

# Addressing **Work- Related Injuries and Illnesses:**



## A Guide for Primary Care Providers in Massachusetts

Massachusetts Coalition for Occupational Safety and Health (MassCOSH)  
in partnership with Greater Boston Physicians for Social Responsibility



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# Addressing Work-Related Injuries and Illnesses:

## A Guide for Primary Care Providers in Massachusetts

Addressing Work-Related Injuries and Illnesses: A Guide for Primary Care Providers in Massachusetts, was developed by the Massachusetts Coalition for Occupational Safety and Health (MassCOSH) and Greater Boston Physicians for Social Responsibility to assist primary care providers understand and help prevent work-related injuries and illnesses. The materials are intended to raise awareness of common occupational hazards and health effects, and to help providers refer patients to sources of support for addressing underlying causes of injury and disease.

Topics included in this manual were selected by focus groups of Boston-area primary care providers, occupational health specialists, injured workers, and union leaders. Thus, the guide is not meant to be a comprehensive resource, but rather an introduction to problems commonly seen among primary care patients, especially low-wage and immigrant workers, in eastern Massachusetts.

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We hope that you will find this information useful in preventing, identifying, and treating work-related illnesses and injuries. Please let us know of any additional information not included here that might be helpful to your work, or of other suggestions for improving this guide: Massachusetts Coalition for Occupational Safety and Health, (617) 825-SAFE, [www.masscosh.org](http://www.masscosh.org).

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MassCOSH brings together workers, unions, community groups, and health, safety and environmental activists to organize and advocate for safe, secure jobs and healthy communities throughout eastern and central Massachusetts. Through training, technical assistance, and building community/labor alliances, MassCOSH mobilizes its members and develops leaders in the movement to end unsafe work conditions.

# Addressing Work-Related Injuries and Illnesses: A Guide for Primary Care Providers in Massachusetts

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This manual was developed to assist primary care providers understand and help prevent work-related injuries and illnesses. The materials are intended to raise awareness of common hazards in the occupational setting and their potential health effects, and to help providers refer patients to sources of support for addressing underlying causes of injury and disease.

Topics included in this manual were selected by focus groups of Boston-area primary care providers, occupational health specialists, injured workers, and union leaders. These groups identified issues of particular concern to their work and constituencies. Thus, the guide is not meant to be a

comprehensive resource, but rather an introduction to problems commonly seen among primary care patients, especially low-wage and immigrant workers, in eastern Massachusetts.

The manual includes the following tools:

- ◆ A suggested **occupational health history** that can help you determine potential work-relatedness of a health problem
- ◆ A series of **selected occupational profiles** for occupations common among low-wage or immigrant workers
- ◆ A series of **selected health effects profiles** for potentially work-related health effects commonly seen in the primary care setting

The profiles are organized in a standard fashion for easy reference. Standard headings are indicated with icons:

### *Signs and Symptoms*



### *Association with Work*



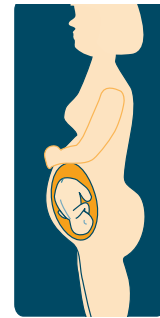
## *Plan*



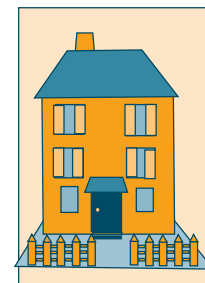
## *Resources for more information*



## *Exposures associated with reproductive or developmental effects are indicated by this icon:*



## *Exposures associated with take-home effects to workers' family members are indicated by this icon:*



**Information on using Workers' Compensation Insurance**, including practical suggestions and an explanation of the importance of this program for your patients

Sections on **prevention tools** and **employer interactions**, including information on where to refer your patients for support in addressing workplace hazards, employees' legal rights to safe and healthy workplaces, recommendations for communicating with both employers and employees about occupational health issues, and **sample letters** to employers

Information on the Massachusetts **Mandatory Reporting System** for certain work-related conditions and a **reporting form** to help you provide required information to the Department of Public Health in a timely fashion

**Resources for more information**, including a resource directory, fact sheets, and referral information

We hope that you will find this information useful in preventing, as well as identifying and treating, work-related illnesses and injuries. Please let us know of any additional information not included here that might be helpful to your work, or of other suggestions for improving this guide: Massachusetts Coalition for Occupational Safety and Health, (617) 825-SAFE, [www.masscosh.org](http://www.masscosh.org).



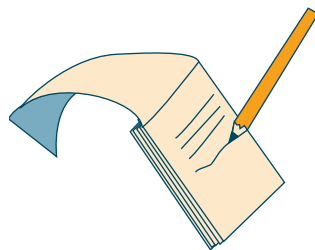


# Section 1 - History Taking

**Contents of this Section** \_\_\_\_\_

*Brief Screening Questions*

*Taking an Occupational/Environmental History*





## Taking an Occupational/Environmental History

Taking a good occupational history can help primary care physicians prevent the onset and progression of illness and potential disability in their patients, as well as help protect others in the same workplace. *American Family Physician* describes three ways in which primary care physicians can improve the detection of occupational disease in their patients:

- ◆ Raise the level of suspicion of occupational disease
- ◆ Build skills for efficiently obtaining an occupational history
- ◆ Develop routine access to occupational medicine resources

Learning about a patient's work does not have to take a lot of time.

- ◆ Use Tool I Quick Screening Questions for Work-Related Conditions to gain fast, helpful information about current jobs and potential work-related conditions.
- ◆ Use Tool II Occupational History for more complex cases or cases that may be related to past jobs, past exposure, or exposures over time.

For information on taking an Environmental History, please see GBPSR's Health Care Provider Fact Sheet in the Resources section of this guide.



## Tool I. Quick Screening Questions for Work-Related Conditions

Patient Name / ID: \_\_\_\_\_

Ask these 5 questions:

1. What type of work do you do?

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2. Do you think your health problem might be related to your work?

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3. Are your symptoms worse during the week or on weekends? At home or at work?

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4. Are you exposed to any of these: chemicals, dust, metals, radiation, noise, or very repetitive work?

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4a. Have you been exposed to any of them in the past?

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4b. Do you use protective gear on the job?

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5. Are any of your co-workers experiencing similar symptoms?

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**Tool II. Occupational History (for more complex situations)**

Patient Name / ID: \_\_\_\_\_

**Part 1: SYMPTOMS**

**1. What are your symptoms?**

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**2. Are your symptoms worse during the week or on weekends? At home or at work?**

[Note: In the case of a work-related condition a temporal relationship may not always exist between symptoms and work.]

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**3. If others at work have similar symptoms or complaints: what jobs do they have? Do they work in the same area? Do they work with the same substances, tools, etc.?**

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**Part 2: CURRENT JOB**

Current symptoms may indicate exposure at current job.

**I. Referring to your current or most recent job:**

**Job title:** \_\_\_\_\_

**Industry:** \_\_\_\_\_

**Name of Employer:** \_\_\_\_\_

**Address:** \_\_\_\_\_

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1. When did you start working at this job? \_\_\_\_\_

2. Are you still working at this job?

Yes       No

2a. If no, when did the job end? \_\_\_\_\_

3. How many hours a week do you work? \_\_\_\_\_hours/week

4. Describe your job tasks, especially parts you feel may be hazardous to your health:

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5. Do you wear protective equipment on this job? (See below for examples)

Yes       No

5a. If yes, what do you use? (check all that are used)

- |   |   |
|---|---|
| <input type="checkbox"/> Gloves _____   | <input type="checkbox"/> Coveralls/apron    |
| <input type="checkbox"/> Safety Glasses | <input type="checkbox"/> Hearing Protection |
| <input type="checkbox"/> Paper mask     | <input type="checkbox"/> Respirator         |
| <input type="checkbox"/> Other _____    |   |

5b. When is this equipment used?

---

---

6. Do you think you should wear protective equipment on this job?

Yes       No

6a. If yes, describe the types of tasks that cause your need for this equipment:

---

---



7. What kind of ventilation is provided for your workplace/work area?

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8. Is there any particular hazard or part of your job that you think is related to your health problems?

Yes       No

8a. If yes, please specify: \_\_\_\_\_

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### Part 3: PAST JOBS

Current symptoms may indicate past exposures — such as to chemicals — at past jobs.

1. Have you ever been off work, switched jobs or quit a job because of a work-related health problem?

Yes       No

1a. If yes, please describe the job and the health problem:

---

---

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### Resources

1. Lax MB, Grant WD, Manetti FA, Klein R (1998). Recognizing occupational disease - taking an effective occupational history. *American Family Physician* 58(4):935-944. Also at: [www.aafp.org/afp/980915ap/lax.html](http://www.aafp.org/afp/980915ap/lax.html)
2. Goldman RH, Peters JM (1981). The occupational and environmental health history. *Journal of the American Medical Association* 246(24):2831-2836.
3. Coye MJ, Rosenstock L (1983). The occupational health history in a family practice setting. *American Family Physician* 28(5):229-234.
4. Agency for Toxic Substances and Disease Registry (ATSDR), Case Studies in Environmental Medicine: Taking an Exposure History at: [www.atsdr.cdc.gov/HEC/CSEM/exphistory/exphist\\_form.html](http://www.atsdr.cdc.gov/HEC/CSEM/exphistory/exphist_form.html)

**II. Employment History** (including military service, part time jobs, self employment, summer jobs, apprenticeships, etc). You can also ask the patient to fill this out during their visit, or take it home and fill it out.

Dates of Employment	<u>Your job (job title, tasks)</u>	<u>Exposures</u>	<u>Protective equipment used</u>



# Section 2 - Occupations

## Contents of this Section

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*Hair and Nail Salon Workers*

*Health Care Aides*

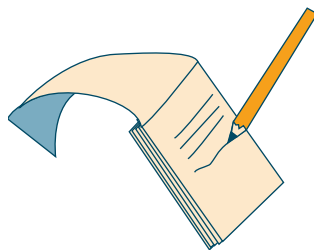
*Janitors*

*Manufacturing Workers*

*Office Workers*

*Residential Construction Workers*

*Restaurant Workers*





**Musculoskeletal Disorders (MSDs)..... 1**  
**Chemical Exposure..... 2**  
**Biological and Physical Agents, Safety..... 4**

If your patient works as a hairdresser, barber, cosmetologist, or nail technician, or if he or she works in a beauty salon, he or she may have injuries and illnesses directly related to work. These may include injuries from physical actions or health effects from chemical exposures. Note that many salon workers are self-employed, “independent contractors” or “booth renters” and, as such, may not have employers.

Some hair and nail salon employers may employ workers directly but neglect to purchase workers’ compensation insurance. The Commonwealth of Massachusetts maintains a fund for covering employees’ medical expenses and lost wages for work-related conditions if their employers lack workers’ compensation insurance.

### Musculoskeletal Disorders (MSDs)

Common musculoskeletal injuries associated with salon work include

- ◆ Carpal tunnel syndrome (CTS) from scissors use and other tasks requiring repetitive fine motor control (braiding, etc.)
- ◆ Low back injury from standing

Accurate diagnosis is key to treatment and to prevention of chronic incapacity. Many conditions require specific techniques for differential diagnosis (e.g., not all wrist pain is carpal tunnel syndrome). Refer to orthopedists, neurologists, or occupational medicine specialists if diagnosis is unclear.

If your patient has a work-related MSD, the current setup of his or her job is likely to exacerbate the condition, prevent recovery, and perhaps cause similar injuries in co-workers. Employers can help prevent these problems with job modifications. Modifications may be quite simple and inexpensive. Examples include improved equipment, adjustments of equipment or furniture, breaks, posture adjustment, introduction of more variability in activity or posture, etc. Employers should be encouraged to seek job evaluations from someone skilled in ergonomics.

### Signs and Symptoms

- ◆ Weakness in the hands or forearms that makes it difficult to lift or carry normal things
- ◆ Tingling, pins and needles
- ◆ Clumsiness: dropping or having to concentrate on holding things
- ◆ Avoidance of or difficulty using hands for ordinary activities
- ◆ Waking up at night with hand, shoulder, or elbow pain
- ◆ Hands cold or tender
- ◆ Chronic pain that gets worse



Note:

*Symptoms may appear in body parts different from those where stress or damage has occurred.*

### Diagnosis

1. Identify range of motion, strength limitations.
2. Document pain, numbness.
3. Have patient demonstrate the motions that trigger the problem and describe requirements of work.

Note:

*Symptoms are easily misdiagnosed as rheumatoid arthritis or other non-work-related conditions.*

## Association with Work

Ask your patient the following questions:

1. Are your symptoms associated with any particular activity at work?
2. Have your work conditions changed recently (hours, tools, assignments)?
3. Do your symptoms improve on vacation, or when you are away from work for more than one day?
4. Did symptoms begin as a result of a slip or fall, injury, or assault at work?

Risk factors for MSDs include repetitive motion, awkward postures, static postures, and forceful exertion.



### Plan

#### Diagnosis

1. Ask 5 brief screening questions in the History Taking section of this guide to explore/confirm work-relatedness.
2. Refer, if necessary, for diagnosis confirmation (e.g., nerve conduction velocity for carpal tunnel syndrome).
3. If the patient is not self-employed, inform him or her about claiming medical benefits from the employer's workers' compensation carrier. This may help the patient obtain wage replacement benefits if needed in the future.
4. If occupational asthma or carpal tunnel syndrome, public health law requires reporting to the MDPH Occupational Health Surveillance Program. Use the Confidential Report of Occupational Disease and Injury included in Mandatory Reporting section of this guide or download the format [www.state.ma.us/dph/bhsre/ohsp/crodi.pdf](http://www.state.ma.us/dph/bhsre/ohsp/crodi.pdf).

#### Treatment and Management

5. If indicated, provide written directions for respite from specific activity (light duty). Specify the amount of time for recovery or the nature of restrictions on work. Ask your patient about the amount and type of work he or she can perform comfortably. (See sample letter in Sample Letters to Employers in this guide.) Light duty may not be available in small businesses.
6. If indicated, prescribe time off work. If the patient is not self-employed and more than five days away from work are indicated, provide information about partial lost wage replacement through workers' compensation.

#### Prevention

7. Ask the patient if he or she feels comfortable with your recommending interventions to the employer. If so, see Intervention Ideas box below and sample letter in Sample Letters to Employers in this guide.

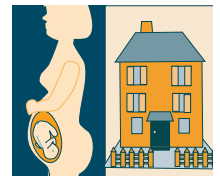
### Intervention Ideas to Prevent MSDs in Hair and Nail Salons

- ◆ Use scissors with your thumb and index or middle finger instead of your ring finger and use ergonomically-designed scissors such as "offset" or "swivel thumb" scissors designed by the Arius-Eickert company, [www.beautytech.com/arius-eickert](http://www.beautytech.com/arius-eickert)
- ◆ Use floor mats and adjustable wheeled stools to avoid back pain.
- ◆ Rotate your tasks, take breaks, reduce your hours, and get assistance with lifting and with the most physically demanding aspects of the job.

### Chemical Exposure

Manufacturers must produce Material Safety Data Sheets (MSDSs) with information about the ingredients and health effects of all chemical products used by salon workers. However, MSDSs are often unavailable in salons, and workers may not know which products they are using. If you are able to identify products used in your patient's workplace you can call the manufacturers and ask them to fax you the MSDSs; look for the MSDSs at [hazard.com](http://hazard.com); or find information about health effects at the Hazardous Substances Data Bank, [toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB](http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB).

Studies have found that hairdressers have elevated risks of dermatitis, asthma, and pregnancy loss. Solvents such as those in nail salon products have been linked with central nervous system effects at high levels of exposure, neurodevelopmental effects to the fetus at lower levels from maternal exposures, and male and female reproductive problems (see Neurologic Conditions and Reproductive and Developmental Disorders profiles in this guide).



## Signs and Symptoms

Be aware that while symptoms may occur quickly, some salon workers develop work-related asthma and other health problems after years of trouble-free work with some products.

Common health problems associated with exposure to salon chemicals:

**Dermatitis** from chemicals (e.g., hair dyes, perfumes, nail acrylics, hydrogen peroxide); frequent hand washing; absence of gloves or improper gloves (e.g. powdered latex gloves for chemical use, latex or vinyl gloves penetrated by monothioglycolates in permanent wave solutions); or contact with salon tools made with nickel.

**Burns** from hair treatment chemicals such as “relaxers” that may have a pH >12.

Work-related **asthma** from sensitizers (quaternary ammonium compounds for disinfection, methyl or ethyl methacrylate or cyanoacrylate in artificial nails, latex gloves, henna) or irritants (ammonia, bleach, hair bleaching products, persulfate boosters in dyes, hair spray, phenolic disinfectants).

Elevated rates of **spontaneous abortions** have been found in some studies of cosmetologists, especially nail technicians. While it is not clear which exposures are to blame, solvent exposures have been linked to spontaneous abortion, other

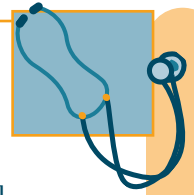
problems with pregnancy, and hormone disruption in both men and women. Male solvent exposure has also been linked to spontaneous abortion in partners.

Formaldehyde, methylene chloride, and n-methyl pyrrolidone in hair and nail products may affect fetal health.

**Effects on fetal brain development** as well as **structural birth defects** can result from high-level maternal exposure to solvents such as xylene and toluene, present in most nail polish base coats. Animal tests suggest that chronic, lower level exposures commonly allowed in the workplace may also pose a risk to fetal development.

Hairdressers and cosmetologists have elevated risks for **some cancers**, including Hodgkin’s disease. Carcinogens in hair and nail products include formaldehyde and methylene chloride. Environmental tobacco smoke may be a concern; cosmetologists and hairdressers have some of the highest smoking rates among female workers. Permanent hair dyes continue to be investigated for possible links to skin, bladder, and other cancers.

Symptoms such as **frequent headache, throat irritation, fatigue, and nausea** may result from exposure to multiple chemicals, environmental tobacco smoke, and inadequate general ventilation in salons.



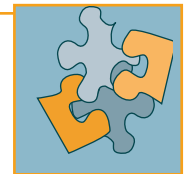
**Children at Risk** Some women who work in nail/beauty salons need to bring young children (including newborns) to the salons, because they have no alternative daycare. These children may spend long hours in poorly ventilated shops, exposed to solvents and irritants.

## Association with Work

Ask your patient the following questions:

- ◆ Have you changed salon products recently?
- ◆ Do you mix chemicals and decant them?
- ◆ Do you apply artificial nails?
- ◆ Have you increased your amount of work time involving chemical product services?
- ◆ Have changes in the weather meant that windows or doors are not open and fans and air conditioners are not in use?
- ◆ Is smoking permitted in your salon?

Assess symptoms associated with work. Note that asthma symptoms may occur hours after exposure and may interrupt sleep.



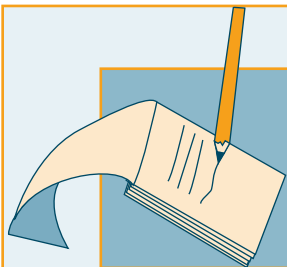
### Plan

#### Diagnosis

1. Ask 5 brief screening questions in the History Taking section of this guide to explore/confirm work-relatedness.
2. If indicated, prescribe time away from work to establish baseline breathing or skin condition. (See sample letter in Sample Letters to Employers in this guide.)
3. Refer, if necessary, to pulmonologist for Pulmonary Function Test. Consider methacholine challenge test to confirm diagnosis of asthma. Consider challenge test to identify asthma trigger. (See Asthma, Dermatitis, or Reproductive and Developmental Disorders profiles in this guide.)

4. If the patient is not self-employed, inform him or her about claiming medical benefits from the employer’s workers’ compensation carrier. This may help the patient obtain wage replacement benefits if needed in the future.

(continued on page 4)



**Plan** (continued from page 3)**Diagnosis**

5. If suspected or confirmed work-related asthma, public health law requires reporting to the MDPH Occupational Health Surveillance Program. Use the Confidential Report of Occupational Disease and Injury included in the Mandatory Reporting section of this guide or download the form at [www.state.ma.us/dph/bhsre/ohsp/crodi.pdf](http://www.state.ma.us/dph/bhsre/ohsp/crodi.pdf).
6. Refer, if necessary, to allergist for patch testing with the "hairdressing series."
7. Refer, if necessary, to occupational medicine specialist, for complex diagnosis or follow-up.

**Prevention**

8. Ask the patient if he or she feels comfortable with your recommending interventions to the employer. If so, see sample letters in Sample Letters to Employers in this guide. See box, "Intervention Ideas to Prevent Hazardous Chemical Exposures in Hair and Nail Salons," below.

**Intervention Ideas to Prevent Hazardous Chemical Exposures in Hair and Nail Salons**

- Use less toxic products and less hazardous application methods (e.g., pump sprays instead of aerosol sprays).
- Decant minimum quantities of chemicals and replace covers.
- Provide hypoallergenic gloves (avoid latex).
- Provide NIOSH-approved dust masks for filing nails and/or mixing powdered chemicals (note that paper masks will not protect against vapors).
- Assure adequate general ventilation. (Building standards require 25 cfm of fresh air per occupant in salons.) Building owners, local building inspectors, and the Massachusetts Division of Occupational Safety's Indoor Air Quality program can determine if the system is adequate. Many salons, however, have no mechanical ventilation at all. Contact DOS at 617-969-7177 or [www.state.ma.us/dos/pages/IAQ.htm](http://www.state.ma.us/dos/pages/IAQ.htm).
- Use vented nail salon tables and/or move hair coloring or nail stations to areas of the salon with better general ventilation.
- Prohibit smoking in the salon.

**Other Hazards: Biological and Physical Agents and Safety**

- Salon workers are at elevated risk of infection from airborne and blood-borne pathogens such as tuberculosis, Hepatitis B and C, and other bacterial, viral, and fungal infections from frequent contact with the public and from working with sharp tools.
- Salon workers should assess which tasks (shaving, etc.) might expose them to blood and should implement universal precautions for those tasks.
- Burns can result from UV light used to cure some nail glues.
- Burns and lacerations can be caused by hair and nail tools.
- Security concerns for salon workers include crime, violence and harassment from clients and members of the public. Refer the patient to OSHA's recommendations on preventing violence in retail establishments: [www.osha.gov/Publications/osha3153.pdf](http://www.osha.gov/Publications/osha3153.pdf) or the OSHA Workplace Violence fact sheet included in the Resources section of this guide.





**Table 1.** Frequently Reported Work Activities and Associated Health Outcomes

Hazardous Activities	Health Outcomes
Cutting and manipulating hair	Carpal tunnel syndrome Lower back pain Lacerations
Standing	Back injuries Foot pain Low birth weight babies Varicosities
Hot tools and UV light	Burns
Contact with the public	Violence Stress Skin infections: impetigo, folliculitis, carbuncles, cellulitis Tuberculosis Hepatitis B and C

**Table 2.** Frequently Reported Chemical Exposures and Associated Health Outcomes

Common Sources of Exposure	Compound	Health Outcomes
Disinfectants	Quaternary ammonium compounds ("quats") Phenolics Formalin	Work-related asthma Eye, nose, and throat irritation Dermatitis Skin depigmentation Some evidence for spontaneous abortion Some evidence for cancer
Gloves	Latex	Respiratory and skin allergies
Hair bleaching	Ammonium persulphate salts Hydrogen peroxide	Work-related asthma Eye, skin, and respiratory irritation and burns Systemic effects Allergic contact dermatitis
Hair dye remover	Urea	Eye, skin irritation
Hair dyes	Ammonia Glycerol Monothioglycolate Henna Persulfates Phenylenediamines 2,4-Diaminoanisole	Allergies Skin and respiratory irritation, Allergic contact dermatitis

Frequently Reported Chemical Exposures and Associated Health Outcomes (continued from page 5)

Common Sources of Exposure	Compound	Health Outcomes
Phenylenediamines	2,4-diaminoanisole	Possible carcinogens
Nail acrylics	Methyl methacrylates Cyanoacrylate catalysts including dimethyl-p-toluidine Solvents including toluene naphthalene, n-butyl acetate	Asthma Dermatitis Eye and respiratory irritation Naphthalene: possible carcinogen headache, skin irritation, cataracts red blood cell hemolysis in G6PD deficient people
Nail polishes and removers	Toluene Xylene Ethanol Isopropanol Methylene chloride Formaldehyde Toluene sulfonamide	Central nervous system depression Eye, skin, and respiratory irritation Spontaneous abortion Hormone disruption Birth defects Neurodevelopment Some evidence for cancer
Permanent wave solutions	Thioglycolates	Irritant dermatitis Allergic contact dermatitis
Metal tools	Nickel	Allergic contact dermatitis

**Resources**

**Articles and resources on salon health concerns**

[www.beautytech.com](http://www.beautytech.com)  
[www.nailsmag.com](http://www.nailsmag.com)

**Training curriculum**

"Health and Safety for Hair Care and Beauty Professionals"  
[www.lohp.org](http://www.lohp.org)

**Hazard control and prevention**

Alternatives for Community and Environment "Healthy Hair Campaign": [www.ace-ej.org](http://www.ace-ej.org)

**Toxics Use Reduction Institute (www.turi.org)**

[www.turi.org/community/smallbusiness/HealthyCosmetology.shtml](http://www.turi.org/community/smallbusiness/HealthyCosmetology.shtml)  
[www.turi.org/PDF/HairRelaxing.pdf](http://www.turi.org/PDF/HairRelaxing.pdf)  
[www.turi.org/PDF/Bleaching.pdf](http://www.turi.org/PDF/Bleaching.pdf)  
[www.turi.org/PDF/HairColoring.pdf](http://www.turi.org/PDF/HairColoring.pdf)

**Ventilation**

NIOSH. Controlling Chemical Hazards During the Application of Artificial Fingernails [www.cdc.gov/niosh/hc28.html](http://www.cdc.gov/niosh/hc28.html)

**Ergonomics**

Avoiding Carpal Tunnel Syndrome  
[www.arius-eickert.com/articles/carpal.asp](http://www.arius-eickert.com/articles/carpal.asp)

**Violence prevention**

OSHA. Recommendations for Workplace Violence Prevention Programs in Late-Night Retail Establishments  
[www.osha.gov/Publications/osha3153.pdf](http://www.osha.gov/Publications/osha3153.pdf)



**Musculoskeletal Disorders** ..... 1  
**Chemical Exposure** ..... 2  
**Infectious Disease** ..... 4  
**Stress** ..... 4



Nursing aide work is a leading growth occupation in the healthcare industry, with employment expected to increase 30% by the year 2006.

