | |
|----------------------------------------------------------------------------------------|--------------------------------|
| a. Have you had 2 or more such episodes? | 5a. No ___ Yes ___ Unknown ___ |
| b. Have you required medicine or treatment for these attacks? | 5b. No ___ Yes ___ Unknown ___ |
| c. Is there a chemical, substance or job at work which you think causes these attacks? | 5c. No ___ Yes ___ Unknown ___ |

IF YES, please describe: _____

6. During the past year, did you bring up phlegm or mucus most days of the week (4 out of 7 days) for a period of 3 months straight? Count phlegm or mucus with first smoke or on first going out-of-doors. Do not count phlegm or mucus from your nose. 6. No ___ Yes ___ Unknown ___

7. Do you smoke cigarettes? 7. No ___ Yes ___ Unknown ___

- If YES,
- | | |
|--------------------------------------------------------|-------------------------|
| a. How many packs of cigarettes do you smoke each day? | 7a. ___ # packs per day |
|--------------------------------------------------------|-------------------------|

Do You Have Work-Related Asthma?

A Guide for YOU and YOUR DOCTOR

Do you have any of these symptoms: cough, wheezing, difficulty breathing, shortness of breath, or chest tightness? If the answer is YES, you may have work-related asthma.

What Is Work-Related Asthma?

Work-related asthma is a lung disease caused or made worse by exposures to substances in the workplace. Common exposures include chemicals, dust, mold, animals, and plants. Exposure can occur from both inhalation (breathing) and skin contact. Asthma symptoms may start at work or within several hours after leaving work and may occur with no clear pattern. People who never had asthma can develop asthma due to workplace exposures. People who have had asthma for years may find that their condition worsens due to workplace exposures. Both of these situations are considered work-related asthma.

A group of chemicals called **isocyanates** are one of the most common chemical causes of work-related asthma. OSHA is working to reduce exposures to isocyanates and has identified their use in numerous workplaces. See table below for common products (both at home and work) and common jobs where exposure to isocyanates may occur.

Why You Should Care About Work-Related Asthma

Work-related asthma may result in long-term lung damage, loss of work days, disability, or even death. The good news is that early diagnosis and treatment of work-related asthma can lead to a better health outcome.

What To Do If You Think You Have Work-Related Asthma

If you think that you may have work-related asthma, see your doctor as soon as possible. **Take this information and a copy of the safety data sheet with you.**

Work-Related Asthma Quick Facts

- Work-related asthma can develop over ANY period of time (days to years).
- Work-related asthma may occur with changes in work exposures, jobs, or processes.
- It is possible to develop work-related asthma even if your workplace has protective equipment, such as exhaust ventilation or respirators.
- Work-related asthma can continue to cause symptoms even when the exposure stops.
- Before working with isocyanates or any other asthma-causing substances, ask your employer for training, as required under OSHA's Hazard Communication standard.

Helpful Resources for Workers

- If you have a workplace health and safety question contact the Occupational Safety and Health Administration (OSHA) at 1-800-321-OSHA (6742) or go to OSHA's Workers web page at www.osha.gov/workers.html.
- Additional information on worker protection from isocyanates can be found on OSHA's Isocyanates Safety and Health Topics page: www.osha.gov/SLTC/isocyanates.

Products and Jobs Where Exposure to Isocyanates May Occur

| Common Products* | Common Jobs and Job Processes* |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• Polyurethane foam• Paints, lacquers, ink, varnishes, sealants, finishes• Insulation materials• Polyurethane rubber• Glues and adhesives | <ul style="list-style-type: none">• Car manufacture and repair• Building construction (plaster, insulation)• Foam blowing and cutting• Painting• Truck bed liner application• Foundry work (casting)• Textile, rubber and plastic manufacturing• Printing• Furniture manufacturing• Electric cable insulation |

*Many more jobs and products may also cause work-related asthma.

Diagnosis of Work-Related Asthma: A Guide for Clinicians

1. Consider work-related asthma in ALL adults with new-onset asthma or aggravation of previously controlled asthma.
2. Obtain a detailed medical history that documents the patient's asthma symptoms, allergies, and the relationship of the symptoms to work (onset, timing, severity).

Key Questions:

- Do your symptoms change when you are away from work (evenings, weekends, vacation)?
- Did you have any unusual exposures or changes in your job processes prior to the onset of symptoms?
- Do you have any allergy symptoms, such as runny nose, nasal congestion, or itchy, watery eyes? Are these symptoms worse at work?

3. Document a history of occupational exposures.
 - An electronic occupational history exposure form can be found at: www.atsdr.cdc.gov/csem/exp-history/docs/CSEMExposHist-26-29.pdf.
 - An occupational exposures database can be found at: www.aocedata.org/Default.aspx.
 - You or your patient may also request a safety data sheet (SDS, formerly MSDS) for chemicals in the workplace from your patient's employer, as per the OSHA Hazard Communication standard, 29 CFR 1910.1200: www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10099.
4. Perform pulmonary function testing (PFT) in accord with American Thoracic Society Standards.
 - Spirometry AND peak expiratory flow rates (PEFRs) may assist with diagnosis.
 - For strategies on using spirometry or peak flow to diagnose work-related asthma, consult 2008 American College of Chest Physicians (ACCP) Consensus Statement (referenced below).
 - A normal spirometry result does NOT exclude the possibility of work-related asthma.
 - OSHA publications and guidance for healthcare professionals on spirometry: www.osha.gov/pls/publications/publication.athruz?pType=Industry&pID=278.

5. Consider referral to an occupational medicine, pulmonary and/or allergy specialist for supplemental testing and assistance with determining work-relatedness, reducing exposures and protecting the worker's employment status.
 - To find an occupational and environmental medicine physician or clinic, visit:
 - American College of Occupational and Environmental Medicine: www.acoem.org
 - Association of Occupational and Environmental Clinics: www.aoec.org

Helpful Resources for Clinicians

- Tarlo, Susan M., et al. "Diagnosis and Management of Work-Related Asthma: American College of Chest Physicians' Consensus Statement." CHEST Journal 134.3 suppl (2008):1S-41S. (includes a work-related asthma diagnosis and management algorithm)
- OSHA Clinicians' web page: www.osha.gov/dts/oom/clinicians
- OSHA Occupational Asthma web page: www.osha.gov/SLTC/occupationalasthma
- NIOSH Occupational Respiratory Disease Surveillance – State-Based Surveillance Programs for CA, CT, MA, MI, NJ, NM, NY, OR, TX, WA, WI: www.cdc.gov/niosh/topics/surveillance/ords/StateBasedSurveillance/stateprograms.html (For work-related asthma reporting in other states, contact your local health or labor department.)
- NIOSH Asthma and Allergies web page: www.cdc.gov/niosh/topics/asthma

This guidance document is advisory in nature and informational in content. It is not a standard or regulation, and it neither creates new legal obligations nor alters existing obligations created by OSHA standards or the *Occupational Safety and Health Act* (OSH Act). Pursuant to the OSH Act, employers must comply with safety and health standards and regulations issued and enforced either by OSHA or by an OSHA-approved State Plan (a list of State Plans is available at www.osha.gov/dcsp/osp). In addition, the Act's General Duty Clause, Section 5(a)(1), requires employers to provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm. The mention of any nongovernmental organization or link to its web site in this guidance document does not constitute an endorsement by OSHA of that organization or its products, services, or web site.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

For assistance, contact us. We can help. It's confidential.



www.osha.gov (800) 321-OSHA (6742)



U.S. Department of Labor