Nursing aides are three times more likely to experience a back injury than registered nurses and commonly suffer from dermatitis. Latex allergy affects 5-12% of health care workers. Nursing home workers experience higher rates of injury than hospital workers, construction workers, or miners.

Nursing aides are responsible for the majority of patient lifting, patient transferring, and repositioning. They are often the primary workers present when a patient slips, falls, or is combative. Physical postures and loading required can exceed human biomechanical limits.

Nursing aides are also responsible for dozens of other tasks such as toileting and feeding patients, as well as bed making, tidying, and handling messy emergencies. Nursing aides are exposed directly or indirectly to cleaning agents, disinfectants, and chemotherapeutic agents. More than 300 chemicals are in use in hospitals – twice as many as in most manufacturing facilities.

Nursing aides are at risk of exposure to infectious diseases such as hepatitis B, hepatitis C, HIV, and tuberculosis. Sources of exposure include used sharps, particularly needles discarded inappropriately (in linens, garbage, patient care surfaces, etc.); patient bites; soiled linens and clothes; bedpans; and patients with infections, including undiagnosed TB.

Nursing aides may be exposed to violence from combative patients and patients' family members and experience lost work time due to assault on the job.

Sources of psychological stress faced by nursing aides include

- ◆ responsibilities for which they are not qualified or not fairly compensated
- ◆ very low wages for physically demanding work
- ◆ excessive workloads
- ◆ little control over the design of their jobs

## Musculoskeletal Disorders (MSDs)

### Signs and Symptoms

Common musculoskeletal disorders among nursing aides include low back pain and shoulder injuries from patient-lifting tasks, sprains and strains from overexertion, and slips and falls from wet, slippery floors (see Table 1, page 2).

1. Document pain, stiffness, numbness, burning, or tingling in the affected body region.
2. Identify functional limitations associated with the symptoms (range of motion, strength limitations, etc.).
3. See Back Injuries and Musculoskeletal Disorders profiles in this guide.



### Association with Work

- ◆ Ask the patient to describe, and to demonstrate, the specific job tasks he or she believes caused or exacerbated an injury.
- ◆ Ask the patient to describe the types of patient lifting and transferring tasks he or she performs regularly. Identify lifting or assistive devices used, if any. Such devices vary in quality and effectiveness. Determine whether lifting is conducted alone or in teams/groups and which lifting techniques are used with different patient types and sizes. Ask if the facility has a specific protocol for extra-large patients.
- ◆ Ask the patient to describe the specific hand motions that are most stressful (e.g., opening unit-dose medications, peeling open plastic wrap products, pulling laundry carts with sharp cut-out handles, pinching food trays while serving with the other hand, lifting and repositioning equipment, making beds, etc.).



- ◆ Ask your patient these questions:

Do any of your co-workers suffer from similar or related symptoms?

Do your symptoms affect activities off the job? If so, how?

**Table 1. Musculoskeletal Disorders**

Common Tasks and Exposures	Health Effects
Patient lifting, transferring, repositioning, e.g., transferring bed-to-wheelchair, lifting sit-to-stand (weight bearing patients) adjusting patient slumped in chair, preparing patient for transfer into a sling or lifting device	Acute back pain (especially low back) such as: muscle (e.g., erector spinae) strain; injuries to ligaments, facet joints; intervertebral disc injury (e.g., herniation); sciatica Neck, shoulder, arm, wrist, hand, and lower extremities symptoms
Working in a bent posture: bed-making, lifting objects from floor, retrieving from lowshelves	Back pain Muscle sprains
Static postures of long duration: patient bathing, feeding, etc.	Back pain Neck pain Upper extremity strain
Hand-intensive work with force: opening supply packets, unit-dose medication packets, vacuum-packed items	Tendinitis Tenosynovitis Carpal tunnel syndrome Epicondylitis
Pushing/pulling: food or laundry carts, wheelchairs, shower chairs, gurneys, geri chairs	Low back pain Upper extremity symptoms
Overhead work lifting or lowering objects from high shelves	Neck/shoulder injury Thoracic outlet syndrome Other

## Chemical Exposure

### Signs and Symptoms

New onset asthma or aggravation of existing asthma can be associated with exposures commonly encountered by nursing aides. Symptoms may include shortness of breath, coughing, wheezing, and “tight throat.” Onset of symptoms at night can obscure the association with workplace exposures.

- ◆ Ask the patient about “difficulty breathing,” chest tightness, or asthma that started while working in healthcare.
- ◆ If such symptoms are reported, suspect work-related asthma. See Asthma profile in this guide.

Both contact and allergic dermatitis may be associated with nursing aide work. Document dermatitis. See Dermatitis profile in this guide. Some chemicals used in the patient care setting may be reproductive toxins. If your patient is pregnant, is considering pregnancy or parenthood, or is experiencing menstrual changes, see Reproductive and Developmental Disorders profile in this guide.



### Association with Work

Common exposures that could trigger new onset asthma include quaternary ammonium compounds, formaldehyde, or glutaraldehyde used to disinfect. Natural rubber latex gloves may be associated with work-related asthma. Irritants might include bleach, ammonia, floor strippers, and buffing chemicals.

Common exposures associated with dermatitis include cleaning products and disinfectants, and natural rubber latex products. For more information about cleaning chemicals, see the Janitors profile in this guide.

Secondhand exposure to medications and anesthetic gases may occur, depending upon the clinical areas in which your patient works and the types of controls in place. Ask your patient about the areas where he or she works and about any medications he or she helps to administer.



- ◆ If the worker reports respiratory symptoms, ask which products he or she believes exacerbate the symptoms. Probe for information on floor buffers, carpet cleaners, disinfectants, cleaners, air fresheners, perfume from co-workers or visitors, etc. Record the common name, form (aerosol/spray/etc.), and intended purpose of the product. Determine whether the patient uses the product directly or is exposed second-hand.
- ◆ If hand dermatitis, ask about the above-mentioned exposures, also handwashing protocols, disinfectant soaps used, alcohol-based rinses required, and availability of alternative products. Find out if the worker is responsible for using disinfectant “soaks” (e.g., glutaraldehyde). Ask about types of gloves provided to conduct these tasks and glove use in general.
- ◆ Obtain Material Safety Data Sheets (MSDSs) for chemicals used at the patient’s job. MSDSs describe health effects associated with exposure and required safety measures. Employers are required by law to make them readily accessible to employees.

You can

- ◆ Ask your patient to obtain MSDSs for chemicals used at the job or work area; or
- ◆ Ask your patient if he or she belongs to a union. If so, the patient can contact the steward or field representative to help obtain the MSDSs; or
- ◆ Ask your patient’s permission to write a letter to the employer to request the MSDSs (see sample letter in Sample Letters to Employers in this guide); or
- ◆ Ask the patient to note down product names and numbers from the labels of substances used. You can obtain most MSDSs from the database at [hazard.com](http://hazard.com).

MSDSs may be incomplete or outdated, frequently fail to list sensitizers and reproductive toxins, and do not list ingredients present at less than 1%. You can call the telephone numbers on MSDSs for further information or obtain additional information at the Hazardous Substances Data Bank: [toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm](http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm).

**Table 2. Chemical Exposures**

Hazard	Health Effects
Low level disinfectants* and cleaning chemicals Quaternary ammonium compounds (QAC) Phenolic compounds * used to disinfect environmental surfaces and certain medical equipment	QAC: skin and respiratory irritation, occupational asthma Phenolics: skin depigmentation, other
High level disinfectants** Glutaraldehyde Note: Many safer alternatives are on the market. **used to cold soak semi-critical medical devices FDA approved	Contact dermatitis Allergic dermatitis Occupational asthma
Latex Natural rubber latex proteins and chemical additives	Allergic response can range from type IV delayed hypersensitivity to type I immunologic response, anaphylactic shock, and death.
Poor indoor air quality Inadequate ventilation of chemicals, pharmaceuticals Infectious agents	Headache Malaise Variety of effects on the respiratory tract, eyes, skin, etc. “Sick Building Syndrome”
Anaesthetic gases (various)	Neurologic effects Reproductive effects Hepatic toxicity
Anti-neoplastic drugs (various)	Cancer Mutagenicity Reproductive effects
Sterilization agents Ethylene oxide (EtO)	Peripheral neuropathy Cancer Reproductive effects
Aerosolized medications (various, e.g., Ribavirin)	Ribavirin: potential human teratogen

## Infectious Disease

### Association with Work

To evaluate exposure to infectious agents, ask questions such as:  
 Do you handle clothing soiled with blood or feces?  
 Do you ever find sharps or needles in bedding or laundry?  
 Do any of your patients have tuberculosis?



- ◆ Determine whether the patient has been offered the Hepatitis B series and, if so, whether he or she has received the whole series.
- ◆ If your patient has sustained a needlestick or other sharps injury, find out if he or she reported this incident and, if so, whether postexposure prophylaxis was provided.
- ◆ For information about bloodborne pathogens and the standard that protects workers from exposure, see OSHA's Bloodborne Pathogens Factsheet: [www.osha.gov/SLTC/hospital\\_etool/hazards/bbp/bbp.html](http://www.osha.gov/SLTC/hospital_etool/hazards/bbp/bbp.html).

## Stress

### Signs and Symptoms

Stress, shift work, excessive noise exposure and other stressors may cause increases in blood pressure. In a person with incipient hypertension, these hazards may cause frank disease.



- ◆ Evaluate symptoms associated with shift work, including sleep disorders, eating disorders, anxiety, depression, and stress-related diseases.
- ◆ Ask about chronic hypertensive disease symptoms that might resemble gastrointestinal symptoms.

### Association with Work

- ◆ Document the shifts worked by the patient, the total number of hours per day, the frequency of overtime or unanticipated workshifts, etc. Also document whether the patient works different shifts on different days, and the extent to which she or he is able to choose shifts. Describe the ways the shift work affects home life (e.g., time with children, time with spouse, need for childcare arrangements, ability to sleep, participation in cultural or religious activities, etc.).
- ◆ If anxiety or depression, investigate care of combative patients as well as shift work. Find out if the patient has ever been a victim of a workplace assault; if so, identify the physical and psychological effects and sense of security on the job. Ask the worker if he or she told someone on the job and, if so, what type of response and follow-up was received.



Table 3. Work Organization/Psychosocial Stressors

Hazard	Health Effects
Job Strain/ Lack of control over job requirements	Psychological distress Hypertension Cardiovascular disease
Violence	Physical trauma Psychological trauma Death
Latex Natural rubber latex proteins and chemical additives	Allergic response can range from type IV delayed hypersensitivity to type I immunologic response, anaphylactic shock, and death
Facility restructuring or reorganization	Mental health disorders, e.g., depression, anxiety
Shift work	Sleep disorders Gastrointestinal problems Weight gain
Noise	Headaches Irritability Impaired concentration Impaired attention to detail



## Plan

### Diagnosis

1. Ask 5 screening questions in the History Taking section of this guide to explore/confirm work-relatedness. Note employer name and full facility address.
2. Refer, if necessary, for diagnosis or management of complex work-related problems, for example
  - low back disorder (imaging studies are of little use except for disc herniation)
  - upper extremity disorders (to an occupational medicine physician)
  - mental health symptoms including impact from assaults or trauma
3. Obtain Material Safety Data Sheets (MSDSs) for chemicals used at the patient's job. See additional information at the Hazardous Substances Data Bank: [toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm](http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm).
4. Inform the patient about claiming medical benefits from the employer's workers' compensation carrier. This may help the patient obtain wage replacement benefits if needed in the future.
5. If occupational asthma or carpal tunnel syndrome, public health law requires reporting to the MDPH Occupational Health Surveillance Program. Use the Confidential Report of Occupational Disease and Injury included in the Mandatory Reporting section of this guide or download the form at [www.state.ma.us/dph/bhsre/ohsp/crodi.pdf](http://www.state.ma.us/dph/bhsre/ohsp/crodi.pdf).

### Treatment and Management

6. If the worker was potentially exposed to a bloodborne pathogen, refer to the OSHA Bloodborne Pathogen Standard for specific and detailed post-exposure protocols. See [www.osha.gov/SLTC/bloodbornepathogens/index.html](http://www.osha.gov/SLTC/bloodbornepathogens/index.html).
7. If indicated, provide written directions for respite from specific activity (light duty). Ask your patient about the amount and type of work he or she can perform comfortably. Find out if the employer has an appropriate return-to-work program. Specify the amount of time for recovery and the nature of restrictions on work (see sample letter in Sample Letters to Employers in this guide).
8. Encourage the patient not to perform any patient handling activities while in active pain. Be aware that back belts do not prevent injury. See Back Injuries profile in this guide.
9. If indicated, prescribe time off work. If 5 or more days away from work are indicated, provide information about partial lost wage replacement through workers' compensation.
10. If obtaining workers' compensation seems infeasible, discuss with the patient how much work he or she can afford to miss. Ask if the employer or union provides disability benefits. Social Security benefits may be available if you determine that a condition totally disables a patient from working and is likely to do so for at least 12 months. Check eligibility for the Family and Medical Leave Act in the Legal Rights profile in this guide.
11. Discuss strategies for gaining employer support for a recovery and return-to-work plan. Discuss potential patient concerns about adverse consequences for reporting illness. If your patient is an immigrant, discuss concerns about potential immigration-related consequences, such as loss of work permits (green cards) or visas.

### Prevention

12. Provide resource materials on devices that reduce or eliminate hazards. See Resources section of this profile.
13. If the patient agrees, write a letter to the employer recommending preventive measures or providing references from Resource section of this profile (see sample letter in Sample Letters to Employers in this guide).
14. Educate the worker regarding the health effects of rotating shifts (GI effects, sleep disorders, eating irregularities, etc).

continued on page 6

**Plan** *continued from page 5*

15. If your patient belongs to a union, encourage him or her to contact the steward or union representative. If your patient agrees, consider contacting the union directly with information about hazards, health effects, and recommended interventions.
16. You or your patient can contact MassCOSH (617-825-SAFE) or an organization listed in the Resources section of this guide for additional information and support.

## Resources

### MSD Prevention/Ergonomics

Back Injury Prevention Guide in the Health Care Industry for Health Care Providers, California Division of Occupational Safety and Health, [www.dir.ca.gov/dosh/puborder.asp](http://www.dir.ca.gov/dosh/puborder.asp)

Directory of Patient Handling Equipment, New York Public Employees Federation, available from MassCOSH (617-825-SAFE)

Guidelines for Nursing Homes, OSHA, provides information for employers to identify ergonomic stressors and implement practical controls, [www.oshaslc.gov/ergonomics/guidelines/nursinghome/index.html](http://www.oshaslc.gov/ergonomics/guidelines/nursinghome/index.html)

Rental equipment for bariatric (obese) patients [www.sizewiserentals.com](http://www.sizewiserentals.com)

Safe Patient Handling and Movement, Veteran's Health Administration, information for health care facilities on 1) workplace assessment, 2) equipment evaluation, 3) patient assessment, 4) no-lift policies, 5) administrative strategies, and 6) establishing competency programs, [www.patientsafetycenter.com](http://www.patientsafetycenter.com)

Strategies to Reduce the Risk of Back Strain in Nursing Homes, Government of Western Australia, [www.safetyline.wa.gov.au/pagebin/manhhazd0022.htm](http://www.safetyline.wa.gov.au/pagebin/manhhazd0022.htm)

Ergonomics Information (various), National Institute for Occupational Safety and Health (NIOSH) [www.cdc.gov/niosh/ergopage.html](http://www.cdc.gov/niosh/ergopage.html)

### Safer Products

Janitorial Chemicals Safety Project [www.westp2net.org/Janitorial/current.htm](http://www.westp2net.org/Janitorial/current.htm)

Cleaning for Health: Products and Practices for a Safer Indoor Environment, Inform, Inc. 2002, [www.informinc.org](http://www.informinc.org)

Alternatives to glutaraldehyde and the factsheet "10 Reasons to Eliminate Glutaraldehyde" [www.sustainablehospitals.org](http://www.sustainablehospitals.org); click on "Glutaraldehyde"

Alternatives to latex gloves [www.sustainablehospitals.org](http://www.sustainablehospitals.org); click on "Latex & Gloves"

Diagnostic Quick Reference, Environmental Protection Agency, Indoor Air Quality information, [www.epa.gov/iaq/pubs/hpguide.html#Diag](http://www.epa.gov/iaq/pubs/hpguide.html#Diag) Quick Ref Occupational Hygiene/Indoor Air Quality Program, Massachusetts Division of Occupational Safety, [www.state.ma.us/dos/pages/IAQ.htm](http://www.state.ma.us/dos/pages/IAQ.htm)

### Reducing Workplace Stress

Hospital eTool: Stress [www.osha.gov/SLTC/hospital\\_etool/hazards/stress/stress.html](http://www.osha.gov/SLTC/hospital_etool/hazards/stress/stress.html)  
Violence, Occupational Hazards in Hospitals, NIOSH, [www.cdc.gov/niosh/pdfs/2002-101.pdf](http://www.cdc.gov/niosh/pdfs/2002-101.pdf)

Guidelines for Preventing Workplace Violence for Healthcare and Social Service Workers, OSHA, [www.osha-slc.gov/SLTC/workplaceviolence/guideline.html](http://www.osha-slc.gov/SLTC/workplaceviolence/guideline.html)

Resource List for Workplace Violence Prevention, New York Public Employees Federation, [www.pef.org](http://www.pef.org)

Plain Language About Shiftwork, NIOSH, [www.cdc.gov/niosh/97-145.html](http://www.cdc.gov/niosh/97-145.html)

Hospital eTool: Noise, OSHA, [www.osha.gov/SLTC/hospital\\_etool/hazards/noise/noise.html](http://www.osha.gov/SLTC/hospital_etool/hazards/noise/noise.html)





**Musculoskeletal Disorders (MSDs)..... 1**  
**Chemical Exposure..... 3**  
**Immigration Issues..... 5**

Janitors (custodians, cleaners) are at risk for a wide variety of conditions: fatal myocardial infarctions, occupational asthma, carpal tunnel syndrome, back pain, and cancers including lung cancer, high-grade or late-stage bladder tumors, and aggressive prostate tumors. Janitors are also at risk for blood-borne diseases, occupational dermatitis, eye injuries, chemical burns, and asbestosis.

Janitors using hard surface cleaners, carpet cleaners, graffiti removers, pesticides, or certain specialty products may be exposed to mixtures of organic solvents which target the nervous system and may cause both acute (narcosis) and chronic (neurobehavioral) effects. Some solvents have been associated with peripheral neuropathy, others with hearing loss, yet others with reproductive harm. Solvent exposure may mimic alcohol exposure.

Women janitors are at risk for preterm delivery and stillbirth. Janitors’ children have increased odds of birth defects including hydrocephalus and ventricular septal defects. Children whose fathers have been employed as janitors are several times more likely than the general population to have Down’s syndrome. In addition to reproductive impacts, janitors’ children may also be at risk from “take-home” exposures such as to chemicals in pesticides, paints, glues, cleaners, and other solvents if these substances are stored at home or in the family’s vehicle.

Many janitors work for more than one employer at more than one site. You may need to probe to identify the worksites or ask to see pay stubs to identify the employers.

**Musculoskeletal Disorders (MSDs)**

Accurate diagnosis is key to treatment and to prevention of chronic incapacity. It is important to resist the temptation to use catch-all diagnoses (e.g., not all wrist pain is carpal tunnel syndrome). Refer to orthopedists, neurologists, or occupational medicine specialists if diagnosis is unclear.

If your patient has a work-related MSD, the current setup of his or her job is likely to exacerbate the condition and prevent recovery, and could, perhaps, cause similar injuries in co-workers. Employers can help prevent these problems with job modifications that may be quite simple and inexpensive, including improved or adjusted equipment, equipment maintenance, breaks, introduction of more variability in activity, etc. Employers should be encouraged to seek job evaluations from someone skilled in ergonomics. Worksite improvements are the most effective way to prevent these disorders.



**Signs and Symptoms**

Table 1.

Tasks	Health Outcomes/Injuries
Repetitive mopping and sweeping	Carpal tunnel syndrome Upper extremity discomfort and disability: Rotator cuff injury, Tenosynovitis
Moving furniture	Back injuries Acute strains and sprains
Folding, arranging heavy awkward furniture	Back injuries Acute strains and sprains
Carrying backpack vacuum cleaners up and down stairs	Neck, shoulder, back injuries
Poorly maintained vacuum cleaners and floor buffers for stripping and waxing	Hearing loss Back, shoulder, arm injuries

## Signs and Symptoms *continued from page 1*

Activities	Health Outcomes/Injuries
Working bent over Lifting from below knee level	Back injuries, especially L5-S1
Working with arms overhead Lifting from shelves over shoulder height	Neck and shoulder injuries: Thoracic outlet syndrome, Rotator cuff injury
Work after hours when ventilation, heating, or air conditioning systems are turned down or off	Heat stress Risk of MSDs exacerbated by cold

### Diagnosis

1. Identify range of motion, strength limitations.
2. Document pain, numbness.
3. Have patient demonstrate the motions that trigger the problem and describe requirements of work.



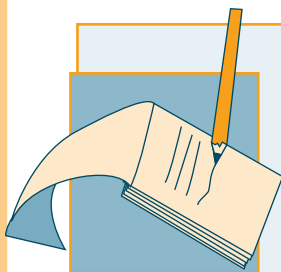
### Association with Work

Ask your patient the following questions:

1. Are your symptoms associated with any particular activity at work?
2. Have your work conditions changed recently (hours, tools, assignments)?
3. Do your symptoms improve on vacation, or when you are away from work for more than one day?
4. Did symptoms begin as a result of a slip or fall, injury, or assault at work?



Risk factors for MSDs include repetitive motion, awkward postures, static postures, and forceful exertion.



### Plan

#### Diagnosis

1. Ask your patient the exact name of his or her employer(s) and address of work site(s).
2. Ask 5 brief screening questions in the History Taking section of this guide to explore/confirm work-relatedness.
3. Inform the patient about claiming medical benefits from the employer's workers' compensation carrier. This may help the patient obtain wage replacement benefits if needed in the future.
4. Refer, if necessary, for diagnosis confirmation (e.g., nerve conduction velocity for carpal tunnel syndrome).
5. If carpal tunnel syndrome, public health law requires reporting to the MDPH Occupational Health Surveillance Program. Use the Confidential Report of Occupational Disease and Injury included in the Mandatory Reporting section of this guide or download the form at [www.state.ma.us/dph/bhsre/ohsp/crodi.pdf](http://www.state.ma.us/dph/bhsre/ohsp/crodi.pdf).
6. For complex diagnosis of work-related constellation of problems, refer to an occupational medicine specialist.

#### Prevention

7. If the patient agrees, you can write a letter to the employer recommending preventive measures. See sample letters in the Employer Interactions section. If the patient belongs to a union, encourage him or her to contact the shop steward or field representative (see "Do You Have a Union?" p. 6). Examples of interventions to prevent injury include:
  - ◆ Repair and maintain vacuum cleaners, floor buffers, and wheels on all carts
  - ◆ Add thick padding to handles so they are easier to grasp and maneuver
  - ◆ Replace old, heavy mops or brooms with lighter ones
  - ◆ Introduce job rotation, assistance with lifting and with the most physically demanding aspects of job
8. You can also encourage your patient to consult MassCOSH (617-825-SAFE ) or an organization listed in the Resources section. Be aware of immigration concerns (see p. 5).

*continued on page 3*

**Plan** *continued from page 2*

9. If indicated, provide written directions for respite from specific activity (light duty). Specify the amount of time for recovery or the nature of restrictions on work. Janitors are often unable to alter their pace of work or rest as needed. Ask your patient about the amount and type of work he or she can perform comfortably. See Sample Letters to Employers in this guide.
10. If indicated, prescribe time off work. If more than five days away from work are indicated, provide information about partial lost wage replacement through workers' compensation. Call the employer (Human Resources office if a large company) to ensure that a First Report of Injury has been filed with the Department of Industrial Accidents.
11. If obtaining workers' compensation seems infeasible, discuss with the patient how much work he or she can afford to miss. Ask if the employer or union provides disability benefits. Social Security Disability benefits may be available if you determine that an MSD totally disables a patient from working and is likely to do so for at least 12 months. If the company employs at least 50 people within 75 miles, provide information about the Family and Medical Leave Act (see Legal Rights to Safety and Health profile). Discuss strategies for gaining employer support for a recovery and return to work plan.

## Chemical Exposure

Janitors often work after hours when building ventilation, heating, or air conditioning systems are turned down or off. They may therefore experience increased exposure to chemicals and dusts. Janitors frequently lack access to the protective equipment and practices indicated for use with given chemicals.



## Signs and Symptoms

Common health problems associated with exposure to janitorial chemicals:

- ◆ Dermatitis from harsh chemicals, frequent hand washing, absence of gloves, or improper gloves (e.g., powdered latex gloves for chemical use)
- ◆ Work-related asthma from sensitizers (quaternary ammonium compounds for disinfection) or irritants (ammonia, bleach, phenolic disinfectants)
- ◆ Acute episodes of RADS (reactive airway dysfunction syndrome) from mixing of irritant chemicals, spills or releases
- ◆ Neurobehavioral effects from solvent exposure (acute high-level and chronic low-level)
- ◆ Potential increased risk for some childhood cancers and birth defects from solvent exposure to pregnant women. Solvents easily cross the placental barrier and can impact the developing fetus. Animal and human studies show impacts on the developing brain.
- ◆ Headache, fatigue, lethargy from inadequate air exchange

**Table 2.** Selected Chemical Exposures in Janitorial Work

Compound	Common Sources of Exposure	Health Outcomes/Symptoms
2-Butoxyethanol	Cleaners Floor strippers	Work-related asthma Systemic effects, especially renal Eye, skin irritation CNS depression, other neurological effects Headache
Alcohols: isopropyl, ethyl, methyl, propyl	Alcohols Cleaners	Ethanol may lead to CNS depression Methyl more acutely hazardous.

*table continued on page 4*

Compound	Common Sources of Exposure	Health Outcomes/Symptoms
Ammonia	Ammonia Cleaners	Eye, nose, throat, skin irritation
Ethanolamine	General purpose cleaners	Skin, eye, respiratory irritation Headache Lethargy, narcosis Neurological effects Reproductive effects
Organic solvents (various: consult MSDSs, Hazardous Substances Data Bank)	Carpet cleaners Graffiti removers Hard surface cleaners,	Neurobehavioral effects for some: damage to reproductive system, hearing, etc.
Phenolics	Disinfectants (hospital)	Work-related asthma Eye, nose, throat irritation Skin depigmentation Dermatitis Neurological effects
Quaternary ammonium compounds (Quats)	Disinfectants (cafeteria, restaurant, hospital)	Work-related asthma Eye, nose, throat irritation Dermatitis
Sodium hypochlorite	Bleach	Eye, nose, throat, skin irritation
Sodium lauryl sulfate	Detergents, cleaners	Allergic contact dermatitis
Sulfonate surfactants	General purpose cleaners, Detergents	Skin, eye irritation
Variety of toxins and solvents (consult MSDSs, Hazardous Substances Data Bank)	Pesticides	Acute intoxication Neurological effects Reproductive effects Respiratory effects

### Association with Work

Ask your patients the following questions:

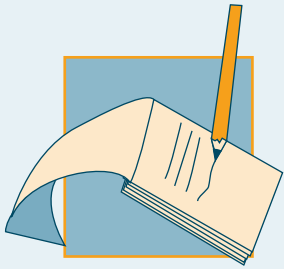
1. Has the employer changed cleaning products recently?
2. Do you control addition of the cleaning agent to water? Do you ever add extra to boost cleaning ability?
3. Do you strip floors, or perform other specialty cleaning?

The following factors should also be considered:

4. Assess symptoms associated with work. Note that asthma symptoms may occur hours after exposure and may interrupt sleep.
5. Some custodial workers develop work-related asthma and other health problems after years of trouble-free work with some products.
6. Ask the patient or the union if other co-workers have similar symptoms.
7. Ask your patient to request Material Safety Data Sheets (MSDSs) for all chemicals used at the patient's workplace. These should describe health effects associated with each product. If your patient does not wish to request these, ask him or her to note down the information on the labels of the substances used in the work area. You can then obtain most MSDSs from the database at [hazard.com](http://hazard.com).

MSDSs can be incomplete or out of date. Also, they do not list ingredients present at less than 1% and frequently fail to list sensitizers or reproductive toxins. You can call the telephone numbers on MSDSs for further information or obtain additional information at the Hazardous Substances Data Bank, [toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm](http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm).





## Plan

### Diagnosis

1. Ask your patient the exact name of his or her employer(s) and address of work site(s).
2. Ask 5 brief screening questions in the History Taking section of this guide to explore/confirm work-relatedness.
3. Obtain Material Safety Data Sheets (MSDSs) for all chemicals used at the patient's workplace. See additional information at the Hazardous Substances Data Bank [toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm](http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm).

4. Consider potential chronic effects (cancers, neurological, reproductive, or developmental disorders) of exposure to the chemicals causing acute effects.

5. Inform the patient about claiming medical benefits from the employer's workers' compensation carrier. This may help the patient obtain wage replacement benefits if needed in the future.

6. Refer, if necessary, to pulmonologist for Pulmonary Function Test. Consider methacholine challenge test to confirm diagnosis of asthma. Consider challenge tests to identify asthma triggers. (See Asthma, Dermatitis, or Reproductive and Developmental Disorders profiles in this guide.)

7. Refer for complex diagnosis of work-related constellation of problems to an occupational medicine specialist.

### Prevention

8. If the patient agrees, you can write a letter to the employer recommending preventive measures. If the patient belongs to a union, you can work with the union to recommend these changes. Encourage the patient to contact his or her shop steward or field representative (see box below).

9. You can also encourage the patient to consult MassCOSH (617-825-SAFE) or an organization listed in Resources. Be aware of immigration concerns (see below).

10. If indicated, prescribe time away from work to establish baseline breathing or skin condition. See sample letter in Employer Interactions section. If more than five days away from work are indicated, provide information about partial lost wage replacement through workers' compensation. Call the employer (Human Resources office if a large company) to ensure that a First Report of Injury has been filed with the Department of Industrial Accidents.

11. If obtaining workers' compensation seems infeasible, discuss with your patient how much work he or she can afford to miss. Ask if the employer or union provides disability benefits. Social Security Disability benefits may be available if you determine that a condition totally disables a patient from working and is likely to do so for at least 12 months. If the company employs at least 50 people within 75 miles, provide information about the Family and Medical Leave Act (see Legal Rights to Safety and Health profile in this guide).

### Immigration Issues

Many cleaning workers are immigrants. You may need to reassure them that workers' compensation covers all workers regardless of their immigration or citizenship status.

Workers may be concerned about threatened deportation or other adverse consequences for raising concerns about job safety. Such retaliation is illegal but does occur in this industry. If your patient is concerned about adverse consequences for using workers' compensation or seeking to correct hazards, encourage him or her to contact the union or MassCOSH, 617-825-SAFE. MassCOSH has special programs for immigrant workers.

### “Do you have a union?”

Around 20,000 janitors in Massachusetts are union members. Ask your patients if they are members:

- ◆ The union can help them correct unsafe conditions at their job.
- ◆ The union can identify and help co-workers with similar conditions.
- ◆ Some union members have access to short-term disability benefits that pay a portion of their lost wages if they miss work due to non-occupational causes.

Some janitors might not know that they are union members! You can ask them if dues are deducted from their paycheck.

You can encourage janitors to speak with their stewards or field representatives. You may also wish to contact the union directly with questions or concerns. The main Boston union that represents janitors is SEIU Local 615: 617-523-6150. Ask to speak to the Building Services representative for the patient’s work site.

### Resources

Barron T, Berg C, Bookman L. (1999). How to Select and Use Safe Janitorial Chemicals. Project Completion Report, Pollution Prevention Incentives for States. Santa Clara, U.S. EPA Region IX. [www.westp2net.org/Janitorial/Appendix%20Part%201.pdf](http://www.westp2net.org/Janitorial/Appendix%20Part%201.pdf).

Center for Research on Occupational and Environmental Toxicology. Janitors and Custodians. [www.croetweb.com/outreach/croetweb/links.cfm?topicID=18](http://www.croetweb.com/outreach/croetweb/links.cfm?topicID=18).

Culver A, Feinberg M, Klebenov D, Muskinow J, Sutherland L. (2002). Cleaning for Health: Products and Practices for a Safer Indoor Environment. New York: INFORM, Inc; [www.informinc.org/cleanforhealth.php](http://www.informinc.org/cleanforhealth.php).



**Miscellaneous Operations Found in Many Industries..... 1**  
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The manufacturing sector employs over 436,000 workers, representing about 15% of private industry workers in Massachusetts, and tends to employ many minority and immigrant workers. Immigrants account for almost one quarter of manufacturing workers in Massachusetts.

Manufacturing, the mechanical or chemical transformation of materials into new products, encompasses a broad range of industries in Massachusetts. Manufacturing workplaces may be noisy, dirty, cluttered, busy, hot or cold (depending on the season); may have poor lighting; and often present numerous safety and health hazards. This profile provides specific information about only a few of the common manufacturing processes and hazards found in Massachusetts.

### Material Safety Data Sheets

MSDSs describe health effects associated with chemical exposure, as well as recommended safety measures. Employers are required by law to make them readily accessible to employees.

- ◆ Ask your patient to obtain MSDSs for chemicals used at the patient’s work area, or
- ◆ Ask your patient if he or she belongs to a union. If so, the patient can contact the steward or field representative to help obtain the MSDSs, or
- ◆ Ask your patient’s permission to write a letter to the employer to request the MSDSs (see sample letter in Sample Letters to Employers in this guide), or
- ◆ Ask the patient to note down product names and numbers from the labels of substances used. You can then obtain most MSDSs from the database at the website [hazard.com](http://hazard.com).

MSDSs can be incomplete or outdated. MSDSs frequently fail to list sensitizers or reproductive toxins, and do not list ingredients present at less than 1%. Call the telephone numbers on MSDSs for further information or obtain additional information at the Hazardous Substances Data Bank: [toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm](http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm)

### Miscellaneous Operations Found in Many Industries

Process or Task	Hazards	Health Outcomes
1. Material handling	Forklift trucks Other powered handling equipment, such as walkers, lifts, cranes, conveyor belts	Carbon monoxide from poorly tuned propane forklifts Traumatic injuries, such as lacerations, amputations Traumatic injuries from vehicle accidents, rollovers Carbon monoxide poisoning

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Miscellaneous Operations Found in Many Industries *continued from previous page*

Process or Task	Hazards	Health Outcomes
2. Maintenance, Cleaning and Repairs		
Electrical work	Electric shock	Burns Electrocution
General	Unpredictable hazards, may include confined space entry, or failure to observe lockout/tagout of equipment to shut off the equipment's energy source during maintenance  Potential intermittent exposures to hazards of the industry, such as toxic chemicals, noise, etc., but without the benefit of control systems, such as ventilation, that operate during normal work hours	Traumatic injuries Exposures to various chemicals in confined spaces
Machining	Sharp, moving parts Metal working fluids Metal dusts	Traumatic injuries Work-related asthma Dermatitis
Painting	Solvents associated with oil based paints, pigments  Check paint MSDSs for lead, mercury, cadmium as ingredients Working at heights, on ladders and scaffolding	CNS depression, liver effects, dermatitis (See Neurological Disorders profile in this guide) Various health effects depending on metal  Falls, traumatic injuries Sprains and strains
Plumbing	Cutting pipes PVC pipe solvents/glues  Lead Ergonomic hazards Hot work	Lacerations Solvent-related health effects (CNS depression, liver effects, dermatitis) See Lead Exposure profile in this guide MSDs Heat stress, burns
Welding and brazing	Lead Cadmium  Metals, various  Ultraviolet radiation	See Lead Exposure profile in this guide Cadmium affects respiratory system, kidneys, and blood, and is carcinogenic Health effects vary with metal; stainless steel (nickel, chromium) carcinogenic, asthmagenic and galvanized steel (zinc) causes heavy metal disease Burns, welder's flash

*continued next page*



Miscellaneous Operations Found in Many Industries *continued from previous page*

Process or Task	Hazards	Health Outcomes
3. Preparation and Surface Finishing Operations (Variety of tasks depending on surface material, contamination, and method used)		
Cleaning	Acid and alkali cleaning Abrasive blasting (abrasives including silica, Black Beauty)  Degreasing Lead dusts from cleaning or removal of old paint	Eye, nose, throat irritation Dermatitis Noise-induced hearing loss Silicosis Solvent-related health effects See Lead Exposure profile in this guide
Grinding, polishing, buffing	Power tools Metal and abrasive dusts  Formaldehyde from abrasive wheels  Vibration	Traumatic injuries Exposure to lead, cadmium, zinc; health effects depending on metal Eye, nose, throat irritation, work-related asthma Vibration-related MSDs, white finger disease (Raynaud's Phenomenon)
Electroplating	Acid baths (chromium, nickel, tin) Cyanide salt solutions (gold)	Skin injuries (chromium holes in nasal septum and pitted erosion of skin) Nickel and chromium are carcinogens Dermatitis Eye, nose, throat irritation

Electronic Manufacturing/Assembly

Process or Task	Hazards	Health Outcomes
Semiconductor fabrication (diffusion and ion implantation)	Highly hazardous gases (e.g., arsine, phosphine)	Arsine: massive intravascular hemolysis resulting in acute renal failure Phosphine: cytotoxic, profound changes in brain, kidneys, heart, and liver; poisoning typically represents various stages of cardiovascular collapse
Cleaning Photo resist application Etching	Other chemicals, solvents, gases in "clean rooms" Variety of substances depending on process(es) e.g., arsenic, acids, glycol ethers, solvents, ultraviolet radiation	Solvent-related health effects (CNS depression, irritation, dermatitis) Several glycol ethers are associated with adverse reproductive effects
Assembly of printed circuit boards	Machine operation or manual tasks that include: Reach over shoulder height or down to floor level Repetitive motions Awkward postures Forceful exertion Piece rate pay and machine pacing (low control in a job with high demands)	MSDs: carpal tunnel syndrome, thoracic outlet syndrome, DeQuervains syndrome, tennis elbow, neck and back pain  Stress Fatigue Depression Increased risk of injuries

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Electronic Manufacturing/Assembly *continued from previous page*

Process or Task	Hazards	Health Outcomes
Hand soldering	Lead Cadmium (cad-plated bolts)  Colophony (rosin core solder)  Alcohols (ethanol, isopropyl, methanol)  Flux (may contain formaldehyde)	See Lead Exposure profile in this guide Cadmium affects respiratory system, kidneys, blood, carcinogenic Work-related asthma from colophony exposure Eye, nose, throat irritation from flux, alcohols Dermatitis Eye, nose, throat irritation Formaldehyde is a carcinogen and asthmagen
Wave soldering (machine)	Dross (lead dust) during maintenance	See Lead Exposure profile in this guide

Food Processing

Process or Task	Hazards	Health Outcomes/Injuries
1. Moving and transfer of materials	Manual tasks that include: Reach over shoulder height or down to floor level Repetitive motions, e.g., order picking, unloading trucks Awkward postures, e.g., ulnar deviation at wrist, bent at waist Heavy lifting Forceful exertion Prolonged standing  Slippery floors from spills, constant cleaning with soap/disinfectant solutions  Collisions with overhead equipment and food storage	MSDs: carpal tunnel syndrome, thoracic outlet syndrome, De Quervain's syndrome, tennis elbow, neck and back pain  Hernias  Back pain Varicose veins Strains, sprains, and traumatic injuries from slips and falls  Traumatic injuries
2. Food preparation		
Production line	Slicers, knives, blades  Cold temperatures  Hot temperatures  Machine-paced, fast rate (low control in a job with high demands)  Noise	Lacerations MSDs Muscle tension, increased risk of MSDs, traumatic injuries Raynauds Phenomenon (Hand-Arm Vibration Syndrome) Heat stress Fatigue Stress-related disorders Fatigue Depression Increased risk of injuries  Hearing loss Stress-related disorders

Process or Task	Hazards	Health Outcomes/Injuries
Spices	Paprika, garlic dust	Occupational asthma Eye, nose, throat irritation
Flour	Buckwheat, gluten, rye, wheat, soya flour	Occupational asthma
Seafood processing	Prawns, scallops, shrimp, clams, etc. Aerosolized seafood and cooking fluid Handling or shelling	Occupational asthma Contact dermatitis Allergic urticaria
Cleaning	Disinfectants (chlorine and quaternary ammonium compounds) for food and surface cleaning Forceful exertion Repetitive movements, e.g., mopping	Work-related asthma Dermatitis  MSDs

**Furniture**

Process or Task	Hazards	Health Outcomes
Machine sanding and hand sanding	Wood dust; western red cedar, mahogany, oak, etc. Abrasive dust Formaldehyde in particle board Pressure treated wood (outdoor furniture)	Asthma and other respiratory effects Eye, nose, throat irritation Wood dusts, formaldehyde, and some pressure treatments are carcinogens
Woodworking machine operations; saws, shapers, lathes, etc.	Unguarded blades Noise	Lacerations Hearing loss Stress-related disorders
Gluing (various solvents)	Inhalation Skin contact	Allergic sensitization Dermatitis Respiratory effects Nervous system effects
Finishing operations	Stains, paints, urethanes, epoxies, varnishes, etc. Organic solvents	Systemic effects related to the particular materials Review MSDSs regarding specific ingredients Turpentine, petroleum distillates, toluene, xylene, cause irritation, CNS depression Methyl alcohol affects nervous system, liver, kidneys Toluene absorbed through skin N-hexane causes nerve damage Methylene chloride, trichloroethylene and perchloroethylene are carcinogens



## Plastics

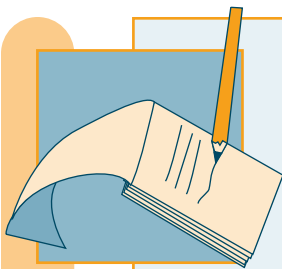
Process or Task	Hazards	Health Outcomes
Handling raw materials	<p>Thermoplastics: polyvinyl chloride (PVC), polyethylene, polystyrene, acrylics</p> <p>Thermosets: polyurethane, phenolics, ureas, epoxies</p> <p>Additives: fillers, pigments, plasticizers, flame retardants</p> <p>Manual material handling tasks</p>	<p>Various health effects depending on material</p> <p>Review MSDSs for effects of specific ingredients</p> <p>Cancer from PVC monomer isocyanate monomer</p> <p>Asthma from isocyanates, epoxies</p> <p>MSDs</p>
Injection molding, blow molding, extruding, foaming, calendering (sheet formation)	<p>Ergonomic hazards, especially reach over shoulder height</p> <p>Hot operating equipment</p> <p>Plastic dust</p> <p>Lubricants</p> <p>Solvents</p> <p>Thermal degradation products (e.g., acrolein, acids, aldehydes, carbon monoxide, nitrogen oxides, metals, polycyclic aromatic hydrocarbons-PAHs)</p>	<p>MSDs</p> <p>Burns</p> <p>Fatigue</p> <p>Heat stress</p> <p>Dermatitis</p> <p>Eye, nose, throat irritation</p> <p>Work-related asthma</p> <p>Other effects depend on the particular materials (e.g., polymer fume fever, organic solvent-related effects)</p> <p>Review MSDSs for effects of specific products</p>
Pelletizing	Noise	<p>Hearing loss</p> <p>Stress related disorders</p>
Material handling including blending/mixing operations	<p>Carbon monoxide from poorly tuned propane forklifts</p> <p>Powered handling equipment such as walkers, lifts, cranes, conveyor belts</p> <p>Vehicle accidents, rollovers</p> <p>Handling drums, totes</p> <p>Confined spaces</p>	<p>Carbon monoxide poisoning</p> <p>Traumatic injuries</p> <p>Back injuries</p> <p>Confined spaces make exposures higher and rescue more difficult</p>
Fabricating and finishing operations, typically mechanical tasks	<p>Repetitive motion</p> <p>Use of hand tools</p>	<p>MSDs</p> <p>Hand injuries</p>
Shipping, packing, receiving	<p>Machine pacing</p> <p>Repetitive motion</p>	<p>Stress</p> <p>MSDs</p>

## Printing and Publishing

Process or Task	Hazards	Health Outcomes
Handling raw materials	Inks (pigments, solvents) Oil mist Solvents (blanket wash, fountain solution, may contain alcohols, glycol ethers, perchloroethylene, methylene chloride)	Various effects depending on material(s) Review MSDSs for effects of specific products Eye, nose, throat irritation Perchloroethylene and methylene chloride are carcinogenic
Machine operations: printing, cutting, binding	Reaching into printing and binding machines Unguarded moving parts, exposure to sharp blades	Traumatic injuries, including contusions, lacerations, amputations, crushing
Cleaning operations	Cleaning products Blanket wash Inks	CNS depression Contact dermatitis Skin irritation
Photographic development	Photographic development Darkroom chemicals (e.g., acetic acid, hydroquinone, sulfur oxides) Risk of chemical splash to eyes  Wet floors  Working alone	Eye, nose, throat, skin irritation Dermatitis Eye injuries   Traumatic injuries (falls)

## Specialty Apparel

Process or Task	Hazards	Health Effects
Runner, material handling Shipping/receiving	Lifting bolts and supplies  Material handling equipment operation (e.g., forklifts, powered lifts)	MSDs, especially shoulder and back pain, thoracic outlet syndrome Traumatic injuries
Cutting	Sharp tools Mechanized cutting equipment Contact with treated material (e.g., formaldehyde) Fabric dust	Lacerations Dermatitis Cancer Asthma Eye, nose, throat irritation
Sewing	Piecework (need to rush)  Manual tasks that include: Repetitive motions Static postures Awkward postures	Lacerations Stress-related disorders MSDs
Spot removal Silk screening	Solvent inhalation (e.g., methylene chloride, perchloroethylene, trichloroethylene)  Skin contact	CNS depression Cancer Liver effects  Dermatitis, absorption contributes to dose
Pressing	Hot surfaces	Burns Heat stress Fatigue



## Plan

### Diagnosis

1. Ask 5 brief screening questions in the History Taking section of this guide to explore/confirm work-relatedness. Note employer name and full facility address.
2. Refer to an occupational medicine specialist for complex diagnosis or follow-up.
3. Obtain Material Safety Data Sheets (MSDSs) for chemicals of concern used at the patient's workplace.

See additional information at the Hazardous Substances Data Bank, [toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm](http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm).

4. If occupational asthma or carpal tunnel syndrome, public health law requires reporting to the MDPH Occupational Health Surveillance Program. Use the Confidential Report of Occupational Disease and Injury included in the Mandatory Reporting section of this guide or download the form at [www.state.ma.us/dph/bhsre/ohsp/crodi.pdf](http://www.state.ma.us/dph/bhsre/ohsp/crodi.pdf)
5. Additional evaluations may be indicated, e.g., audiogram, pulmonary function test (with methacholine challenge), blood lead level, carboxyhemoglobin level, depending on exposures of greatest concern.
6. Given the broad range of tasks and hazards described, eliciting detailed descriptions of hazardous tasks, exposures and others affected may be the most challenging and rewarding task. Good notes from the occupational description can form the basis for further research about suspect exposures and illnesses/injuries of concern.
7. Inform the patient about claiming medical benefits from the employer's workers' compensation carrier. This may help the patient obtain wage replacement benefits if needed in the future.

### Treatment and Management

8. If indicated, provide written directions for respite from specific activity (light duty). Ask your patient about the amount and type of work he or she can perform comfortably. Find out if the employer has an appropriate return-to-work program. Specify the amount of time for recovery and the nature of restrictions on work (see sample letter in Sample Letters to Employers in this guide).
9. If indicated, prescribe time off work. If 5 or more days away from work are indicated, provide information about partial lost wage replacement through workers' compensation.
10. If obtaining workers' compensation seems infeasible, discuss with the patient how much work he or she can afford to miss. Ask if the employer or union provides disability benefits. Social Security benefits may be available if you determine that a condition totally disables a patient from working and is likely to do so for at least 12 months. Check eligibility for the Family and Medical Leave Act in the Legal Rights profile in this guide.
11. Discuss strategies for gaining employer support for a recovery and return to work plan. Discuss potential patient concerns about adverse consequences for reporting illness. If your patient is an immigrant, discuss concerns about potential immigration-related consequences, such as loss of work permits (green cards) or visas.

### Prevention

12. If your patient belongs to a union, encourage him or her to contact the steward or union representative. If your patient agrees, consider contacting the union directly with information about hazards, health effects, and recommended interventions. Your patient can also contact MassCOSH (617-825-SAFE) or an organization listed in the Resources section of this guide.
13. If the patient agrees, you can write a letter to the employer recommending preventive measures (see sample letter in Sample Letters to Employers in this guide).

## Resources

Industry-specific hazards information: [www.cdc.gov/niosh/toplst.html](http://www.cdc.gov/niosh/toplst.html), National Institute for Occupational Safety and Health (NIOSH)

Hazard Data Sheets on Occupation:

[www.ilo.org/public/english/protection/safework/cis/products/hdo/htm/index.htm](http://www.ilo.org/public/english/protection/safework/cis/products/hdo/htm/index.htm)

International Labour Organization.

Recognition of Health Hazards in Industry: A Review of Materials and Processes 2nd Edition. Burgess WA. New York: John Wiley & Sons, Inc.; 1995.

Preventing Occupational Diseases and Injury. Weeks JL, Levy BS, Wagner GR. Washington, D.C.: American Public Health Association; 1991.



<b>Musculoskeletal Disorders (MSDs)</b> .....	<b>1</b>
<b>Eyestrain</b> .....	<b>3</b>
<b>Stress</b> .....	<b>3</b>
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### Musculoskeletal Disorders (MSDs)

Common upper-extremity musculoskeletal disorders (MSDs) seen in office workers include non-specific repetitive strain injury, tendinitis, tenosynovitis, and thoracic outlet syndrome. Carpal tunnel syndrome (CTS) is somewhat less common among office workers than some other MSDs. Other problems in office work include lower and upper back and neck pain associated with workstation design or postural issues.

MSDs develop over time and can be difficult to cure. Patients' conditions can further deteriorate if they are misdiagnosed or continue to be exposed to the hazards that caused the condition.

#### Signs and Symptoms

- ◆ Weakness in the hands or forearms that make it difficult to lift or carry as normal
- ◆ Tingling, pins and needles
- ◆ Clumsiness: dropping or having to concentrate on holding things
- ◆ Difficulty using hands for ordinary activities
- ◆ Waking up at night with upper extremity pain
- ◆ Hands cold or tender
- ◆ Chronic pain that gets worse

Symptoms may appear in body parts distal to where stress or damage has occurred.

Note:

*Symptoms are easily misdiagnosed as rheumatoid arthritis or other non-work related conditions.*

#### Diagnosis

1. Identify range of motion, strength limitations.
2. Document pain, numbness.
3. Have patient demonstrate the motions that trigger the problem and describe requirements of work.

Note:

*Upper-extremity MSDs are sometimes mis-labeled as Carpal Tunnel Syndrome without adequate diagnostic confirmation of median nerve entrapment.*

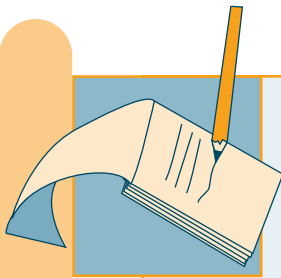
#### Association with Work

##### You can ask your patients these questions:

1. Are your symptoms associated with any particular activity at work?
  2. Have your work conditions changed recently (hours, tools, assignments)?
  3. Do your symptoms improve on vacation, or when you are away from work for several days?
  4. Did symptoms begin as a result of a slip or fall, injury or assault at work?
- ◆ Risk factors for MSDs include repetitive motion, awkward postures, static postures, and forceful exertion.
  - ◆ Jobs that involve a lot of keyboard work should be assessed when patients report symptoms listed previously.
  - ◆ MSDs associated with work typically worsen at the start of the workweek and improve with several weeks' rest from work.

You may need to probe sensitively to determine work-relatedness. Often MSDs affect the most conscientious and industrious workers, yet when they report their injuries they may be seen as malingerers. Many patients with work-related MSDs experience fear and denial regarding the injuries' severity or association with work. Fear of job loss, inability to earn a living, or loss of reputation as a good worker may lead some patients to minimize their pain, deny its connection to work, or insist on working while injured.





## Plan

### Diagnosis

1. Ask 5 screening questions to explore/confirm work-relatedness. (See History Taking section in this guide). Ask about MSD risk factors, especially prolonged keyboarding or other activities that involve repetitive motion or awkward or static postures.
2. Refer, if necessary, for diagnosis confirmation or comprehensive follow-up to an occupational medicine physician or orthopedist.
3. If carpal tunnel syndrome, public health law requires reporting to the MDPH's Occupational Health Surveillance Program. Use the Confidential Report of Occupational Disease and Injury in the Mandatory Reporting section of this guide or download the form at [www.state.ma.us/dph/bhsre/ohsp/crodi.pdf](http://www.state.ma.us/dph/bhsre/ohsp/crodi.pdf)
4. Inform the patient about claiming medical benefits from the employer's workers compensation carrier. This may help the patient obtain wage replacement benefits if needed in the future.

### Treatment and Management

5. In the case of serious conditions involving nerve entrapment, like CTS, prescribe period of rest to allow recovery and prevent more permanent damage.
6. Refer to a physical therapist or occupational therapist if possible. Stretching may also be prescribed. Some patients benefit from complementary therapies such as acupuncture or movement therapies (yoga, Feldenkrais, Alexander Technique, Shiatsu, etc.).
7. If splints are prescribed, ensure that the patient receives proper training in their use by an occupational medicine specialist or therapist. Note: *Incorrect use of splints or use of splints during work can exacerbate injuries.*
8. If indicated, provide respite from specific activity. Provide a letter to the employer specifying the nature and duration of the work restrictions. Ask your patient about the type and amount of work they can perform comfortably. See sample letters in the Sample Letters to Employers section of this guide.
9. If patient is not able to modify his or her workstation and workload, time off from work may be necessary. Partial wage replacement from workers' compensation may be available if you can show work-relatedness.
10. If your patient has difficulty obtaining workers' compensation, he or she may need other disability coverage. Social Security Disability benefits may be available if you determine that an MSD totally disables a patient from working and is likely to do so for at least 12 months. If the employer has 50 or more employees, provide information about the Family and Medical Leave Act (see Legal Rights section in this guide).
11. MSD support groups may benefit your patient. Refer to MassCOSH (617-825-SAFE) or RSI Action (617-247-6827, [www.rsiaction.org](http://www.rsiaction.org)).

### Prevention

12. To prevent recurrence or exacerbation of MSDs, office workstations should be assessed and modified. Insurance may cover workstation assessments performed by occupational therapists or ergonomists. Recommended changes to reduce MSD risk include adjusting workstation furniture, frequent short breaks, gentle stretches during the day, and identifying opportunities to pace work more evenly. Patients can find workstation guidelines at [www.healthycomputing.com/office/setup](http://www.healthycomputing.com/office/setup).
13. If your patient belongs to a union, encourage him or her to seek assistance from the union. With the patient's consent, provide the union with copies of letters to the employer.



## Eyestrain

If your patient works with video display terminals and complains of eyestrain, a thorough eye examination is indicated. This exam should include function at close working distances. Ask the patient about their viewing distance (from eyes to screen) and the location of the screen in his or her field of view.

### Recommend the following workstation adjustments to the patient or employer:

- ◆ Eye-to-screen distance: at least 25", preferably more  
The farthest distance where the patient can still clearly see the screen is optimal
- ◆ Vertical location: eyes should focus on the top 1/3 to 1/4 of the screen
- ◆ Lighting: ceiling suspended, indirect lighting  
Use blinds and shades to control glare/outside light
- ◆ Screen colors: dark letters on a light background

Information on eyestrain is available at [www.tifaq.com/information/vision.html](http://www.tifaq.com/information/vision.html).

## Stress

### Signs and Symptoms

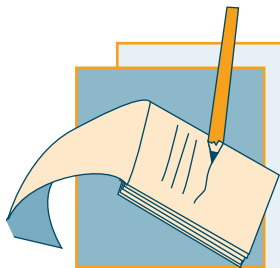
- ◆ Self-reported stress
- ◆ Difficulty concentrating
- ◆ Headaches
- ◆ Stomach disorders
- ◆ Cardiovascular problems



### Association with Work

Common causes of stress include unreasonable workload or pace, production quotas, inadequate control of work, electronic monitoring of work, sexual and other forms of harassment, and noise.

Sources of noise include loud equipment, loud ventilation systems, and outdoor traffic.



### Plan

#### Prevention

1. If noise is a source of stress, the following may be recommended to the patient or the employer:
  - ◆ Quieter keyboards
  - ◆ Sound reduction covers on loud equipment
    - ◆ Moving loud equipment away from work areas
    - ◆ Installing sound absorption materials in the ceiling, floors, walls, windows, or partitions
2. The patient may require support in addressing workplace stressors.
  - a. If the patient belongs to a union, encourage him or her to contact a steward, business agent, field representative, or health and safety officer.
  - b. Female patients may wish to contact the Boston office of 9to5, an organization that helps women with sexual harassment and other workplace issues: [www.9to5.org](http://www.9to5.org).
  - c. Some employers have Employee Assistance (EAP) Program for assisting workers with issues including stress, problems with supervisors or co-workers, or harassment.
  - d. You can refer your patient to MassCOSH (617-825-SAFE).

## Poor Indoor Air Quality



### Signs and Symptoms

Poor indoor air quality can produce a wide variety of effects on the respiratory tract, eyes, skin, and other organs. Tables 1 and 2 (below) list symptoms associated with indoor air pollutants.

For further information on symptoms associated with particular indoor pollutants, see the US Environmental Protection Agency's "Diagnostic Quick Reference" at [www.epa.gov/iaq/pubs/hpguide.html#Diag Quick Ref](http://www.epa.gov/iaq/pubs/hpguide.html#Diag Quick Ref).

Hazardous exposures in indoor air include chemical or particulate emissions from building materials and furnishings, products and equipment, combustion engines in adjacent garages, or human activities (Table 1); and microorganisms and other biological contaminants (Table 2). Even when levels of individual chemicals do not exceed health guidelines, chemical combinations may cause health effects in ways that are not well understood. For example, ozone (produced by photocopy machines or electric arcing) can react with terpenes (citrus oils found in common "citrus" cleaners) to produce aldehydes, organic acids, small particulates, and hydroxy radicals that are highly irritating to the respiratory tract. Both types of contaminants may contribute to "sick building syndrome," a range of symptoms that may be attributable to exposure to a combination of indoor air pollutants under inadequate ventilation conditions (see description below).

**Table 1. Building Materials, Furnishings, Equipment, Auto Exhaust, Human Activity**

Compound	Common Sources of Exposure	Health Outcomes
Acetic acid	X-ray development equipment Silicone caulking compounds	Eye, respiratory, and mucous membrane irritation
Asbestos	Renovation, encapsulation work, or poor maintenance of insulation and other building materials like floor tiles, dry wall compounds, and reinforced plaster, especially in buildings built before 1975	After long latency: Asbestosis Mesothelioma Other lung, pleural, peritoneal, larynx, GI tract cancers
Carbon dioxide	Human respiration with poor ventilation (elevated CO <sub>2</sub> levels usually indicate poor ventilation)	Difficulty concentrating Drowsiness Increased respiration rate
Carbon monoxide	Tobacco smoke Fossil-fuel engine exhausts Improperly vented fossil-fuel appliances Unvented gas and kerosene appliances Improperly vented combustion products	Dizziness, headache Nausea Cyanosis Elevated carboxyhemoglobin Cardiovascular effects and death
Carbonless copy paper (source of irritation not established; possibly formaldehyde, isocyanates, phthalates, acrylates, glutaraldehyde, amines, or kerosene)	Carbonless copy paper	Eye, skin, mucous membrane irritation Rarely: sensitization to formaldehyde or other volatile organic compounds
Formaldehyde	Off-gassing from urea formaldehyde foam insulation, plywood, particle board and paneling, carpeting and fabrics (such as draperies) Glues and adhesives Combustion products including tobacco smoke	Hypersensitive or allergic reactions Dermatitis, Eye, respiratory and mucous membrane irritation Odor annoyance Reproductive effects

table continued on page 5

table continued from page 4

Compound	Common Sources of Exposure	Health Outcomes
Miscellaneous inorganic gases: Ammonia Hydrogen sulfide Sulfur dioxide	Microfilm equipment Window cleaners Acid drain cleaners Combustion products Tobacco smoke Blueprint equipment	Eye, respiratory, mucous membrane irritation Aggravation of chronic respiratory diseases Neurological effects
Nitrogen oxides	Gas and diesel exhaust Gas furnaces and appliances Tobacco smoke Welding	Eye, respiratory, mucous membrane irritation.
Ozone	Copy machines, electrostatic air cleaners electrical arcing, smog	Eye, respiratory and mucous membrane irritation Aggravation of chronic respiratory diseases
Personal care products (e.g., perfumes and fragrances)	Office workers Clients	Headache Rhinitis, sinus congestion Wheezing, cough Difficulty concentrating
Radon	Ground beneath buildings, building materials, and groundwater	No acute health effects are known but chronic exposure may lead to increased risk of lung cancer from alpha radiation.
Synthetic Fibers	Fibrous glass, e.g., fiberglass duct lining or insulation in plenums above the ceiling which has deteriorated and enters the air through supply vents Mineral wool	Eye, skin, lung irritation Dermatitis
Tobacco smoke	Cigars, cigarettes, pipe tobacco	Eye, respiratory, mucous membrane irritation Coughing, wheezing, sneezing, headache, and sinus problems
Volatile organic compounds (VOCs) including acrolein, alcohols, benzene, methacrylates, methyl ethyl ketone, polycyclic aromatic hydrocarbons, toluene, trichloroethylene	Asphalt, cleaning compounds, cosmetics, personal products, gasoline vapors, glues, insecticides and herbicides combustion products, moth balls, paints, permanent markers, photocopiers, signature machines, silicone caulking materials, "spirit" duplicators, tobacco smoke	Nausea, dizziness Eye, respiratory, mucous membrane irritation Headache, Fatigue Neurological and reproductive effects

**Table 2. Microorganisms and Other Biological Contaminants (Microbials)**

Organisms	Common Sources of Exposure	Health Outcomes
Bacteria	Air handling system condensate	Hypersensitivity: Hypersensitivity pneumonitis Humidifier fever Allergic rhinitis Asthma
Dander	Cooling towers	
Fungi and Mold	Water damaged materials, including carpets, walls, ceilings	
Mites	High humidity indoor areas	
Pollen	Damp organic material	
Viruses	Porous wet surfaces	
	Humidifiers	Infections such as legionellosis: symptoms include chills, fever, muscle ache, chest tightness, headache, cough, sore throat, diarrhea, and nausea
	Hot water systems	
	Outdoor excavations	
	Plants	
	Animals and animal excreta	
	Insects	
	Food and food products	

For specific respiratory and other symptoms associated with particular indoor pollutants, see the US Environmental Protection Agency's "Diagnostic Quick Reference" at [www.epa.gov/iaq/pubs/hpguide.html#Diag Quick Ref](http://www.epa.gov/iaq/pubs/hpguide.html#Diag Quick Ref).

**Sick or Tight Building Syndrome**

*Sick building syndrome is a condition associated with complaints of discomfort including headache; nausea; dizziness; dermatitis; eye, nose, throat, and respiratory irritation; coughing; difficulty concentrating; sensitivity to odors; muscle pain; and fatigue. The specific causes of the symptoms are often not known but sometimes are attributed to the effects of a combination of substances or individual susceptibility to low concentrations of contaminants. The symptoms are associated with periods of occupancy and often disappear after the worker leaves the worksite.*

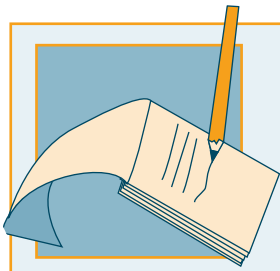
- OSHA website, [www.osha.gov](http://www.osha.gov) (OSHA Technical Manual, Section III: Chapter 2)

**Association with Work**

Exploring the association with work for this broad range of respiratory, dermatological, and general health symptoms can be difficult. Some recent changes or conditions at work may provide the needed information about triggers:



- ◆ Symptoms improve on vacation and extended time away from work
- ◆ Symptoms worsen on the first day of work after return from a vacation or even weekends off work
- ◆ Recent building renovations can create exposures to a variety of irritating or toxic substances such as dusts, molds, solvents, paints, or adhesives
- ◆ Recent or prolonged water damage from leaks, floods, sewage, spills or other moisture incursions may promote biological contamination
- ◆ Breakdown in any component of the ventilation system may go unnoticed until subsequent symptoms are reported
- ◆ Unusual indoor or outdoor activities may be queried: pesticide application, rerouted traffic pattern or bus idling outside an air intake
- ◆ Co-workers may have similar symptoms/patterns of symptoms



## Plan

### Diagnosis

1. Ask 5 screening questions to explore/confirm work-relatedness (see History Taking section in this guide). If indicated, also see Asthma, Dermatitis or Reproductive and Developmental Disorders sections in this guide.
2. Refer, if necessary, to occupational medicine specialist for complex diagnosis or follow-up.
3. If suspected or confirmed work-related asthma, public health law requires reporting to

the MDPH's Occupational Health Surveillance Program. Use the Confidential Report of Occupational Disease and Injury in the Mandatory Reporting section of this Guide or download the form at [www.state.ma.us/dph/bhsre/ohsp/crodi.pdf](http://www.state.ma.us/dph/bhsre/ohsp/crodi.pdf).

4. Inform the patient about claiming medical benefits from the employer's workers' compensation carrier. This may help the patient obtain wage replacement benefits if needed in the future.

### Treatment and Management

5. If indicated, prescribe time off from work to determine whether the symptoms reverse or improve with removal from the work environment. See sample letter requesting a period of removal from work in the Sample Letters to Employers section of this Guide. If five or more days away from work are indicated, provide information about workers' compensation wage replacement benefits.

6. Ask if the employer provides disability benefits. If obtaining worker's compensation seems infeasible, discuss with the patient how much work he or she can afford to miss. Social Security Disability benefits may be available if you determine that the patient is totally disabled from working and is likely to be for at least 12 months. Check eligibility for the Family and Medical Leave Act in the Legal Rights profile in this guide.

### Prevention

7. If building-related illness with clear etiology, recommend selected interventions from the box on Page 8. With patient's consent, provide a letter recommending interventions to the employer. See sample letter in the Sample Letters to Employers section in this guide.

8. If the condition's relationship to work is unclear: With the patient's consent, suggest employer contact the Occupational Hygiene/Indoor Air Quality Program (OH/IAQ) at the Massachusetts Division of Occupational Safety (DOS), (617-969-7177, [www.state.ma.us/dos/pages/IAQ.htm](http://www.state.ma.us/dos/pages/IAQ.htm)). OH/IAQ conducts free investigations of workplace health hazards upon request of an employer, employee, union, or Board of Health or upon referral by another agency or health professional.

9. Ensure that the employer remediates work areas before returning a patient affected with hypersensitivity. If illness persists despite remediation, suggest patient be reassigned to another area.

10. If your patient belongs to a union, encourage him or her to seek assistance from the union. With the patient's consent, provide the union with copies of letters to the employer. MassCOSH can also provide your patient with resources (617-825-SAFE).

## Resources

### Indoor Air Quality

Environmental Protection Agency. Diagnostic Quick Reference [www.epa.gov/iaq/pubs/hpguide.html#Diag](http://www.epa.gov/iaq/pubs/hpguide.html#Diag) Quick Ref  
Occupational Hygiene/Indoor Air Quality Program at the Massachusetts Division of Occupational Safety, [www.state.ma.us/dos/pages/IAQ.htm](http://www.state.ma.us/dos/pages/IAQ.htm)

### Office Work/Musculoskeletal Disorders

Ergonomics information for office workers at [www.healthycomputing.com](http://www.healthycomputing.com)  
RSI Action: all-volunteer network of support and information for office workers with Repetitive Strain Injuries: [www.rsiaction.org](http://www.rsiaction.org), 617-247-6827  
New York Committee for Occupational Safety and Health. Links to selected web sites on occupational health for office workers at [www.nycosh.org/links\\_H-Z.html](http://www.nycosh.org/links_H-Z.html)  
Pascarelli E, Quilter D. Repetitive Strain Injury: Computer User's Guide. New York: John Wiley and Sons; 1994

### Stress

National Institute for Occupational Safety and Health. Stress... At Work, [www.cdc.gov/niosh/stresswk.html](http://www.cdc.gov/niosh/stresswk.html)



## Recommendations to Employers for Improving Indoor Air Quality

### 1. Ventilation

- ◆ Ensure that ventilation provides an adequate supply of fresh outdoor air. ASHRAE in its 62-1989 standard recommends 20 cubic feet per minute of outdoor air per occupant for offices.
- ◆ Outside air intakes should not be located near potential sources of contamination (automobile garages, cooling towers, building exhausts, roadways).
- ◆ Use local exhaust ventilation and enclosure to capture and remove contaminants. Room air in which contaminants are generated should be discharged directly outdoors, not recirculated.
- ◆ Filtration, electronic cleaners, and chemical treatment with activated charcoal or other sorbents may also be used to remove contaminants.
- ◆ Isolate areas of renovation, painting, carpet laying, pesticide application, etc., from occupied areas. Perform this work during evenings and weekends. If ventilation is turned off during weekends or other periods, ensure that the system sufficiently dilutes contaminants prior to occupancy.
- ◆ Maintain combustion sources such as furnaces or water heaters to assure proper burning. Position their exhaust systems so that exhaust will not re-enter the building.
- ◆ Evacuate contaminated areas until they are adequately ventilated.
- ◆ If possible, open the windows if the office is not located near a major source of air pollution such as a garage or industrial plant.

### 2. Improved Ventilation Efficiency

- ◆ Ensure that outdoor air supply dampers and room air vents are open.
- ◆ Remove or modify partitions or obstructions that block fresh air flow.
- ◆ Rebalance the system to prevent inflow or outflow of contaminated air due to pressure differentials between rooms.
- ◆ Prevent poor distribution of make-up air with proper placement of air inlets and exhausts.
- ◆ Use room fans to improve mixing and dilution of pollutants.

### 3. Temperature and Humidity

- ◆ Maintain relative humidity levels in the range of 30%–60%.
- ◆ Maintain temperature in the range of 68–76 degrees Fahrenheit.

### 4. Preventive Maintenance for HVAC System Components

- ◆ Check damper positions and functioning belts, baffles, ductwork, and system balance.
- ◆ Measure airflow. If necessary, adjust airflow to meet ASHRAE recommendations.
- ◆ Replace filters on air handling units at regular intervals.
- ◆ Clean air distribution ducts and dampers.
- ◆ Replace damaged insulation.

### 5. Prevention of Microbial Contamination

- ◆ Eliminate known and potential sources of microbial contaminants by prompt cleanup and repair of all areas where water collects or leaks: floors, walls, roofs, HVAC cooling coils, drain pans, humidifier reservoirs, air washers, fan coil units, and filters.
- ◆ Remove and discard porous organic materials that are contaminated (e.g., damp insulation in ventilation systems, moldy ceiling tiles, and mildewed carpets).
- ◆ Clean and disinfect nonporous surfaces where microbial growth has occurred with detergents, chlorine-generating slimicides, or other biocides. Ensure that these cleaners have been removed before air handling units are turned on.
- ◆ Maintain indoor air relative humidity below 60% (50% where cold surfaces are in contact with room air).
- ◆ Adjust intake of outdoor air to avoid contamination from nearby soil, vegetable debris, cooling towers, or sanitary stacks unless air is adequately filtered.

<b>Traumatic Injuries.....</b>	<b>1</b>
<b>Musculoskeletal Disorders.....</b>	<b>2</b>
<b>Ambient Environmental Conditions.....</b>	<b>2</b>
<b>Exposure to Chemicals.....</b>	<b>3</b>
<b>Exposure to Lead and Asbestos.....</b>	<b>5</b>

If your patient works as a roofer, carpenter, laborer, painter, or siding installer or in other trades related to building, renovating, or repairing houses or small commercial buildings, he or she may have symptoms or injuries related to work. Residential construction involves a wide variety of tasks such as climbing up and down ladders and scaffolds, working on roofs, operating backhoes, manual digging and shoveling, carrying heavy objects, and using numerous chemicals. Some tasks may appear to be similar to home repair, but the tools, equipment, and work practices may be very different. The tools used in construction are often very heavy (up to 50 pounds) and there is little mechanical help for lifting and carrying on small construction and renovation sites. Long hours are typical and may include traveling long distances to and from the job. These hours increase fatigue and stress, both of which contribute to traumatic injuries and musculoskeletal injuries. Moreover, exposure to harsh environmental conditions, toxic chemicals, and lead or asbestos can result in illness, injury, and/or chronic health problems.

Many small residential contractors hire workers as “independent contractors.” This relationship might limit the patient’s ability to obtain workers’ compensation, unemployment insurance, and other benefits. Many small contractors also do not carry workers’ compensation insurance (although this is illegal), but their employees may still be able to obtain coverage through a state fund (see Workers’ Compensation section in this guide).

## Health Outcomes in Residential Construction

### Traumatic Injuries

Traumatic injuries may be obviously work-related. In the case of residential construction, however, the association with work may be less clear-cut because many activities are very similar to activities carried out by workers on their own homes. Consequently, it is important to ask if the patient was working for pay at the time of the incident. A simple description of “what happened” may not elicit that information.

Also, workers who are being paid “under the table” (with no taxes withheld) or who are undocumented may be hesitant to say they were working at the time of the injury. They may benefit from referrals to advocacy organizations, including MassCOSH (617-825-SAFE), or the organizations listed in the Resources section of this guide.

Common causes of traumatic injuries include

- ◆ use of ladders when scaffolds are required
- ◆ work high above ground with no fall protection
- ◆ faulty or inadequate equipment
- ◆ lack of training on proper use of hazardous equipment

Electrocution injuries may occur when operating at heights near power lines.

You can find information on falls, scaffolds, and ladders at the website of the Massachusetts Department of Public Health: [www.state.ma.us/dph/bhsre/ohsp/falls.htm](http://www.state.ma.us/dph/bhsre/ohsp/falls.htm), or call 617-624-5627.

If you see indications that workers face high risks of traumatic injury on a particular job, obtain the name of the company. There may be a Preferred Provider Organization with clinicians who have a working relationship with the employer and may be able to contact that employer with recommendations for adequate equipment and/or training.



Workers identified to their employers through this process may experience adverse consequences. Discuss this approach with your patient first. If the patient is concerned about potential reprisals, you may wish to involve MassCOSH or other advocacy organizations.

If you believe that workers are in imminent danger of death or serious injury, you should call OSHA (Boston/South of Boston Office: 617-565-6924; North of Boston Office: 617-565-8110; other contact numbers: [www.osha.gov](http://www.osha.gov)).

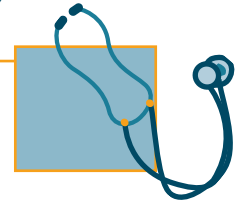
## Musculoskeletal Disorders (MSDs)

Repetitive strain can cause cumulative trauma disorders, which result from a series of micro-traumas to the musculoskeletal system. There may be no identifiable precipitating event to associate with current symptoms. A thorough description of the job tasks over time may be necessary to aid in diagnosis and identifying the hazardous work tasks. (For further information see the Musculoskeletal Disorders and Back Injuries profiles in this guide.)

### Signs and Symptoms

#### Diagnosis

1. Document pain, numbness, and other symptoms.
2. Identify range of motion and/or strength limitation on physical examination.
3. Have patient demonstrate the motions that trigger the problem and describe requirements of work.



### Association with Work

Slips, falls, and trauma may contribute to chronic disorders as well as traumatic injuries.

If symptoms resolve or diminish on vacation or after long weekends, the temporal relation indicates work causation or exacerbation. Occurrence of symptoms at work is not necessary to prove association with work; symptoms may worsen at night or wake workers from sleep.

If symptoms are consistently related to the same activity whenever it is repeated, gather detailed information about that task, especially the physical requirements and description of the equipment involved.

The key factors associated with musculoskeletal disorders are force, awkward posture, inadequate rest, vibration, and repetition. Some of these factors may be subtle, such as ulnar deviation (awkward posture) required to hold a heavy tool in place.



#### Useful questions can include the following:

- ◆ Do symptoms improve on vacation, or when away from work?
- ◆ Are symptoms associated with any particular activity at work?
- ◆ Have work conditions (hours, tools, tasks) changed recently, coincident with the onset of symptoms?
- ◆ Did symptoms begin following a slip or fall or other injury or incident at work?
- ◆ Does the job involve any of the risk factors for repetitive strain injury: force, repetition, vibration, awkward posture, or lack of rest/recovery?

Two important risk factors prominent in construction are working in awkward postures and lifting heavy loads repeatedly. Awkward postures include working with the arms above the shoulders or below the knees. These postures are common in residential construction because of workers' inability to control the work set-up. Some questions related to these risks factors might be:

- ◆ Do you work with your arms raised above your shoulders?
- ◆ Do you work on your knees for extended periods?
- ◆ Do you lift or carry objects greater than 50 lbs?
- ◆ Do you lift or carry any objects in an awkward (non-neutral) position?

## Ambient Environmental Conditions

Heat, cold, and local ambient air pollution are hazards associated with outdoor work. Acute sunburn and chronic skin damage, including actinic keratoses and some skin cancers, may result from high solar exposures, which may also contribute to development of cataracts. Sun protection, including hats, light-colored clothing, and sun block cream should be used. Sunglasses should be considered.

Residential construction workers are at risk of heat-related illnesses. Acclimatization and hydration are crucial; limiting duration of work on hot humid days is indicated. Workers

must have adequate sanitation facilities and unrestricted drinking water.

If your patient works outdoors in the winter, you may wish to refer to suggestions for protecting workers from the cold:

[www.state.nj.us/health/eoh/survweb/coldfact.pdf](http://www.state.nj.us/health/eoh/survweb/coldfact.pdf)

High levels of noise may cause permanent hearing damage; wearing the proper types of hearing protectors can prevent this damage.



## Exposure to Chemicals

Chemicals used in residential construction include cleaning agents, paint removers, glues, adhesives, solder, grout, plastics, wood and concrete additives, paints, varnishes, and wood filler. The process for selecting chemicals may not be very sophisticated, particularly in small-scale residential construction and renovation. The tendency is to use chemicals that work the fastest and are easily found on the shelves of the large discount home building supply stores. These are often the most toxic.

Material Safety Data Sheets (MSDSs) provide information on toxic ingredients in products manufactured or sold in the United States and on their acute and chronic health hazards. MSDSs for particular chemical products can be found at [hazard.com](http://hazard.com) or on the manufacturer's website. These, however, may not list all toxic ingredients, often fail to list sensitizers, and may be out of date. You can obtain additional information about specific products at the Hazardous Substances Data Bank, [toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm](http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm).

Asthma can be triggered or aggravated by chemicals, including diisocyanate-containing products such as polyurethanes used in floor refinishing, paint systems, varnishes, grouts, and adhesives; epoxy resins and ethanolamines found in some spray paints; and acrylates found in glues. Some of these chemicals are sensitizers, so there is risk from low levels of exposure.

Asthma and allergies can be exacerbated by exposure to diesel exhaust from heavy machinery, especially in poorly ventilated areas. Diesel exhaust exposure is also associated

with increased risk of lung cancer as well as transient lung irritation and inflammatory symptoms.

Exposure to solvents can cause neurologic symptoms, including dizziness, fatigue, headache, weakness, nausea, and other central nervous system effects. These can resemble acute alcohol intoxication and can also exacerbate the effects of alcohol consumption. Long-term effects of solvent exposure may include liver and kidney damage, cardiovascular damage, or cancer. Solvents have also been associated with reproductive effects in both men and women and their offspring. (See Reproductive and Developmental Disorders profile in this guide.)

Carcinogens in residential construction include chlorinated hydrocarbons, particularly methylene chloride (dichloromethane), frequently used as a paint stripper. Many of these have low boiling points and vaporize easily. Exposures are increased when these products are used indoors with poor ventilation.

Some solvents can be absorbed through the skin. Clothing may hold solvents against the skin for prolonged times; impervious gloves or gauntlets may be needed.

Carbon monoxide from combustion or methane and/or hydrogen sulfide from sewer gas released during plumbing or excavation can accumulate in enclosed spaces. Special precautions should be taken when entering an enclosed space due to potentially dangerous gas or vapor accumulation. Persons exposed to such gases may lose consciousness suddenly.

### Selected Chemical Exposures Common in Residential Construction

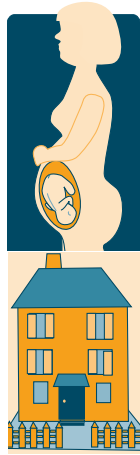
Health Outcomes	Exposures	Sources of Exposures
Asthma	Diisocyanates in polyurethanes Epoxy resins Ethanolamines Diesel exhaust Certain wood dusts	Adhesives Glues containing acrylates Grouts Polyurethanes used in floor refinishing, paint systems Spray paints Varnishes
Cancer, lung	Asbestos Diesel exhaust Certain wood dusts Arsenic and chromium dusts	Asbestos in walls, around boilers and pipes Heavy machinery in poorly ventilated areas Sanding and cutting wood pressure treated with chrominated copper arsenate
Cancers, various	Chlorinated hydrocarbons, particularly methylene chloride (dichloromethane) Polycyclic aromatic hydrocarbons in asphalt	Paint strippers Roofing or paving with asphalt

*continued next page*

Health Outcomes	Exposures	Sources of Exposures
Carbon monoxide (CO) poisoning	Carbon Monoxide Gasoline, kerosene, and propane engines and heaters Methylene chloride metabolism	Motorized tools, particularly concrete cutting tools, in poorly ventilated areas
Dermatitis, allergic Dermatitis, irritant contact	Wet concrete and cement Asphalt Epoxy resins	Chromium, copper, and arsenic in wood preservatives Adhesives Spray paints Wood pressure treated with chrominated copper arsenate Various solvents, chemicals
Irritation of respiratory tract, eyes, skin	Various irritant chemicals	Hydrogen sulfide Cleaning agents Paints Polyurethanes Solvents Sewer gases released during plumbing or excavation
Neurologic symptoms including dizziness, fatigue, headache, weakness, nausea, other CNS effects	Various solvents Adhesives Cleaning agents	Glues Paint removers Polyvinyl chloride (PVC) pipes containing tetrahydrofuran, other solvents
Pneumoconioses (chronic lung fibrosis: asbestosis, silicosis, etc.)	Kaolin Silica dust	Asbestos in walls, around boilers and pipes Silica dust from masonry, stone cutting, rock drilling, abrasive blasting, blasting concrete, rock hauling and dumping Silica and/or kaolin dust from sanding drywall joint compound

## Exposure to Lead and Asbestos

Health problems associated with lead exposure can occur as a result of direct exposure from lead paint removal or as a result of working as a bystander to lead paint removal. Elevated blood lead levels may not cause symptoms at first but can damage the neurologic, reproductive, hematopoietic, gastrointestinal, cardiovascular, musculoskeletal, and renal and reproductive systems. See the Lead Exposure profile in this guide if you suspect the patient may be exposed to lead paint dust.



Licensed deleading companies and asbestos abatement companies typically follow an extensive set of legally required procedures to protect workers and their families from hazardous exposures. Some employers, however, hire under-the-table workers to remove lead paint from old houses or remove asbestos while gutting, renovating, or demolishing old buildings. These workers can be at risk of serious, even life-threatening exposures. They can also bring toxic substances home to their families. Workers hired to repaint an older house may not realize that they are sanding or scraping lead paint. In addition, other workers who work in the vicinity of these activities can be exposed.

Power sanding is the most hazardous activity for lead exposure in construction, but any dry sanding or scraping can create a lead hazard for workers and residents. Lack of suitable hand-cleaning and eating facilities while working means that lead dust can be ingested from contaminated hands while eating or smoking. Smoking exacerbates the risk of inhaling lead.

If your patient is removing lead paint or asbestos and you are not sure whether his or her employer is providing the proper protections, certain questions can help you ascertain this:

- ◆ Does the employer provide respirators to wear at work?
- ◆ Does anyone measure lead or asbestos in the air during work?
- ◆ Are you in a health surveillance program?
- ◆ (If lead:) Does the employer send workers to have their blood tested for lead levels?

If you believe that the patient is exposed to lead or asbestos, there are several steps you can take:

- ◆ Inform the patient of the hazards of lead or asbestos exposure to workers and their families.
- ◆ Educate the patient that he or she needs to wear coveralls at work and should leave them there. Workers should also leave their work shoes at work. Wearing work clothes or shoes in the car or

home can expose the entire family to asbestos fibers or lead dust.

You can encourage the patient to sign up for union apprenticeship programs that provide proper training and equipment for lead and asbestos removal and also help him or her obtain employment afterwards. These jobs are likely to pay higher wages than under-the-table work. If your patient is an immigrant, explain that these unions are eager to welcome new members from other countries and have staff who speak Spanish and Portuguese.

The patient can call:

- ◆ New England Regional Council of Carpenters: 617-268-3400
- ◆ International Union of Painters and Allied Trades District Council # 35: 617-524-0248
- ◆ Boston Sheet Metal Workers # 17: 617-288-7410
- ◆ Boston Building Trades Council: 617-282-2242

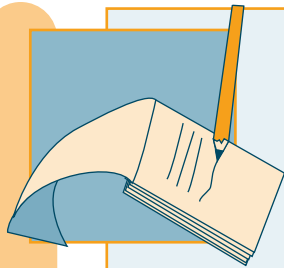
If you suspect that lead or asbestos exposure at the workplace places your patient and/or other workers at risk of serious health problems, encourage the patient to contact an advocacy organization like MassCOSH. In cases of serious imminent danger, contact the Massachusetts Division of Occupational Safety (DOS): 617-969-7177

Further information is available at:

[www.state.ma.us/dos/pages/lead.htm](http://www.state.ma.us/dos/pages/lead.htm)  
[www.state.ma.us/dos/pages/asbestos.htm](http://www.state.ma.us/dos/pages/asbestos.htm)

The DOS Lead Program seeks to reduce occupational lead exposures in Massachusetts. The Occupational Blood Lead Registry tracks elevated blood lead levels, counsels workers, and advises physicians on the medical management of lead poisoning. The Lead Program mandates training and licensure/certification of the workforce, sets competency standards for lead abatement, and performs workplace inspections to ensure compliance with DOS regulations.

The DOS Asbestos Program is responsible for the regulation of occupational asbestos exposure in the Commonwealth. The program works with employers, employees, unions, and state and local agencies to create healthier work conditions through site visits, analytical services, and technical information. The Asbestos Program requires all asbestos abatement workers to be trained and licensed. Under the program, the DOS is responsible for inspecting work sites and, when necessary, taking enforcement actions to ensure compliance with DOS Asbestos Regulations.



## Plan

### Diagnosis

1. Ask 5 brief screening questions in the History Taking Section of this guide to explore/confirm work-relatedness.
2. Refer, if necessary, for diagnosis confirmation, e.g., nerve conduction velocity for carpal tunnel syndrome, pulmonology for pulmonary function test, methacholine challenge test to confirm diagnosis of asthma, chemistry laboratory to draw blood for lead levels.
3. Inform the patient about claiming medical benefits from the employer's workers' compensation carrier. If the employer does not carry compensation insurance, inform the patient about the state fund for uninsured employers (see Workers' Compensation section in this guide). This may help the patient obtain wage replacement benefits if needed in the future.
4. If carpal tunnel syndrome or work-related asthma, public health law requires reporting to the MDPH Occupational Health Surveillance Program. Use the Confidential Report of Occupational Disease and Injury included in the Mandatory Reporting section of this guide or download the form at [www.state.ma.us/dph/bhsre/ohsp/crodi.pdf](http://www.state.ma.us/dph/bhsre/ohsp/crodi.pdf).
5. Refer for complex diagnosis of work-related constellation of problems to an occupational medicine specialist.

### Treatment and Management

6. If the diagnosis is cumulative trauma disorder, recommend time off from work or respite from specific activity. "Light duty" is rarely available in residential construction. The patient may not be able to negotiate with the employer for a job with restrictions. Consult with the patient on the amount and type of work he or she can perform comfortably. Ask how likely it is that he or she can find suitable work and how much work he or she can afford to miss.
7. If indicated, prescribe time off work. If the patient is not self-employed and five or more days away from work are indicated, provide information about partial lost wage replacement through workers' compensation. Call the employer to ensure that a First Report of Injury has been filed with the Department of Industrial Accidents.
8. If workers' compensation is unavailable, Social Security Disability benefits may be available if you determine that an injury totally disables a patient from working and is likely to do so for at least 12 months. Discuss eligibility for short-term disability and strategies for gaining employer support for a recovery and return to work plan.

### Prevention

9. Ask the patient if he or she feels comfortable with your recommending interventions to the employer. If so, see sample letter in Sample Letters to Employers in this guide. See box below.
10. Consider calling OSHA (617-565-6924) if your patient or his or her co-workers are at imminent risk of serious injury or death. Conditions presenting imminent danger can include uncovered roof openings, faulty scaffolds, broken ladders, etc. You can also give your patient information about OSHA. See OSHA patient fact sheet in this guide.

## Intervention Ideas to Prevent Injuries and Illnesses in Residential Construction

- ◆ Install and use hoisting devices rather than carry heavy materials up ladders.
- ◆ Use ladders at the correct angle (4:1) to prevent slip out. The proper use of ladders is dependent on good planning, which means having and bringing the correct ladders to the site.
- ◆ Use guardrails and toeboards on scaffolds to prevent falls and falling materials from striking workers below.
- ◆ Maintain good housekeeping at the work site to prevent trips and falls and awkward postures while carrying heavy materials. Good housekeeping is dependent on having sufficient time and sufficient personnel on site for clean-up.
- ◆ Train in the use of all tools and equipment, particularly power tools.
- ◆ Substitute less toxic chemicals where available.
- ◆ Use wet methods to help keep lead and asbestos out of the air. Use scraping to release less lead than power sanding. Glove bags can be used for removing short lengths of asbestos pipe lagging.
- ◆ Optimize area ventilation.
- ◆ Ensure proper use of personal protective equipment, including respirators. Consult an industrial hygienist before introducing respirators. Respirators must be specific to the chemical exposure and the circumstances of use. The worker must be medically certified as capable of wearing a respirator and the employer must have a Respiratory Protection Program in place.

**Musculoskeletal Disorders .....1**  
**Chemical Exposures .....3**  
**Acute Injuries .....4**

Restaurant workers are likely to be teenagers or immigrants, who can be especially vulnerable to workplace hazards. Restaurant work may involve informal employment arrangements: working for relatives, cash payment, and incomplete observation of wage and hour laws like minimum wage, overtime, and child labor restrictions.

Common injuries to restaurant workers include lacerations, punctures, musculoskeletal disorders, heat stress, exposure to chemicals, and burns. Strains, sprains and back injuries result from slips and falls on wet, slippery floors. Restaurants lead all other industries in work-related injuries to teens, accounting for 26% of all teen workers' compensation cases. Burns and scalds, frequently caused by hot oil and grease, are the fourth most common injury seen among hospitalized teens.

If your patient works for a small family business or may be undocumented, he or she may not think of his or her restaurant work as employment or may not wish to acknowledge this employment. Focus on specific tasks performed and potential exposures rather than employment arrangements. Small restaurants may not carry workers' compensation insurance (though this is illegal); however, their employees may still be eligible for benefits. See Workers' Compensation section in this guide.

## Musculoskeletal Disorders (MSDs)

Accurate diagnosis is key to treatment and to prevention of chronic incapacity. Use of an inexact term (e.g., not all wrist pain is "carpal tunnel syndrome") can complicate treatment and compensation. Refer to orthopedists, neurologists or occupational medicine specialists if a diagnosis is unclear.

If your patient has a work-related MSD, the current setup of his or her job may exacerbate his or her condition, prevent recovery, and perhaps cause similar injuries in co-workers. Employers can help prevent these problems with job modifications. Modifications may be quite simple and inexpensive. Examples include improved equipment, adjustment and maintenance of equipment, breaks, introduction of more variability in activity, etc. Employers should be encouraged to seek job evaluations from someone skilled in ergonomics.

## Signs and Symptoms

Patients may report numbness, tingling, swelling, excessive warmth, etc. before experiencing pain. Recognition of early symptoms can prevent progression of the injury.

### Signs and symptoms of MSDs can include

- ◆ Weakness in the hands or forearms that makes it difficult to lift or carry normal things
- ◆ Tingling, pins and needles
- ◆ Numbness
- ◆ Clumsiness: dropping or having to concentrate on holding things
- ◆ Waking up at night with pain
- ◆ Hands cold or tender
- ◆ Chronic pain that gets worse

### Diagnosis

1. Identify range of motion, strength limitations.
2. Document pain, numbness.
3. Have patient demonstrate the motions that trigger the problem and describe requirements of work.



## Association with Work



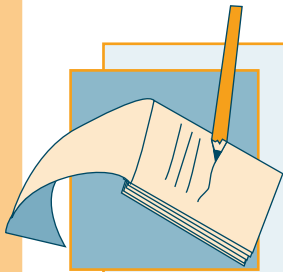
Ask your patient these questions:

1. Are your symptoms associated with any particular activity at work?
2. Have your work conditions changed recently (hours, tools, assignments)?
3. Do your symptoms improve on vacation, or when you are away from work for more than one day?
4. Did symptoms begin as a result of a slip or fall, injury or assault at work?

Risk factors for MSDs include repetitive motion, awkward postures, static postures, and forceful exertion.

Note:

Teen workers may believe that these injuries result from sports or other activities. Probe to determine whether work may exacerbate or contribute to these conditions.



### Plan

#### Diagnosis

1. Ask 5 brief screening questions in the History Taking section of this guide to explore/confirm work-relatedness. Ask patient to act out or pose tasks.
2. Refer, if necessary, for diagnosis confirmation (e.g., nerve conduction velocity for carpal tunnel syndrome).
3. Refer for complex diagnosis of work-related constellation of problems to occupational medicine specialist.
4. Inform the patient about claiming medical benefits from the employer's workers' compensation carrier. This may help the patient obtain wage replacement benefits if needed in the future.
5. If carpal tunnel syndrome, public health law requires reporting to the MDPH Occupational Health Surveillance Program. Use the Confidential Report of Occupational Disease and Injury included in the Mandatory Reporting section of this guide or download the form at [www.state.ma.us/dph/bhsre/ohsp/crodi.pdf](http://www.state.ma.us/dph/bhsre/ohsp/crodi.pdf)

#### Treatment and Management

6. If indicated, provide written directions for respite from specific activity (light duty). Ask your patient about the amount and type of work he or she can perform comfortably. Find out if the employer has an appropriate return-to-work program. Specify the amount of time for recovery and the nature of restrictions on work (see sample letter in Sample Letters to Employers in this guide).
7. If indicated, provide rest (time off work). If the patient is not self-employed and 5 or more days away from work are indicated, provide information about partial lost wage replacement through workers' compensation.
8. If obtaining workers' compensation is not feasible, find out from the patient how much work he or she can afford to miss. Ask if the employer provides disability benefits. Social Security benefits may be available if you determine that a condition totally disables a patient from working and is likely to do so for at least 12 months. If the restaurant is large or is part of a chain, check eligibility for the Family and Medical Leave Act in the Legal Rights profile in this guide.

#### Prevention

9. If the patient agrees, write a letter to the employer recommending preventive measures (box, below). See sample letter in Sample Letters to Employers in this guide.

### Intervention Ideas to Prevent MSDs in Restaurants

Store heavy items, especially liquids, on shelves between knee and shoulder height

Provide rolling carts to transport heavy items

Equip buckets and other containers with handles

Provide long-handled tools to lift ice cubes from bottom of ice machine without bending over

Maintain anti-fatigue rubber floor mats where people work standing

When possible, divide loads into lighter portions: use smaller trays, divide products into smaller containers

Train employees to ask for help moving heavy or awkward items

Train employees to move ice containers and other heavy items one at a time

## Chemical Exposures

### Signs and symptoms

#### Selected Chemical Exposures Common in Restaurants

Common Sources of Exposure	Health Outcomes
Soaps and detergents Cleaners, sanitizers not diluted according to manufacturers' instructions	Skin and eye irritation
Caustic detergents and sanitizers	Chemical burns
Sanitizers containing sensitizers such as quaternary ammonium compounds ("quats")	Occupational asthma Allergic dermatitis
Degreasers containing glycol ethers Oven cleaners containing glycol ethers	Occupational asthma Allergic dermatitis
Pesticides Insecticides Rodenticides	Variety of dermatologic, neurologic, respiratory, and reproductive outcomes Consult Material Safety Data Sheets about specific compounds
Latex gloves	Immunological contact urticaria

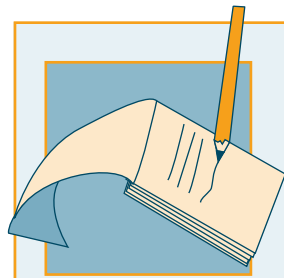
### Association with Work



1. Ask whether the patient handles the substance in question or whether it is used in an automated closed system. For example, correct use of some industrial dishwashers prevents worker exposure to detergents except during maintenance of the machines.
2. Ask if the patient has been involved in cleaning or maintaining equipment like vents, dishwashers, ovens or stoves. If so, probe to identify potential exposures during these activities.
3. Obtain Material Safety Data Sheets (MSDSs) for chemicals used at the patient's job. MSDSs describe health effects associated with exposure, as well as required safety measures. Employers are required by law to make them readily accessible to employees. You can
  - ◆ Ask your patient to obtain MSDSs for chemicals of concern, or
  - ◆ Ask your patient if he or she belongs to a union. If so, the patient can contact the steward or field representative to help obtain the MSDSs, or
  - ◆ Ask your patient's permission for you to write a letter to the employer to request the MSDSs (see sample letter in Sample Letters to Employers in this guide), or
  - ◆ Ask the patient to copy product names and numbers from product labels. You can then obtain most MSDSs from the database at [hazard.com](http://hazard.com).



MSDSs may be incomplete or outdated, frequently fail to list sensitizers or reproductive hazards, and do not list ingredients present at less than 1%. You can call the telephone numbers on MSDSs for further information or obtain additional information at the Hazardous Substances Data Bank: [toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm](http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm).



## Plan

### Diagnosis

1. Ask 5 brief screening questions in the History Taking section of this guide to explore/ confirm work-relatedness. Emphasize that you are asking about any work the patient does, regardless of whether it is work for family members or under-the-table.

2. Obtain Material Safety Data Sheets (MSDSs) for chemicals used at the patient's workplace. See additional information at the Hazardous Substances Data Bank [toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm](http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm)

3. If the patient is under 18 or the diagnosis is suspected or confirmed occupational asthma, public health law requires reporting to the MDPH Occupational Health Surveillance Program. Use the Confidential Report of Occupational Disease and Injury included in the Mandatory Reporting section of this guide or download the form at [www.state.ma.us/dph/bhsre/ohsp/crodi.pdf](http://www.state.ma.us/dph/bhsre/ohsp/crodi.pdf)

### Prevention

4. If the patient agrees, you can write a letter to the employer recommending preventive measures (see box, below). See sample letter in Sample Letters to Employers in this guide.

5. MassCOSH (617-825-SAFE) can also offer assistance about hazards, potential health effects, and resources. See also the organizations listed in the Resources section of this guide..

6. If the patient works for a small or family-owned restaurant and is comfortable approaching the employer about workplace issues, recommend use of the free OSHA Consultation Service. See OSHA Consultation Service box, page 6. See sample letter in Sample Letters to Employers in this guide

## Intervention Ideas to Prevent Hazardous Chemical Exposures in Restaurants

### To Prevent Hazardous Exposure to Cleaning Compounds

1. Dilute cleaning products according to manufacturers' instructions, not in excess concentrations

2. Provide the correct personal protective equipment as specified by the MSDS when it is necessary to handle industrial chemicals

This may include goggles and aprons as well as gloves. Neoprene or other gloves may be required to handle caustics, acids, and solvents that will dissolve many types of gloves designed for other uses.

3. Avoid use of ammonia if chlorine-containing compounds are used

### To Prevent Latex Allergy

1. Use polyethylene gloves, not latex

2. Use gloves only when necessary to handle food

### To Prevent Pesticide Exposure

1. Contract out pesticide application

2. Contract with pest control firms that use Integrated Pest Management techniques to minimize use of pesticides while still being effective

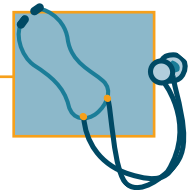
The Massachusetts Department of Food and Agriculture's Pesticide Bureau (617-626-1700) has published IPM: Integrated Pest Management Kit for Building Managers at [www.state.ma.us/dfa/pesticides/publications/IPM\\_kit\\_for\\_bldg\\_mgrs.pdf](http://www.state.ma.us/dfa/pesticides/publications/IPM_kit_for_bldg_mgrs.pdf)

3. Schedule application to ensure adequate time before kitchen work

## Acute Injuries

### Signs and Symptoms

Common injuries in restaurant work include cuts, burns and scalds and traumatic injuries resulting from slips and falls. Heat exhaustion is also common.







## Plan

1. Ask 5 brief screening questions in the History Taking section of this guide to explore/confirm work-relatedness. Emphasize that you are asking about any work the patient does, regardless of whether it is work for family members or under-the-table.
2. If the patient agrees, you can write a letter to the employer recommending preventive measures (see box, below). See sample letter in Sample Letters to Employers in this guide.
3. MassCOSH (617-825-SAFE) can also offer assistance about hazards, potential health effects, and resources. See also the organizations listed in the Resources section of this guide.
4. If the patient works for a small or family-owned restaurant and is comfortable approaching the employer about workplace issues, recommend use of the free OSHA Consultation Service. See box, page 6. See sample letter in Sample Letters to Employers in this guide.

### *Intervention Ideas to Prevent Acute Injuries in Restaurants*

#### **To Prevent Burns**

##### **Stoves, Ovens, and Grills**

- Provide heatproof handle covers on stove and oven handles
- Provide adequate numbers of heatproof mitts readily accessible to all workers and in sizes that comfortably fit all workers. Temperature resistant gloves usually have wool or cotton liners or leather palms, and are made of Kevlar, terry cloth, or other heat-absorbing material. Rubber gloves are completely inappropriate for handling hot items.
- Provide three-foot forks and long oven mitts for use with pizza ovens
- Do not substitute towels or non-heatproof gloves for proper mitts and potholders
- Ensure that stoves, ovens, and grills are turned off and allowed to cool before cleaning
- For cleaning the grill, provide a cleaning tool with a handle that allows downward pressure, a firm grasp with one or two hands, and three inches between the grill's hot surface and the operator's hands
- Prevent fires by cleaning vent grates regularly (e.g., weekly), and periodically having them cleaned professionally

##### **Deep Fat Fryers**

- Use all liquid shortening; solid cubes of lard can cause splattering
- Change used oil with shortening shuttle rather than by carrying pans
- When a shortening shuttle is not available:
  - Use a lift system or pump to a closed container
  - Have a written protocol for alternative procedures
  - Wait until restaurant is closed
  - Allow the oil to cool to 100°F

#### **To Prevent Cuts, Other Traumatic Injuries**

##### **Cutting, Slicing, and Mixing Machines**

- Ensure that all cutting and slicing machines and dough mixing machines have, and are operated with, proper guards
- Ensure that machines are disconnected from power source before guards are removed for maintenance or cleaning or to remove blockages
- Use cutting, slicing, and dough machines with interlock guards to prevent operation when guards are removed for cleaning or maintenance
- Have food pushers for feed hoppers and delivery shoots
- Train workers to use them, never their fingers.*
- Train specific workers to run hazardous equipment and limit the equipment use to those individuals
- Follow federal regulations that prohibit workers under 18 years of age from operating power-driven bakery or meat-slicing machines

##### **Knives**

- Have knives and blades sharpened regularly (e.g., weekly) by qualified sharpener
- Provide proper chopping boards

### **Intervention Ideas to Prevent Acute Injuries in Restaurants** *continued from previous page*

- ◆ Train employees in cutting techniques
- ◆ Maintain and designate holders for knives and other cutting tools
- ◆ Ensure that sharp tools are stored in the designated holders where not in use.
- ◆ Do not place sharp tools in basins with water or other items
- ◆ Obtain properly guarded or enclosed machines like bread slicing machines rather than relying on manual slicing

#### **Other**

- ◆ Throw away broken or chipped glassware
- ◆ Separate broken glass from trash collected in plastic garbage bags
- ◆ Keep tanks of nitrogen or carbon dioxide chained and secured

### **To Prevent Slips and Falls**

#### **Doors**

- ◆ Clearly designate different swinging doors for entering, exiting
- ◆ Fit swinging doors with windows that allow view of people approaching from other side

#### **Floor**

- ◆ Maintain carpeting, rugs, and mats
- ◆ Maintain wooden duckboards and railings
- ◆ Cover the floor with slip-resistant waxes or slip-proof tiles
- ◆ Provide rubber floor mats at food prep stations, ice

machines, and other areas that become wet

- ◆ Provide ramped mats in front of grills and fryers
- ◆ Provide ramped or rubber mats at doors of walk-in freezers to prevent pooling of condensed water

#### **Work Practices**

- ◆ Avoid storing materials in hallways or on stairs
- ◆ Avoid storing ice on floors near walking areas
- ◆ Train employees to clean spills and grease during the shift
- ◆ Schedule major wet floor cleaning between shifts with adequate time to dry

#### **Other**

- ◆ Keep stairways well lit
- ◆ Install an automatic motion-detector light to illuminate the dumpster area
- ◆ Provide or subsidize slip-resistant shoes for employees
- ◆ Store heavy items, especially liquids, on lower shelves between knee and shoulder height
- ◆ Check and maintain ladders and footstools
- ◆ Fit ladders and footstools with non-skid feet

### **To Prevent Heat Exhaustion**

- ◆ Provide air conditioning in the kitchen
- ◆ Provide fresh, cool drinking water for workers at all times
- ◆ Schedule regular breaks for workers to leave hot areas

### **OSHA Consultation Service**

The Occupational Safety and Health Administration (OSHA) provides free health and safety consultation services, mainly to small businesses.

The Consultation Service is separate from the OSHA enforcement program. The Consultation Service does not issue citations or penalties. It also does not report violations to OSHA enforcement staff.

The Consultation Service offers free health and safety walkthroughs by safety professionals. The consultants produce recommendations and a written report for the employer.

In Massachusetts, employers can request this service through the following agency:

Division of Occupational Safety and Health, Department of Workforce Development  
1001 Watertown Street, West Newton, Massachusetts 02165

Tel: (617) 969-7177 Fax: (617) 727-4581

Email: [masscon@state.ma.us](mailto:masscon@state.ma.us)

[www.state.ma.us/dos/Consult/Consult.htm](http://www.state.ma.us/dos/Consult/Consult.htm)

For more information about the Consultation Service, employers can visit the website at [www.osha.gov/oshprogs/consult.html](http://www.osha.gov/oshprogs/consult.html)

## **Resources**

### **OSHA free consultation service for small employers (see Box above)**

[www.osha.gov/oshprogs/consult.html](http://www.osha.gov/oshprogs/consult.html)

### **OSHA webpage for teen restaurant workers and their employers**

[www.osha.gov/SLTC/youth/restaurant](http://www.osha.gov/SLTC/youth/restaurant)

### **Massachusetts Department of Public Health teen injury surveillance reports**

[www.mass.gov/dph/bhsre/ohsp/teens/page1.htm](http://www.mass.gov/dph/bhsre/ohsp/teens/page1.htm)

### **Massachusetts Department of Public Health child labor law information**

[www.mass.gov/dph/bhsre/ohsp/cll.htm](http://www.mass.gov/dph/bhsre/ohsp/cll.htm)





# Section 3 - Health Effects

## Contents of this Section

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*Asthma*

*Back Injuries*

*Dermatitis*

*Headache*

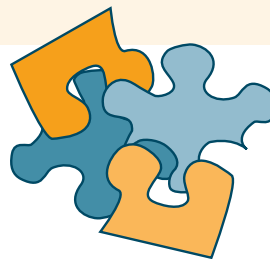
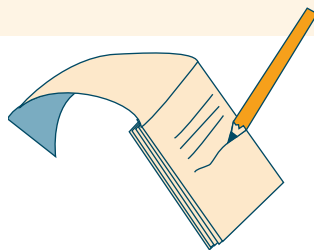
*Hearing Loss*

*Lead Exposure*

*Musculoskeletal Disorders, Non-Back*

*Neurologic Conditions*

*Reproductive and Developmental Disorders*





Work-related asthma (WRA) is defined as asthma that is caused or exacerbated by work. Asthma is characterized by reversible airway narrowing, accompanied by airways inflammation. Of all office and emergency room visits for asthma, approximately 70% are by adults. Up to 29% of all asthma in adults is attributable to work exposures.

## Signs and Symptoms

Patients may initially present with complaints of:

- ◆ Shortness of breath after activity or climbing stairs
- ◆ Persistent or episodic cough
- ◆ Persistent or episodic wheezing or whistling in the chest
- ◆ Chest pressure, tightness, or other discomfort
- ◆ Fatigue

These symptoms may occur during exposure or after work, or may wake patients at night. There may be cultural differences in the words used to describe breathlessness. One study found that white and African-American patients with asthma used different words to describe symptoms associated with documented substantial airways obstruction: African-Americans used the terms “tight throat,” “scared-agitated,” “voice tight,” “itchy throat,” and “tough breath,” while Whites used the terms “light headed,” “out of air,” “aware of breathing,” and “hurts to breathe.”

Wheeze may be present, sometimes only audible by auscultation. Expiration may be slowed; speaking may be clipped, as the patient breathes more frequently. The patient may cough or appear fatigued, pale and tired from interrupted sleep and the extra work of breathing. Oxygen saturation may be depressed. But sometimes, between asthma attacks, the physical examination may be entirely normal.

## Association with Work

Often the patient may not be aware of the relationship to work because of the insidious onset and seemingly erratic nature of the symptoms. The offending agent may not be encountered every day at work. Symptoms are often worst at night and may continue through weekends or other breaks from work. Some patients only become aware of the work-related nature of the symptoms by the abatement of symptoms during extended vacations or other prolonged absences from work.



### A. Temporal Association with Work

A potential relationship with work is indicated if:

- ◆ The onset of the disease coincides with the introduction of a new product, a new process, or change of jobs; or
- ◆ Symptoms improve on vacation or on weekends; or
- ◆ Symptoms worsen over the course of the work week; or
- ◆ Symptoms worsen the first day of the work week or upon return to work.

Association with work may be evaluated with a peak flow meter if the patient is willing to use it at least four times a day and record the best of three tries, on arising; before, during and after work, and at bedtime. However, some patients may be chronically obstructed from inflammation and edema and may not improve until removed from work for 2-3 weeks and treated with oral steroids. Pre- and post-shift spirometry can be helpful but may be inconvenient to conduct; it can also miss late asthmatic reactions or, when work exposures are sporadic, may not be done on a day when exposure to the causative agent is encountered by the patient. Confirmatory inhalation challenge testing with a suspected specific agent is

rarely done except in highly specialized centers.

New-onset asthma that starts within 24 hours of an acute exposure to an irritant is called reactive airways dysfunction syndrome (RADS). The onset of RADS symptoms often follows a spill or release. Some RADS cases have immediate onset of severe symptoms requiring treatment in an emergency department. Symptoms may persist for months or even years. In recent years, increasing evidence indicates that work-related asthma can also result from repeated low-level irritant exposures insufficient to cause full-blown RADS.

### B. Association with Specific Workplace Exposures

Agents associated with work-related asthma may be immunologic sensitizers or non-specific irritants. The most important step in reducing symptoms is the identification of the agent(s) that trigger symptoms:

- ◆ Has anything changed at work recently?
- ◆ Was a new process or chemical introduced?
- ◆ Have the patient's work duties changed?
- ◆ Is there a particular process that triggers the patient's symptoms?
- ◆ Do the patient's co-workers have similar symptoms?

Common Eastern Massachusetts occupations that should trigger immediate suspicion include autobody repair, baking, woodworking, custodial or janitorial work, health care work with frequent latex glove changes, etc. Common sensitizing agents include latex, certain hard wood dusts, baker's flour, cleaning products or sanitizers, mold in water-damaged schools and office buildings, isocyanate paints and coatings, organophosphate pesticides, etc. A list of common sensitizers is provided on Page 3. A more complete and searchable database, including several hundred sensitizing agents known to cause asthma, is provided by the Association of Occupational and Environmental Clinics (AOEC) at [www.aoec.org/aoecode.htm](http://www.aoec.org/aoecode.htm).

If the agent is a sensitizer, the patient may have other symptoms, such as itching of the eyes and/or nose. If the agent is an irritant, the patient may have other symptoms, such as eye or skin irritation. The description may include statements such as, "every time they open the glutaraldehyde . . ." or "whenever

I have to clean the toilets with the cleaner . . ." or "this happened the last time they stripped the floors, too." Specific antibodies to the causative agent may be identified in the patient's serum when the asthma involves an immunologic mechanism. Allergy skin testing can also be used to document sensitization to a specific agent found in the workplace.

Irritants and other chemicals not yet listed as asthmagens by the AOEC may also cause work-related asthma. If you are unable to determine an exposure that might be triggering the asthma you may wish to refer the patient to a pulmonologist or occupational medicine physician who specializes in respiratory diseases. Providers should also consider obtaining MSDSs for chemicals that are suspected agents.

Any worker with asthma, whether new-onset or pre-existing asthma, may be more troubled by irritant chemicals, dust, or environmental tobacco smoke at work.

**Table 1. Asthma-Causing Agents****Examples of known sensitizers**

There are over 350 occupational asthmagens. For an updated, more complete list of asthmagens see [www.aoec.org/aoeccode.htm](http://www.aoec.org/aoeccode.htm)

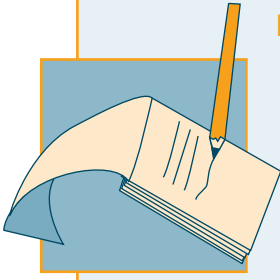
<b>Biological agents</b>	Bat guano Biologic enzymes (e.g., <i>B. subtilis</i> ) Cockroach, Dust mites Egg protein Laboratory animals Molds (e.g., <i>Aspergillus</i> ) Psyllium Shrimp, Crab
<b>Cleaning products/sterilants</b>	Amines (e.g., ethylene diamine, hexamethylene tetramine) Benzalkonium chloride, Chloramine T, Chlorhexidine Ethanolamine, Formaldehyde, Glutaraldehyde, Hexachlorophene Quaternary ammonium compounds ("quats")
<b>Hairdressing and nail chemicals</b>	Formaldehyde, Methyl methacrylate Persulfates (in hair bleach)
<b>Metals</b>	Chromium, Cobalt, Nickel, Platinum Welding on stainless steel, Zinc
<b>Miscellaneous chemicals</b>	Chromic acid, Cyanoacrylate, Epoxy resins. Isocyanates (e.g., MDI, TDI) Metal working fluids (coolants for machining metals) Colophony (in rosin core solder), Styrene
<b>Natural products</b>	Baking flour (wheat, rye, soya flour), Latex (natural rubber latex) Plants (e.g., tobacco leaf, hops, freesia, chicory) Spices (e.g., garlic dust, paprika) Wood dusts (western red cedar, oak, mahogany, ashwood)
<b>Paints and coatings</b>	Anhydrides (e.g., trimellitic anhydride, phthalic anhydride) Cross-linking agents and hardeners, Epoxies Ethanolamines. Isocyanates (e.g., TDI, MDI, IPDI, HDI) Methyl methacrylate Polyamines (e.g., ethylene diamine, triethylene tetramine), Styrene
<b>Pesticides</b>	Chlorpyrifos (Dursban), Dichlorvos, Organophosphate pesticides (e.g., malathion, parathion, diazinon)

**Table 2.** Asthma-Causing Agents  
By occupations at risk

Industry	Exposures
Agriculture	Animal urine/dander, Grain dusts, Grain mites
Animal handling	Animal urine/dander
Baking	Enzymes (fungal amylase), Flour/grain dust, Grain mites
Cleaning, Janitorial work	Cleaning materials, Dusts, Molds
Daycare	Cleaning materials, Dusts, Latex gloves (natural rubber), Molds
Electronics	Amines, Metals, Soldering flux (colophony)
Hairdressing	Henna, Persulfate, Methyl methacrylate
Health Care	Formaldehyde, Glutaraldehyde, Latex (natural rubber), Methylidopa, Penicillins, Psyllium
Laboratory Work	Animal urine/dander, Bird feathers, Enzymes, Formaldehyde, Glutaraldehyde, Insects, Latex (natural rubber)
Machining/Tool setting	Metal working fluids, Oil mists
Office Work	Cleaning materials, Dusts, Molds
Pharmaceuticals	Cephalosporins, Pancreatin, Papain, Pepsin, Psyllium
Photography	Complex amines
Plastics/Rubber manufacture	Anhydrides, Diisocyanates
Sawmills	Wood dusts (Eastern white/western red cedars, mahogany, oak, redwood)
Seafood processing	Crabs, Shrimp
Teaching	Cleaning products, Molds, Dusts
Textile manufacture	Dyes, Gums
Welding	Welding fumes

Table adapted from New York State Department of Health Occupational Health Surveillance Program





## Diagnosis

1. Ask 5 brief screening questions in the History Taking section of this guide to explore/ confirm work-relatedness.
2. Identify workplace exposures causing or exacerbating the asthma. Questions from 'B' on Page 2 may be helpful in probing.
3. Obtain Material Safety Data Sheets (MSDSs) for chemicals used at the patient's workplace. See additional information at the Hazardous Substances Data Bank at [toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm](http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm).
4. Provide pre- and post-shift spirometry or, preferably, provide peak flow meter with detailed instructions for two full weeks of 4x/day use to assess work-relatedness.
5. Consider a referral to a pulmonologist or occupational medicine clinic listed in the Resources section of this guide.
6. Inform the patient about claiming medical benefits from the employer's workers' compensation carrier. This may help the patient obtain wage replacement benefits if needed in the future.

## Treatment and Management

7. Treat the asthma, including controller and rescue medications. See Massachusetts Occupational Asthma Treatment Guidelines: [www.state.ma.us/dia/hcsb/tg28.pdf](http://www.state.ma.us/dia/hcsb/tg28.pdf).
8. A treatment plan should be established and discussed with the patient. See [www.mhqp.org/AAP.pdf](http://www.mhqp.org/AAP.pdf).
9. Encourage the patient to note the frequency of symptoms and bronchodilator use to allow assessment of work-relatedness.
10. Public health law requires reporting all cases of suspected or confirmed work-related asthma to the MDPH Occupational Health Surveillance Program. Use the Confidential Report of Occupational Disease and Injury included with this guide in the Mandatory Reporting Forms section or download the form at [www.state.ma.us/dph/bhsre/ohsp/crodi.pdf](http://www.state.ma.us/dph/bhsre/ohsp/crodi.pdf)
11. If needed, and with patient's consent, write a letter requesting time off work to see if the symptoms reverse or improve spontaneously.
12. If 5 or more days off work are indicated, provide information about partial wage replacement through workers' compensation.

## Prevention

13. With patient's consent, write a letter to the employer describing the risk to employees and recommending the employer eliminate the sensitizing substance from use. See the Employer Interactions section in this guide for sample letters.
14. If sensitizing substance is not eliminated, provide employer with guidance on methods to reduce exposure to sensitizers and triggers. Such methods include: isolating the process; reducing quantities; local exhaust ventilation; limiting the number of people exposed; use of respirators, impermeable gloves or aprons; etc.
15. If your patient belongs to a union, encourage him or her to contact their steward or union representative. If your patient agrees, consider contacting the union directly with information about hazards, health effects, and recommended interventions.
16. Encourage patient to call MassCOSH (617-825-SAFE) or an organization listed in the Resources section of this guide for additional assistance.
17. Provide patient with information on reducing asthma triggers in the home.
18. If exposure to the chemical trigger is an essential part of your patient's work, discuss the possibility of a career change with your patient.



## Resources

### **Asthma, general**

American Academy of Allergy, Asthma and Immunology. The Allergy Report  
[www.aaaai.org/ar/working\\_vol1/024.asp](http://www.aaaai.org/ar/working_vol1/024.asp)

### **Occupational asthma, clinical guidelines**

Commonwealth of Massachusetts Occupational Asthma Treatment Guidelines:  
[www.state.ma.us/dia/hcsb/tg28.pdf](http://www.state.ma.us/dia/hcsb/tg28.pdf)

### **Clinical evaluation, management, and prevention of work-related asthma.**

Friedman-Jimenez G, Beckett WS, Szeinuk J, Petsonk EJ (2000).  
American Journal of Industrial Medicine 37:121-141.

### **Occupational asthma, a relational database**

[www.remcomp.com/asmanet/asmapro/asmawork.htm](http://www.remcomp.com/asmanet/asmapro/asmawork.htm)  
Scroll down for a list of occupational asthma case reports.

### **Occupational asthma, cases and agents**

Association of Occupational and Environmental Clinics  
[www.aoec.org/](http://www.aoec.org/)

### **Patient educational material**

Walgreens [www.walgreens.com/library/topics/Asthma.jhtml](http://www.walgreens.com/library/topics/Asthma.jhtml).  
Search for Occupational Asthma: Wheezing at Work



Musculoskeletal disorders of the back, in particular Low Back Disorders (LBD) also called Low Back Pain (LBP), are a leading cause of work-related disability and affect about one million workers every year.

The majority of back problems resolve in 4 to 6 weeks and over 90% resolve in 6 to 8 weeks. Of the small percentage of workers disabled by LBP and out of work for more than 6 months, less than half are able to resume their job. In the case of recurrent or persistent back pain, particular care should be given to aggressive intervention to prevent full disability.

The following occupations are among those at high risk for back injuries:

Vehicle operators/drivers	Nursing aides, nurses, and other health care workers
Laborers and materials handlers/construction workers	Child care/day care workers
Warehouse workers	Machine operators
Cleaning workers	Retail workers, cashiers

## Signs and Symptoms

### 1. Examination includes inspection, palpation, percussion, and functional assessment of the spine.

Conduct examination with patient in standing, seated, prone, and supine positions.

#### Standing Tests

- ◆ Posture (kyphosis, scoliosis, scapula/shoulder and pelvic abnormalities/deformities)
- ◆ Neck and lower back ROM measurements (flexion, extension and lateral flexion, rotation)
- ◆ Inspection of lumbar lordosis and position of iliac crest (anterior/posterior)
- ◆ Schober Test (expansion measurement of curvature at level S1 from erect to forward flexion: normal <2 inches)
- ◆ Finger-floor distance in standing/bent-forward position (inches)

#### Sitting Tests

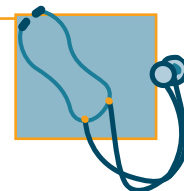
- ◆ Lumbar lordosis

#### Prone Tests

- ◆ Hip range of motion
- ◆ Sustained extension in lying (press up symptom change)
- ◆ Isometric endurance of the back muscles

#### Supine Tests

- ◆ Single and double straight leg raising (a nerve root tension/inflammation test)
- ◆ Hamstring length



### 2. Conduct neurological tests of the spine and extremities: tests of reflexes, sensory and motor functions, muscle strength, nerve root inflammation such as dural tension signs and straight leg raise test or Lasegue test.

Note:

Ask your patient to rate the severity of pain on a scale from 1 to 10. This will give you a basis for comparison and for evaluation of treatment in future visits.

#### Chronic or recurrent LBP

- ◆ Waddell's Tests (for non-organic pain behavior)

#### Lab Tests

Note: These tests may be required for workers' compensation documentation.

- ◆ ESR to screen for inflammatory, infectious and malignant problems (ESR elevated) and to assist in the differential diagnosis of degenerative back disorders
- ◆ Other labs if indicated (i.e. rheumatoid factor, C-reactive protein, uric acid, alkaline phosphatase (AP) or antibody titers)

- ◆ X-rays only if a red-flag condition (fracture, infection, tumor in combination with CBC and ESR) or clinically significant misalignment of the spine (scoliosis, spondylolisthesis)
- ◆ MRI or CT for possible disc herniation or spinal stenosis  
MRI imaging detects disc herniations with 89% sensitivity and 82% specificity. CT or MRI may also be useful if considering surgery or initial conservative treatment has failed.

Note:

*Treatment guidelines issued by the Massachusetts Department of Industrial Accidents (the state workers' compensation agency) do not allow MRIs or CTs up to 6 weeks from date of injury. The treatment guidelines also do not allow CTs or MRIs from 7 to 12 weeks from date of injury except under the following circumstances:*

- ◆ An emergency, serious, underlying medical condition; or
- ◆ Physiological evidence of neurological dysfunction; or
- ◆ Failure to progress or respond

See [www.mass.gov/dia/hcsb/tg20.pdf](http://www.mass.gov/dia/hcsb/tg20.pdf), [www.mass.gov/dia/hcsb/tg21.pdf](http://www.mass.gov/dia/hcsb/tg21.pdf).

If history and neuro exam suggest signs of significant radiculopathy or if nerve root dysfunction lasts more than 3-4 weeks, NCS/EMG, H-reflex or SEPs may be useful.

## Association with Work

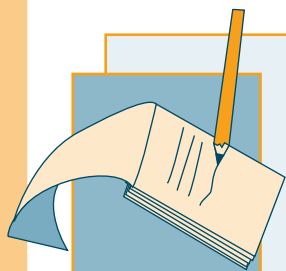


Many workers are at risk for back injuries due to repetitive movements, lifting, awkward body postures required to do work tasks, or vibration. Long working hours, frequent overtime, rapid work pace, and psychosocial stress can also contribute to risk for back injury.

If your patient has a work-related back injury, the current setup of his or her job is likely to exacerbate his or her condition, prevent recovery, and perhaps cause similar injuries in co-workers. Employers can help prevent these problems with job modifications that may be simple and inexpensive. Examples include improved or adjusted equipment, equipment maintenance, breaks, introduction of more variability in activity, etc. Employers should be encouraged to seek job evaluations from someone skilled in ergonomics.

Activities associated with work, for example commuting, sitting in a car for long periods, getting in and out of the car, carrying equipment to and from the workplace, etc., can aggravate LBP. It is important to take these activities into consideration when determining rest, treatment, and return to work plans.

Non-work activities like childcare, elder care, exercise activity, etc. can contribute to back injuries. Injuries are still considered “work-related” if the job aggravates them.



### Plan

#### Diagnosis

1. Ask 5 brief screening questions in the History Taking section of this guide to explore/confirm work-relatedness. Discuss elements of occupational history pertinent to LBP such as amount and frequency of lifting, prolonged standing or sitting, exposure to vibration.
2. Perform tests described in Signs and Symptoms, page 1.
3. Refer, if necessary, for diagnosis confirmation.

4. Inform the patient about claiming medical benefits from the employer's workers' compensation carrier. This may help the patient obtain wage replacement benefits if needed in the future.

#### Treatment and Management

5. Refer to physical or other therapy treatment.
6. If the injury is acute, limit exposure to aggravating work and home activities. Discuss with your patient the feasibility of missing work and of limiting or restricting family and household activities. Recognize both financial and practical limitations to changes in activity.
7. If feasible, recommend specific restrictions for work in a note to employer for 1 to 2 weeks with a follow-up visit as needed. Discourage complete bed rest; rather, encourage activity as tolerated, except when natural pain cues are distorted as in the case of narcotic use.
8. Do not send patients, especially machine operators, to perform any work activities when taking muscle relaxants or narcotics. These medications can mask symptoms and can also impair reaction time. Taking these medications can place patients at risk of overexertion at work. They can also place patients at risk of accidents while traveling to or from work. When these medications are prescribed or when a patient is in severe pain, recommend time off for 1 to 2 days for recuperation at home and reschedule visit for return to work.
9. If indicated, provide written directions for respite from specific activity (light duty). Ask your patient about the amount and type of work he or she can perform comfortably. Find out if the employer has an appropriate return-to-work program. Specify the amount of time for recovery and the nature of restrictions on work. See box, page 3. See sample letter in Sample Letters to Employers in this guide.

(continued next page)

**10.** If indicated, prescribe time off work. If 5 or more days away from work are indicated, provide information about partial lost wage replacement through workers' compensation. Call the employer (Human Resources office if a large company) to ensure that a First Report of Injury has been filed with the Department of Industrial Accidents.

**11.** If obtaining workers' compensation seems infeasible, discuss with the patient how much work he or she can afford to miss. Ask if the employer or union provides disability benefits. Social Security benefits may be available if you determine that a condition totally disables a patient from working and is likely to do so for at least 12 months. Check eligibility for the Family and Medical Leave Act in the Legal Rights profile in this guide. Discuss strategies for gaining employer support for a recovery and return to work plan.

#### **Prevention**

**12.** If the patient agrees, you can write a letter to the employer describing the risks to employees and recommending that the employer seek a job evaluation from an ergonomist.

**13.** If your patient belongs to a union, encourage him or her to contact the steward or union representative. If your patient agrees, consider contacting the union directly with information about hazards and recommended interventions.

**14.** MassCOSH (617-825-SAFE) can offer assistance about hazards and resources. See also the organizations listed in the Resources section of this guide.

#### **Return to Work (RTW)**

Return to work is the goal only under conditions where re-injury is not likely to occur. RTW requires the cooperation of health care providers, employers, employees, and unions when present.

Well-planned light duty can expedite RTW. The provider should write the light duty request as specifically as possible to reduce misinterpretation. Ask the employer for a job description or video/photo of your patient's job to help you understand the requirements of the job.

Work capacity may vary with the age of your patient as well as the number of hours (e.g., overtime work) that your patient is working.

Before sending a patient back to work, ask about potentially injurious activities that are not direct parts of their job description but are involved in their work life: commuting, transporting equipment, transporting children to day care, etc.

Once you have discussed time off and a RTW plan with your patient, do not make changes to this plan upon the employer's request without discussion with your patient. Doing so could erode the patient's trust in you as a provider.

Under the Americans with Disabilities Act (ADA) the employer has some responsibility to accommodate a worker with a disability, although recent rulings have weakened ADA protections (see the Legal Rights profile in this guide).

Be aware that your patient, upon RTW, may encounter resentment from his or her supervisors or co-workers for not being able to perform his or her regular job. The patient may be pressured into carrying out his or her full duties or suffer harassment. Be prepared to offer the counseling and mental health services available at your health center.

## Back Belts

**Q.** Many of my patients report being issued and wearing back belts for lifting work. Shouldn't this decrease their risk of back injury?

**A.** No. The National Institute for Occupational Safety and Health (NIOSH) has found no difference in injury rates and reported pain between workers who wear back belts and workers who don't.

**Q.** If my patient feels protected wearing a back belt, is there any reason to discourage him or her from wearing it?

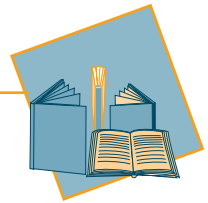
**A.** The illusion of protection may mean that your patient lifts more than he or she should and does not ask for help or use mechanical lifting devices to lift heavy loads. Back belts should never be used instead of making the work safer.

See NIOSH's back belt report at [www.cdc.gov/niosh/backfs.html](http://www.cdc.gov/niosh/backfs.html)

## Resources

Johanning E (2000). Evaluation and management of low-back disorders. *American Journal of Industrial Medicine* 37(1): 94-111.

Back Injury Links from the Center for Research on Occupational and Environmental Toxicology  
[www.croetweb.com/outreach/croetweb/links.cfm?topicID=4](http://www.croetweb.com/outreach/croetweb/links.cfm?topicID=4)



Occupational dermatitis is probably the most prevalent occupational illness. In the Boston area, common occupations with risk factors for skin problems include hairdressing, cleaning, office work, dental work, and other health care professions. Electronics manufacture is an important industry around the I-495 beltway. Food preparation workers, printers, machine tool operatives, chemical/petroleum plant operatives, assemblers, and machine tool setters are frequently affected by skin problems. Workers may develop allergic dermatitis as much as several years after initial exposure to a sensitizer.

Dermatitis may be a warning signal for exposure to compounds with other health effects. For example, dermatitis may indicate exposure to isocyanates at levels that can lead to serious allergic lung disease and asthma. Dermatitis may be one of the only acute conditions indicating exposure to vinyl chloride, which is associated with liver, brain, and lung cancer as well as possible increased risk of spontaneous abortion.

## Signs and Symptoms

Some of the most common types of occupational dermatoses are:

### *Acute Irritant Dermatitis*

- ◆ Severe eczematous reaction from one or more exposures. Macular erythema, hyperkeratosis, or fissuring predominate over vesicular change.
- ◆ Mostly affect the eyelids, cheeks, front and sides of neck, flexor forearm, dorsum of hands, medial thighs, shins
- ◆ Associated with “wet work”

### *Chronic Cumulative Dermatitis*

- ◆ Eczematous changes from repeated exposure to weaker irritants

### *Allergic Contact Dermatitis (Type IV)*

- ◆ T cell-mediated immune response resulting in or exacerbating eczema
- ◆ Varying degrees of erythema, edema, and vesiculation
- ◆ Can induce recurrence of atopic dermatitis
- ◆ Initial exposures may produce no obvious ill effect, followed by sudden severe reactions

### *Immunological Contact Urticaria (Type I)*

- ◆ IgE-mediated response typically caused by high molecular weight proteins
- ◆ Can lead to chronic skin eczema
- ◆ May be associated with systemic and potentially life-

threatening symptoms: systemic urticaria, angioedema, rhinitis, conjunctivitis, bronchospasm, anaphylaxis, pulmonary edema

- ◆ Associated with exposure to animal or vegetable matter, for example among agricultural and veterinary workers, fish processors
- ◆ Is associated with a history of manual labor, especially with metal and metal parts
- ◆ Gradual increase in severity, can lead to sensitivity to airborne concentrations

### *Chronic Hypertrophic Dermatitis*

- ◆ Frequently underreported, misdiagnosed as psoriasis
- ◆ Is often triggered by latex

### *Chloracne*

- ◆ Acneiform skin eruption
- ◆ Indicator of exposure to chlorinated polycyclic aromatic hydrocarbons

### *Spiny Keratoderma*

- ◆ Multiple parakeratotic columns above hypogranular epidermis on palms and soles
- ◆ Frequently underreported



## Association with Work

### A. Temporal Association with Work

#### **Occupational Contact Dermatitis**

- ◆ Typically clears during a 2-3 week break from work
- ◆ Typically recurs within 2-4 days of return to work

#### *Irritant occupational dermatitis*

- ◆ May commence within minutes to hours of exposure
- ◆ May improve slightly over 2 days away from work

#### *Allergic occupational dermatitis*

- ◆ Can start between 2 weeks and many years after first exposure

- ◆ Often does not improve after 2 days away from work
- ◆ Can produce eczematous, pruritic effects in any body area

#### *Occupational urticaria*

- ◆ May improve within hours

#### *Atopic Dermatitis or Psoriasis aggravated by occupational exposures*

- ◆ May not improve within 3 weeks away from work



## B. Association with Specific Workplace Exposures

### 1. Ask questions that may help identify workplace triggers:

- ◆ Has anything changed at work recently?
- ◆ Was a new process or chemical introduced?
- ◆ Have your responsibilities changed?
- ◆ Is there a particular process that triggers your symptoms?
- ◆ Do your coworkers have similar symptoms?

### 2. Obtain Material Safety Data Sheets (MSDSs) for chemicals used at the patient's job.

MSDSs describe health effects associated with exposure and required safety measures. Employers are required by law to make them readily accessible to employees.

- ◆ Ask your patient to obtain MSDSs for chemicals used at his or her job or work area; or
- ◆ Ask your patient if he or she belongs to a union. If so, the patient can contact his or her steward or field representative to help obtain the MSDSs; or
- ◆ Ask your patient's permission for you to write a letter to the employer to request the MSDSs (see sample letter in Sample Letters to Employers in this guide); or
- ◆ Ask the patient to note down product names and numbers from the labels of substances used. You can then obtain most MSDSs from the database at the website [hazard.com](http://hazard.com).

The MSDSs should indicate which substances are associated with skin disorders but may be incomplete or outdated, and frequently fail to list sensitizers. Also, MSDSs do not list ingredients present at less than 1%. You can call the telephone numbers on MSDSs for further information or obtain additional information at the Hazardous Substances Data Bank: [toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm](http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm).

### 3. Ask about protective equipment.

- ◆ Does the employer provide the proper personal protective equipment? This may include aprons, boots, and face shields as well as gloves. MSDSs should specify the types needed.
- ◆ Is the equipment constructed of materials impervious to the irritant/sensitizer? For example, rubber gloves provide virtually no protection against many organic solvents. These require the use of vinyl or nitrile gloves. PCBs permeate most types of gloves. Gloves that are not impervious to the substance may exacerbate the problem by occlusion. Cotton gloves used in soldering can exacerbate dermatitis through wicking fluxes to the skin.
- ◆ Does the equipment fit properly, allowing the patient to work safely and comfortably?

### 4. Patch Testing for Allergic Contact Dermatitis

Patch tests can identify sources of allergic reactions. You can order special series of patches for industries (e.g., hairdressing series, plastic or glue series). Skin exposed to patch tests should be examined after 30 minutes, then after one to five days for delayed reactions.

#### Cautions regarding patch testing:

- ◆ "Potentially irritant or toxic chemicals should not be tested as they can burn a hole in the patient's back. This includes fluxes, caustic chemicals, solvents, acids, and alkalis" (Gawkrodger, 2001).
- ◆ Patch testing with old or degraded substances may result in false negatives.
- ◆ Patch testing with concentrations that are too low may lead to false negatives.
- ◆ Patch testing with concentrations that are too high may result in non-specific irritation.

### 5. Skin Prick Testing for Contact Urticaria

Skin prick testing, together with measurement of specific IgE, is used to identify triggers of immunological contact urticaria. This technique is particularly important in the case of respiratory symptoms.

*Resuscitation measures must be available during prick testing.*

### 6. Identify Non-Occupational Sources of Exposure

Non-occupational sources of contact to the irritant/allergen can aggravate occupational health effects. For example, sources of latex include tires, hoses, tubing, cable coverings, clothing, boots, face masks, finger stalls, motorcycle and bicycle handles, diving suits, rubber sheets, condoms, balloons, dental dams, household gloves. Some people with latex allergies cross-react to bananas, chestnuts, avocados, kiwis, peaches, or pineapples.



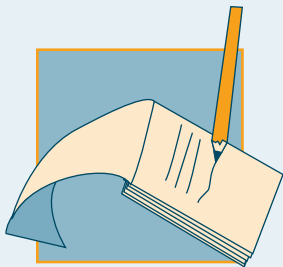


## Common Occupational Irritants and Sensitizers

Industry	Exposures	Associated Outcomes
Agriculture Construction Outdoor work	Fluazinam, other pesticides	Allergic contact dermatitis
	Chromates in cement Chrome compounds in paints	
	Chlorinated herbicides	Chloracne
	Oils, greases, and tars combined with UV radiation	Carcinomas
	Plant and wood substances	Light-activated photocontact dermatitis
Cleaning	Detergents Disinfectants Floor and furniture polishes Drain cleaners Ammonia Bleach	Irritant contact dermatitis
Dentistry	Dental acrylic monomers (acrylates and methacrylates)	Irritant contact dermatitis Allergic contact dermatitis: sensitivity to one often results in cross-sensitization to others
	Latex: latex proteins and residual chemicals from formulation process	Irritant contact dermatitis Allergic contact dermatitis Immunological contact urticaria
Dentistry Respiratory therapy	Infected patients	Herpetic infections of the hands
Electrical maintenance	PCBs in older capacitors and transformers in electric arc and induction furnaces, aluminum potlines, industrial power plants	Chloracne
Electronics manufacture	Rosin core and fluxes associated with soldering	Allergic contact dermatitis
	Acids Cadmium, chromium, copper, zinc, magnesium dusts	Irritant contact dermatitis
	Solvents Additives, contaminants in solvents	Irritant contact dermatitis Defatting Can affect the hands or face
	Acrylic sealants Formaldehyde Polypropylene Additives in greases Nickel in wrist straps Epoxy resins, hardeners Anti-static agents like bishydroxyethyltallow amine in wrist straps	Allergic contact dermatitis
	Fiberglass in printed circuit boards	Pruritis Excoriation

Food services Catering Food processing	Flour, Vinegar, Fish, Meat	Irritant contact dermatitis
	Fish, Shellfish, Vegetables, Spices	Acute irritant dermatitis
	Dough, Additives, Garlic, Onion, Spices	Allergic contact dermatitis
	Fish, Shellfish, Meats, Fruits, Vegetables	Immunological contact urticaria
	Fish, shellfish, poultry, or meat infected with erysipelothrix rhusiopathiae	Erysipeloid. Three forms of this condition exist: - Mild localized form manifested by local swelling and redness of the skin - Diffuse form that might present with fever - Rare systemic form associated with endocarditis
	Latex: latex proteins and residual chemicals from formulation process	Irritant contact dermatitis Allergic contact dermatitis Immunological contact urticaria
Hairdressers Barbers Cosmeticians	Glyceryl monothioglycolate in permanent waves	Allergic contact dermatitis
	Cocamidopropyl betaine in shampoos and body washes	
	Methyldibromoglutaronitrile (Euxyl K 400) in cosmetics	
	Acrylates, epoxy resins (press-on nails, lacquers, nail hardeners, etc.)	
	Toluenesulfonamide formaldehyde resin in nail polish	Allergic contact dermatitis: face, neck, eyelids, periungual
	Infected clients	Skin infections: impetigo, folliculitis, carbuncles, cellulitis
	Many hair and nail products	Irritant contact dermatitis
	Latex: latex proteins and residual chemicals from formulation process	Irritant contact dermatitis Allergic contact dermatitis Immunological contact urticaria
Health care Pharmaceuticals Veterinary medicine	Drugs, stabilizers, especially: aminoglycosides, cephalosporins, ethylenediamine, penicillins, pentamidine isethionate, propacetamol hydrochloride, ranitidine hydrochloride	Allergic contact dermatitis
	Merthiolate Disinfectants: ethylene oxide, glutaraldehyde, quaternary ammonium compounds	
	Latex: latex proteins and residual chemicals from formulation process	Irritant contact dermatitis Allergic contact dermatitis Immunological contact urticaria
Metalwork Machine shops	Metal-working fluids Some neat cutting oils	Allergic contact dermatitis

Office work	Glues Correcting liquid Solvents Cleaning solutions Carbon paper Duplicating machines, toner	Irritant contact dermatitis
	Nickel in scissors, paper clips, hole-punching machines, office machines, drawer handles	Allergic contact dermatitis
	Colophony in paper products	Irritant contact dermatitis
	Latex in fingerstalls, bandaids, other products	Allergic contact dermatitis Immunological contact urticaria
	Thiourea in contact paper	Allergic contact dermatitis Photosensitivity
Textiles	Synthetic fibers Cotton dust Fibers coated with toxic chemicals	Irritant contact dermatitis Allergic contact dermatitis
Various	Wet work	Candida Ringworm



## Plan

### Diagnosis

1. Ask 5 brief screening questions in the History Taking section of this guide to explore/ confirm work-relatedness.
2. Obtain Material Safety Data Sheets (MSDSs) for all chemicals used at the patient's workplace. See additional information at the Hazardous Substances Data Bank: [toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm](http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm).
3. Identify workplace exposures causing or exacerbating the dermatitis. Determine whether the dermatitis may be a warning signal for exposure to compounds with other health effects.
4. Inform the patient about claiming medical benefits from the employer's workers' compensation carrier. This may help the patient obtain wage replacement benefits if needed in the future.

### Prevention

5. Discuss with your patient the option of your writing a letter to the employer to describe the risk to others and direct the employer to eliminate the sensitizing chemical or material from use (see sample letter in Sample Letters to Employers in this guide).
6. If it is not feasible to eliminate the exposure, discuss with the patient the possibility of recommending that the employer take other steps to limit exposure. See box, "Potential Recommendations," below.
7. Refer to the MSDSs and patient history to determine whether proper personal protective equipment is provided at the patient's workplace. If not, discuss with the patient the option of writing a letter to the employer to recommend improvements.
8. If your patient belongs to a union, encourage him or her to contact the steward or union representative. If your patient agrees, consider contacting the union directly with information about hazards, health effects, and recommended interventions. MassCOSH (617-825-SAFE) can

## Plan continued from page 5

also offer assistance about hazards, potential health effects, and resources.

9. Identify non-occupational sources of contact to the irritant/allergen in the patient's life and develop a strategy to minimize exposure.

10. If occupational urticaria, consider the risk of eventual systemic and life-threatening responses to very low concentrations, even airborne environmental exposures. Strategize with patient ways to eliminate exposure as much as possible. Consider time away from work with workers' compensation and/or retraining.

### Potential recommendations to the employer, depending on the type of exposure:

- ◆ *If sun exposure:*  
Recommend broad-brimmed hat and high SPF sunscreen.
- ◆ *If latex gloves:*  
Substitute with vinyl, nitrile, polyethylene, Tactylon, Biogel, or Eudermic gloves.  
Provide powder-free gloves, cotton liners.
- ◆ *If oil-based fluids:*  
Substitute water- or alcohol- based fluids.  
Contact MassCOSH for recommendations: 617-825-SAFE.
- ◆ *If solvents:*  
Provide the proper tools to prevent unnecessary contact with the solvent (e.g., tools that prevent the need to place hands or arms directly in solvents).
- ◆ *If a discrete industrial process:*  
Install local exhaust ventilation, splash guards, or enclosures around the process. Refer to MassCOSH for recommendations of engineering controls.
- ◆ *If electronics assembly:*  
Raising humidity can polymerize potential irritants.
- ◆ *If dusts:*  
Provide local exhaust ventilation, vacuuming, wet mopping.
- ◆ *If fish processing:*  
Improve ventilation.
- ◆ *If ethylene oxide:*  
Ensure adequate aeration of sterilized items.
- ◆ *If due to contaminated work clothing:*  
Support proper cleaning of special work clothes (e.g., hat and coat for clean rooms in electronics assembly).  
Provide clean, well-designed, conveniently located washbasins, showers.
- ◆ *If paper:*  
Reduce contact with the paper.  
Provide cotton gloves.
- ◆ *If fungi:*  
Provide paper towels.

### Resources

Lushniak BD (2000). Occupational skin diseases. *Primary Care* 27(4):895-916.

Beltrani VS (1999). Occupational dermatoses. *Annals of Allergy, Asthma and Immunology* 83(6 Pt 2):607-613.

Gawkrodger DJ (2001). Patch testing in occupational dermatology. *Occupational and Environmental Medicine* 58(12):823-828.

Koh D (1997). Occupational dermatitis - what's new? Electronics industry. *Clinics in Dermatology* 15(4):579-586.

Rietschel RL (1997). Occupational contact dermatitis. *Lancet* 349:1093-1095.

Wood BP, Greig DE (1997). Occupational dermatitis - what's new? Catering industry. *Clinics in Dermatology* 15(4):567-571.

Wrangsjö K, Meding B (1997). Occupational dermatitis - what's new? Hospital workers. *Clinics in Dermatology* 15(4):573-578.

#### Websites

National Institute for Occupational Safety and Health (NIOSH). Occupational Dermatoses - A Program for Physicians: [www.cdc.gov/niosh/ocderm.html](http://www.cdc.gov/niosh/ocderm.html).

Latex Allergy Links: [latexallergylinks.tripod.com](http://latexallergylinks.tripod.com).



Headache in the workplace is a common complaint and can result from a variety of causes, some work-related and some not. Work-related headache that originates in the work environment (“occupational headache”) may be a sign of neurological stress. A preexisting headache with non-occupational causation can be aggravated by exposures in the workplace (“work-aggravated headache”).

Occupational headache may be due to oxygen deprivation or chemical exposures, eyestrain, excessive noise, excess heat, exposure to odors, and stress. Occupational metal exposure may cause brain swelling (tin, lead), and transient hypoxia and vasodilation (zinc, tellurium, manganese, nickel), which in turn may lead to headache. Carbon monoxide produces headache by vasodilation.

Note:

*Headache from carbon monoxide exposure may be associated with dizziness or nausea, and may present like influenza.*

- ◆ Acute headache in workers is usually the result of vasodilation
- ◆ Cyclic and more chronic forms of headache (migraine, cluster) have also been observed in workers

A wide range of chemicals (e.g., toluene, methylene chloride, 1-bromopropane) may also cause headache, although headache is not pathognomonic for any particular exposure. Any persistent or worsening headache should be carefully evaluated.

## Signs and Symptoms

Ask the patient to describe headache in detail: onset, duration, location, radiation, severity, aggravating factors, relieving factors, and associated symptoms. See Table 1, page 2 for headache symptomatology. The diagnosis of occupational headache in those patients without preexisting headache can be made by finding an association with exposures and onset of symptoms.

Note that mild varieties of occupational or work-aggravated headache may be easily controlled by over-the-counter painkillers.



## Association with Work

There are no specific tests for determining the work-relatedness of a headache to an exposure. The provider should obtain the complete headache symptomatology and occupational history. (A possible “test” would be to remove the worker from the exposure and monitor symptoms.)



**Determine temporal relationship between symptoms and work. Association with work is supported if:**

- ◆ The headache is more likely to occur during working hours
- ◆ Symptoms improve on vacation, during the weekends, or after work
- ◆ Headache recurs despite taking analgesics during the workday
- ◆ Co-workers have similar complaints
- ◆ Work-up has ruled out other possible causes of headache

These characteristics of occupational headache are just a general guideline, and not strict diagnostic criteria. For example, occurrence after work hours or at night does not rule out the possibility of occupational or work-aggravated headache.

**Determine nature of exposure. Ask your patient these questions:**

- ◆ Do you work with or near machines that emit combustion exhaust, e.g., forklifts, gas-powered washers, gas baking ovens, auto engines, ice resurfacing machines? (consider checking carboxyhemoglobin) See Table 1.
- ◆ Are there exposures to chemicals or toxins? (such as metals or solvents) See Table 1.
- ◆ Do you work in a confined space? (consider airborne contaminants and hypoxia)
- ◆ Is your work lighting poor or flickering?
- ◆ Does your job involve extensive use of a computer or microscope?
- ◆ Is there excessive noise in your work environment?
- ◆ Is there adequate ventilation at your work? (if not, consider poor indoor air quality)
- ◆ Do any of your co-workers have the same complaint?
- ◆ Have your working conditions changed? (work in a new area/ new process/new chemical or substance?)
- ◆ Have you tried to make any changes to work practices in order to decrease headache?

Obtain Material Safety Data Sheets (MSDSs) for chemicals used at your patient's job. MSDSs describe health effects associated with exposure, as well as required safety measures. Employers are required by law to make them readily accessible to employees.

- ◆ Ask your patient to obtain MSDSs for chemicals he or she is exposed to; or
- ◆ Ask your patient if he or she belongs to a union. If so, the patient can contact the steward or field representative to help obtain the MSDSs; or
- ◆ Ask your patient's permission to write a letter to the employer to request the MSDSs (see sample letter in Sample Letters to Employers in this guide); or
- ◆ Ask the patient to note down product names and numbers from the labels of substances used. You can then obtain most MSDSs from the database at the website [hazard.com](http://hazard.com).

The MSDSs may be incomplete or outdated. MSDSs do not list ingredients present at less than 1%. Call the telephone numbers on MSDSs for further information or find toxicity information at the Hazardous Substances Data Bank: [toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm](http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm).

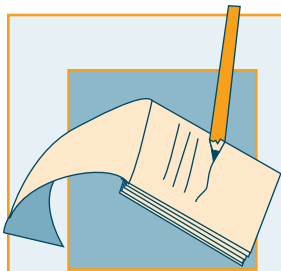
**Table 1.** Exposures associated with headache and occupations at risk

Exposure	Headache Symptomatology (if specific)	Potential Concomitant Symptoms	Occupations at Risk
Carbon monoxide	Increasing severity with increasing concentration: Slight headache with tightness across forehead becomes throbbing frontal headache and then severe frontal and occipital headache	<i>In order of increasing severity:</i> Rapid breathing, nausea, weakness Dizziness, confusion, hallucinations, cyanosis Fatigue, angina, vomiting, loss of consciousness Depression of ST segment of EKG, diminished mental and physical ability, coma, death	Fire fighters Garage mechanics Truck drivers Parking garage attendants Toll collectors Forklift operators Aircraft refuelers Boiler room/Maintenance staff Disaster relief workers Kiln and furnace operators Miners Tunnel workers
Poor indoor air quality Sick Building Syndrome Mold	Typically non-migraine, dull headache	Associated with allergy/upper respiratory symptoms due to microbial contamination or volatile organic compounds	Any workers Often observed in workers in office buildings
<b>Metals:</b>  Lead	Transient headache	In moderate lead poisoning, headache may be associated with fatigue, difficulty concentrating, irritability, abdominal pain, constipation (see Lead Exposure profile in this guide)	House and commercial painting and remodeling, deleading, plastics manufacture, foundry work, plating
Metal fumes (zinc, copper, magnesium)		"Metal Fume Fever": thirst and metallic taste in mouth followed by fever, chills, excess sweating, nausea, weakness, fatigue	Welding, soldering, brazing or other exposure to molten metal
Tin (organotin, e.g., dimethyl tin dichloride, trimethyl tin chloride)		Vertigo, vomiting, nausea, mental confusion, tinnitus, mood change	Production workers in processes involving organic tin (rubber, polymers, PVC film; paints, bactericides, fungicides, wood preservatives)

*continued on page 3*

**Table 1.** Exposures associated with headache and occupations at risk (continued from page 2)

Exposure	Headache Symptomatology (if specific)	Potential Concomitant Symptoms	Occupations at Risk
Tellurium		Tellurium exposure gives garlic smell to breath; causes eye, nose and upper respiratory tract irritation	Lead smelting, iron, steel and copper production, production of rubber, glass, ceramics, plating and etching
Organic solvents: (carbon disulfide, methyl-n-butyl ketone, n-hexane, perchlorethylene, toluene, trichlorethylene (TCE), mineral spirits (Stoddard solvent), methanol	Head and facial pain possible, due to effects on trigeminal nerve.	Tiredness, memory disturbance, dizziness, cognitive impairments, depression and/or anxiety, toxic encephalopathy with prolonged exposure Symptoms may mimic alcohol intoxication: dizziness, vertigo, nausea	Various, including degreasing, parts cleaning, painting, etc.
Methylene chloride (dichloromethane)		Giddiness, irritability, numbness and tingling of the limbs Methylene chloride is oxidized to CO - be aware of possibility of CO poisoning with cumulative exposures.	Furniture or floor refinishing



## Plan

### Diagnosis

1. Ask 5 screening questions in the History Taking section of this guide to explore/confirm work-relatedness. Take full occupational/environmental history if necessary. If association is difficult to establish, consider having patient keep a log or diary of symptoms, times, and work tasks being performed.

2. Rule out carbon monoxide exposure (see Table 1). If CO poisoning is suspected:

#### Carbon Monoxide Poisoning Treatment

- ◆ Treat with 100% oxygen; do not delay awaiting results of a blood test.
- ◆ Obtain venous carboxyhemoglobin (COHb). Smokers may have COHb as high as 5-9%. Non-smokers should have a COHb of less than 5%. Consider hyperbaric treatment for COHb levels > 25%. Mass General Hospital has a hyperbaric treatment center: 617-573-4411.
- ◆ OSHA regulates carbon monoxide exposure in the workplace: [www.osha.gov/SLTC/healthguidelines/carbonmonoxide/recognition.html](http://www.osha.gov/SLTC/healthguidelines/carbonmonoxide/recognition.html). If you believe your patient or his or her co-workers are at imminent risk for serious health effects, call OSHA: 617-565-9860 (regional office).
- ◆ Encourage the patient to contact his or her union or MassCOSH (617-825-SAFE) for assistance with health and safety violations in the workplace.

3. If chemical exposures are suspected, evaluate for nervous system effects (see Neurologic Conditions profile in this guide). Obtain Material Safety Data Sheets (MSDSs) for chemicals or look up toxicity information at: [toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm](http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm).

4. Refer, if necessary, to an occupational medicine clinic. See Resources section of this guide.

(continued on page 4)

*continued from page 3*

### **Prevention**

5. If chemical exposures are suspected, steps should be taken to reduce contact with the aggravating material and/or increase fresh-air flow and ventilation of the work area. Exposure to many airborne chemicals is regulated by OSHA. Encourage your patient to contact his or her union or MassCOSH (617-825-SAFE) for assistance in reducing exposures in the workplace.
6. If excessive noise is the suspected cause of headache, efforts to reduce noise exposure should be undertaken. See Hearing Loss profile in this guide for federal regulations concerning noise exposure in the workplace. Noise in the workplace is regulated by OSHA. Encourage your patient to contact his or her union or MassCOSH (617-825-SAFE) for assistance in reducing noise in the workplace.
7. If eyestrain is the suspected cause of headache, measures to protect the patient include taking short, frequent breaks in order to rest the eyes; correction of inadequate lighting or glare problems; use of corrective glasses (such as “computer” glasses), if needed. See Office Workers profile in this guide for suggestions on preventing eyestrain due to computer use.
8. If poor indoor air quality is the suspected cause, ventilation concerns should be addressed with the employer. See suggestions for improving indoor air quality in the Office Workers profile in this guide.

## **Resources**

### **Carbon Monoxide Exposure**

Massachusetts Department of Public Health Occupational Health Surveillance Program can offer assistance: 617-988-3344.

Ernst A, Zibrak JD (1998). Carbon monoxide poisoning. *New England Journal of Medicine* 339:1603-1608.

### **Lead Exposure**

Massachusetts Occupational Lead Poisoning Registry: 617-969-7177

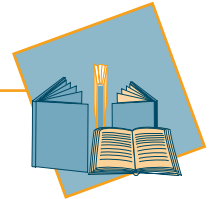
[www.state.ma.us/dos/leaddocs/Lead-registry.htm](http://www.state.ma.us/dos/leaddocs/Lead-registry.htm)  
Also see Lead Exposure profile in this guide.

### **Noise Exposure**

Hearing Loss Prevention at: [www.cdc.gov/niosh/topics/noise](http://www.cdc.gov/niosh/topics/noise)  
Also see the Hearing Loss profile in this guide.

### **Eyestrain**

Information on eyestrain available at [www.tifaq.com/information/vision.html](http://www.tifaq.com/information/vision.html)  
Also see Office Workers profile, page 3, in this guide.





Hearing loss is one of the most pervasive occupational health problems in America today. Approximately 30 million workers are exposed on their jobs to noise levels or chemicals that are potentially hazardous to their hearing. Hazardous levels of noise are common in construction, agriculture, manufacturing, utilities, transportation, and the military. While noise accounts for most occupational hearing loss, exposure to chemicals, barotrauma (change in air pressure), middle ear infection, and foreign bodies may also cause hearing loss.

We all tend to lose hearing with age (presbycusis), and age-related losses add to losses caused by noise and other factors.

Hearing loss can affect a worker's employment, social interactions, and family life. For example, workers with hearing loss may experience difficulty in detecting warning signals or comprehending speech.

The best way to protect workers from noise-induced hearing loss is to reduce sound levels at work. Simple and inexpensive maintenance or controls can often reduce noise significantly. For ideas to recommend to employers, see Resources at the end of this profile.

Hearing protection is important for workers exposed to excessive noise (85 dB or greater). Earmuffs coupled with ear plugs provide the best protection. For workers with hearing loss, use of hearing protection is essential to preserve remaining hearing capacity.

## Measurements of Sound and Hearing

Sound frequencies are measured in Hertz (Hz). Humans' sensitivity to sound is greatest at higher frequencies, and these frequencies have the most potential to cause harm to human hearing.

Noise or the intensity of sound is measured in decibels (dB). Because dB is a logarithmic function, a doubling of sound intensity results in an increase of 3 dB.

## Signs and Symptoms

Possible indications of noise-induced hearing loss (NIHL) include tinnitus, difficulties with word discrimination in the presence of background noise, conflict with family members regarding hearing, and disagreement about TV and radio volume. Affected patients may experience difficulty localizing the source of sounds, detecting and recognizing sounds in the presence of background noise, or discriminating between different frequencies. Hearing loss may be asymmetric in some groups of workers, such as drivers.



### **Patients reporting any of the following should be assessed for potential occupational hearing loss:**

- ◆ Loud noise on the job or a noisy work environment
- ◆ Ringing or buzzing perceived, or other temporary problems with hearing, following work
- ◆ Suggestions of temporary threshold shifts\*
- ◆ Needing to shout to communicate with co-workers
- ◆ Vibration or other problems with machinery potentially causing excessive noise

#### **\*Definitions:**

Threshold shift (TS): Increase in the lowest sound level at which a person can hear a particular frequency; caused by exposure to high noise levels. TS may be temporary (TTS) or permanent (PTS).

Standard threshold shift (STS): Average loss of 10 dB at 2,000, 3,000 and 4,000 Hz in either ear, when compared with the worker's baseline measurements. (Employers must notify workers if workplace audiometric testing shows an STS.)

## Diagnosis

1. The following are diagnostic criteria for occupational hearing loss:

- ◆ History of excessive noise exposure over months to years, with or without history of exposure to ototoxic chemicals  
Construct a rough timeframe. Does onset of symptoms correlate with job exposures? How have symptoms progressed? (Note: hearing loss can also result from acoustic trauma caused by short-term impulsive noise.)

- ◆ Insidious onset of hearing loss, may or may not be accompanied by tinnitus  
Noise-induced hearing loss usually progresses over 10-15 years of intensive noise exposure and then tends to progress more slowly thereafter. It produces a sensorineural defect which evolves over those years.
  - ◆ Physical exam indicative of sensorineural deficit with no corresponding abnormality of ears, head and neck  
Physical examination of the ears should assess presence of cerumen impaction or evidence of middle ear disease. The Weber and Rinne's tests performed with a 512 Hz or 1,024 Hz tuning fork can provide clues as to whether the loss is conductive or sensorineural. In the Weber test, sound will lateralize to the side away from a sensorineural loss and toward a conductive deficit. Rinne's test will demonstrate air conduction better than bone conduction if the loss is sensorineural. If available, office tympanometry can also help detect conductive hearing problems.
  - ◆ Audiometric examination with bilateral loss most prominent in the 3,000-4,000 Hz range - often with a typical "notch" or upturn at 8,000 Hz  
An audiogram threshold level above 20 dB is considered abnormal. If the loss appears to be sensorineural, etiologies other than noise should be excluded. Certain groups of workers, such as drivers, may have one-sided loss. For one-sided loss, rule out acoustic neuroma.
2. A patient whose screening (see above) shows evidence of permanent hearing loss should be referred for a full audiologic evaluation.

### Association with Work



Determine whether the patient is exposed to excessive noise in his or her work environment. In general, hearing loss that is caused by or aggravated by work is considered work-related. Questions that can help determine work-relatedness include

- ◆ Do you have to shout to talk to someone who is an arm's length away from you at your work?
- ◆ Do your ears ring or do you have trouble hearing after you leave the workplace?
- ◆ Do you suffer from temporary hearing loss after you leave the workplace? Do you need to turn up the TV volume higher after work than you do on weekends?

Use a standardized questionnaire for hearing handicap when your patient reports excessive noise in the workplace. (See Resources at the end of this profile.)

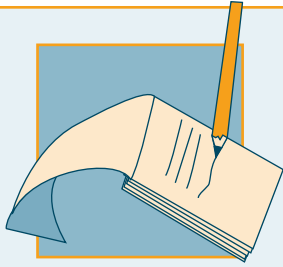
Evidence indicates that some chemical exposures are ototoxic. These may include heavy metals (mercury, lead, arsenic, cobalt); organic compounds (toluene, styrene, n-hexane, trichlorethylene, xylene); potassium bromate; aniline dyes; carbon monoxide; and certain pharmaceutical agents. Exposure to noise may aggravate the effects of ototoxicity. In addition to high-level, acute exposures, chronic low-level exposure to chemicals should be addressed.

### About Hearing Protection

Hearing protection devices have noise reduction ratings (NRR), which your patients can find on the devices or their packaging. According to OSHA, however, manufacturers' ratings should be calculated as follows: 1) earmuffs -subtract 25% from the manufacturers' labeled NRR; 2) slow-recovery formable earplugs - subtract 50%; and 3) all other earplugs - subtract 70% from the manufacturers' labeled NRR. Workers exposed to very high noise levels (e.g., jack hammer, jet engine) should wear earmuffs *and* ear plugs.

### Culture and use of hearing protection

Research indicates that workers from some cultures may be at higher risk for exposure to occupational noise because of cultural perceptions of hearing protection. Low degree of acculturation among Hispanic workers has been correlated with high perceived barriers to hearing protection use. You may wish to ask your patient whether she or he will consider wearing hearing protection even if provided free of charge by the employer. Discuss any barriers to use of hearing protection and encourage requests for and use of hearing protection.



## Plan

### Diagnosis

1. Use questions and tests described in the Diagnosis and Association with Work sections to explore/confirm work-related hearing loss.
2. If evidence of hearing loss, refer patient for a full audiologic evaluation.
3. If you think chemical exposures may contribute to your patient's hearing loss, obtain Material Safety Data Sheets (MSDSs) for chemicals used at the patient's job. See additional information at the Hazardous Substances Data Bank at [toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm](http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm).
4. Hearing loss is an occupational illness covered by workers' compensation in Massachusetts. Inform the patient about claiming medical benefits from the employer's workers' compensation carrier. Your patient may be able to receive compensation for loss of hearing in one or both ears as well as benefits for medical care and equipment (for example, hearing aids).

### Treatment and Management

5. Counsel your patient about reducing other exposures to noise (e.g., from hobbies).
6. Your patient may be affected by the social impact of hearing loss and family repercussions. Be prepared to offer support or counseling services that may be available at your health center.

### Prevention

7. If you are able to estimate the sound levels present at your patient's workplace, ask him or her to note the noise reduction rating of hearing devices provided at work or to bring in the container in which they were packaged. Use the information in the box "About Hearing Protection," to determine whether the devices are adequate for the work environment.
8. With patient's consent, write a letter to the employer requesting that the employer provide your patient with appropriate hearing protection and encouraging the employer to decrease noise in the workplace (see sample letter in Sample Letters to Employers in this guide). Your letter should make specific requests. For example, request maintenance of a particular machine; ask that a choice of ear protection be made available; or recommend a temporary transfer away from certain tasks or using certain machinery. See the WISHA Noise Reduction Ideas Bank at [www.lni.wa.gov/wisha//NoiseBank/search.as](http://www.lni.wa.gov/wisha//NoiseBank/search.as). If the employer is a small business you can recommend the free OSHA Consultation Program: [www.osha.gov/dcsp/smallbusiness/consult.html](http://www.osha.gov/dcsp/smallbusiness/consult.html).
9. If your patient belongs to a union, encourage him or her to inform the union about the occupational hearing loss. The union can encourage the company to measure sound levels in the workplace and can determine if other workers are exposed to excessive noise.
10. If your patient does not belong to a union, encourage him or her to consult MassCOSH (617-825-SAFE) about the hazards identified, their potential effects on other workers, and other hazards that may be present in the same workplace.
11. Inform your patient about OSHA's Occupational Noise Exposure Standard. You can also give your patient general information about OSHA (see Legal Rights profile in this guide).



### What does the law say about noise? \*

- ◆ *Maximum allowable exposure to noise*  
OSHA has set a level of 90dB as the maximum amount of noise to which workers may be exposed over an 8-hour period.
  - ◆ *Action Level- 85 dB*  
Employers must provide audiometric testing for all employees who are exposed to 85dB or more for 8 hours.
  - ◆ *Free Hearing Protection*  
The employer must offer hearing protection, fitted for each individual worker, in any department where workers are exposed to 85dB or more of noise. This protection can be in the form of ear plugs, earmuffs, etc. The protective device must reduce employee exposure to at least 90dB and to 85dB when hearing loss or a standard threshold shift (STS) has occurred. Workers must be given a choice of hearing protective devices and trained in the use and care of these devices.
  - ◆ *Mandatory Hearing Protection for some workers*  
Workers who are exposed to noise levels of 90dB or above, or those who have been shown to have a hearing loss, are required to wear hearing protection.
  - ◆ *Workers' access to noise level measurements and hearing test results*  
Workers have a right to see data on noise measurements that their employer has conducted in the workplace. In companies where workers are exposed to noise 85dB and above, employers must perform monitoring in noisy areas of the workplace to determine which workers are exposed. Workers have a right to the results of their individual hearing tests.
- \* From OSHA's Occupational Noise Exposure Standard 1910.95, available at: [www.osha.gov/SLTC/noisehearingconservation/index.html](http://www.osha.gov/SLTC/noisehearingconservation/index.html).

### Resources

Rabinowitz PM (2000). Noise-induced hearing loss. *American Family Physician* May 1, 61(9):2749-2756, 2759-2760; also at [www.aafp.org/afp/20000501/2749.html](http://www.aafp.org/afp/20000501/2749.html)

May JJ (2000). Occupational hearing loss. *American Journal of Industrial Medicine*. 37(1):112-120.

Noise-induced hearing loss, American College of Occupational and Environmental Medicine: [www.acoem.org/position/statements.asp?CATA\\_ID=53](http://www.acoem.org/position/statements.asp?CATA_ID=53)

Hunter College Center for Occupational and Environmental Health: [www.hunter.cuny.edu/health/coeh/publications/Package\\_HTML/package\\_index1.htm](http://www.hunter.cuny.edu/health/coeh/publications/Package_HTML/package_index1.htm)

#### Noise Control and Hearing Protection

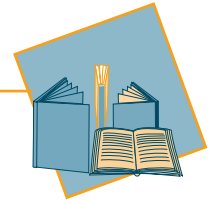
WISHA Noise Reduction Ideas Bank Washington State Department of Labor and Industries: [www.lni.wa.gov/wisha//NoiseBank/search.as](http://www.lni.wa.gov/wisha//NoiseBank/search.as)

Hearing Loss Prevention, National Institute for Occupational Safety and Health: [www.cdc.gov/niosh/topics/noise/Hearing Conservation \(Revised\). OSHA Publication 3074: www.osha.gov/Publications/osha3074.pdf](http://www.cdc.gov/niosh/topics/noise/Hearing%20Conservation%20(Revised).OSHA%20Publication%203074.pdf)

#### Standardized Questionnaires for Hearing Handicap

Koike KJ, Hurst MK, Wetmore SJ (1994). Correlation between the American Academy of Otolaryngology-Head and Neck Surgery five-minute hearing test and standard audiologic data. *Otolaryngology and Head and Neck Surgery* 111(5):625-32.

Ventry IM, Weinstein BE (1983). Identification of elderly people with hearing problems. *ASHA* 25(7):37-42.



Lead poisoning is one of the oldest known occupational diseases. In Massachusetts the most common occupations with significant lead exposure include house and commercial building painting and remodeling, residential lead paint removal (“deleading”), plastics manufacture, and foundry work. In addition, people who paint or renovate their own homes or practice target shooting are often exposed to lead.

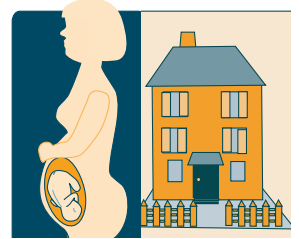
While the impacts of acute, high levels of occupational exposure to lead are well documented, the effects on adults of long-term, low-level exposure are also of concern. Long-term health effects can occur at levels previously thought safe. Relatively low levels of lead are associated with poor cognitive function in aging men. Bone lead lasts for decades and can leach out during the osteoporosis of aging.

Lead is a neurological toxin to the developing fetus and to children at very low levels of exposure (far lower than those harmful to adults). Special consideration needs to be paid to protecting the offspring of lead-exposed workers.

Lead easily crosses the placental barrier and the fetus can be exposed during periods of sensitive brain development in two ways:

1. Lead residing in a mother’s bones from *previous* occupational exposures can be released back into the mother’s system during pregnancy.
2. Occupational exposures *during* pregnancy expose the developing fetus.

Bone lead also leaches into breast milk during lactation. Finally, children can be affected by “take-home” exposures: lead dust carried home on family members’ shoes, clothes, bodies and personal vehicles.



## Signs and Symptoms

Lead adversely affects several body systems. Clinically, the most sensitive are the nervous (central and peripheral), hematopoietic, gastrointestinal, cardiovascular, musculoskeletal, renal and reproductive systems. There is wide variation in individual susceptibility to lead poisoning.

Although early kidney damage is difficult to detect, a 10 µg/dl increase in blood lead level (BLL) has been associated with a 10.4 ml/min decrease in renal creatinine clearance rate. BLL in the 14-30 µg/dl range may cause small increases in blood pressure. BLLs as low as 30 µg/dl may cause a slowing of nerve conduction velocity. Symptoms like abdominal pain and neurological symptoms begin in some adults at a BLL of about 40 µg/dl.

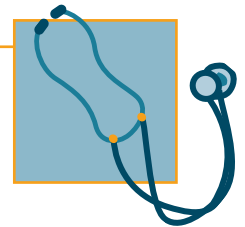
Reproductive system effects from lead exposure are seen in men and women. Abnormal sperm morphology and decreased sperm count have been observed at approximately 40 µg/dl. The children of lead exposed women can exhibit impaired cognitive development such as lowered intelligence, hyperactivity, learning and attention disorders, and changes in behavior. There is no evidence of a threshold for lead-induced cognitive impairment resulting from early life exposures.

An indirect measure of exposure and a physiological marker for the biologically harmful effects of lead is erythrocyte protoporphyrin (EP) or zinc protoporphyrin (ZPP). An increase indicates that lead is affecting the heme synthesis pathway. It reflects exposure in the last 3 to 4 months and rises and falls more slowly than the BLL. This effect can begin at a BLL as low as 20 µg/dl in adults.

Other medical conditions can cause an elevated EP or ZPP, the most common being iron deficiency anemia and inflammatory conditions. Generally, screening for other causes is recommended if the EP or ZPP is above 50 µg/dl, particularly if the BLL is below the threshold of heme effect. Although an action concentration for EP or ZPP in occupational lead exposure is yet to be defined, the test is a useful adjunct for interpretation of the BLL in workplace medical surveillance.

A test that indicates bone stores, and consequently total lead body burden, is non-invasive in vivo (K shell) x-ray fluorescence (XRF) of the bone. This may be of interest to workers with histories of lead exposure, for example women considering pregnancy. In Massachusetts, the Brigham and Women’s Hospital (Channing Lab) operates a bone XRF facility.

Chelation challenge testing, a procedure that measures the quantity of lead excreted into urine after administration of a single challenge dose of a chelating agent, has *not* been found to be useful in predicting health effects, indicating body lead burden or identifying individuals who may derive a therapeutic benefit from chelation.



## Routes of Exposure

Inhalation of lead dust or fumes is the principal source of exposure for adults occupationally exposed to lead. However, significant ingestion exposure can occur from eating, drinking or smoking in lead-contaminated areas. Take-home exposures put household members, particularly young children, at risk of ingesting and/or inhaling lead dust.



**Table 1. Symptoms Associated with Lead Toxicity**

Low Level Chronic Toxicity	Mild Toxicity	Moderate Toxicity	Severe Toxicity	Toxicity in Exposed Offspring
Hypertension Electrical conduction disturbances of the heart Kidney dysfunction Anemia	Occasional abdominal discomfort Mild fatigue Loss of appetite Metallic taste in mouth	Headache Moderate fatigue Difficulty concentrating Irritability Myalgia Paresthesia Arthralgia Nausea Diffuse abdominal pain Constipation Weight loss Decreased libido	Colic (intermittent, severe abdominal cramps) Muscle weakness Confusion	Lowered intelligence Hyperactivity Learning and attention disorders Behavioral changes Aggression Low birth weight Shorter head circumference

## The OSHA Lead Standards

The federal Occupational Safety and Health Administration has two standards for lead exposure in the workplace - one for construction and one for almost all other kinds of work. The standards place comprehensive requirements on the employer for worker protection from lead exposure (see box). Among those requirements is the establishment of a medical monitoring program supervised by a licensed physician. However, many small companies, particularly those in construction, do not have such programs. Therefore, the medical screening and treatment of workers is left to their primary care providers.

### Employer Responsibilities Under the OSHA Lead Standards

- ◆ Monitor the air for lead
- ◆ Keep air lead levels below 50 µg/m<sup>3</sup>
- ◆ Ensure and pay for biological and medical monitoring
- ◆ Pay employees' full salary if medical removal required
- ◆ Train employees annually
- ◆ Provide proper respirators, along with fit-testing and training in proper respirator use
- ◆ Provide other protective equipment and clothing
- ◆ Provide separate eating area
- ◆ Provide washing/shower and clothes changing facilities

## Medical Evaluations

The lead standards specify the frequency and content of medical screening. Annual medical evaluations are required for all employees with a BLL of 40 µg/dl or greater in the prior 12 months. In non-construction work pre-placement medical evaluations are required for all lead-exposed employees. Tables 2 (construction work) and 3 (non-construction work) outline OSHA-mandated medical monitoring and additional recommendations.

**Table 2. Construction Industry OSHA Lead Standard Schedule for Medical Services**

Category of Lead-exposed Employee	Medical Evaluation	Laboratory Testing
All employees assigned to work involving lead exposure below the Action Level	<b>Recommended</b> Preplacement and annually: general and lead-specific history and physical exam with special attention to hematological, neurological (central and peripheral), pulmonary, cardiovascular, gastrointestinal, musculoskeletal, renal and reproductive systems	<b>Recommended</b> Complete lab panel: BLL, ZPP, CBC with red cell indices and peripheral smear, serum creatinine, BUN, complete urinalysis. Sperm analysis or pregnancy test if employee requests. Spirometry if respirator used. Any other test the physician deems necessary.
New employees or those newly assigned to lead work who are performing a specific trigger task* or who are exposed to airborne lead at or above 30 µg/m <sup>3</sup> ** for at least one day per year and prior BLL, if known, is below 40 µg/dl	<b>Recommended</b> (see above for content)	BLL and ZPP <b>required</b> . Complete lab panel <b>recommended</b> (see above).
New employees or those newly assigned to work with airborne exposure at or above 30 µg/m <sup>3</sup> for more than 30 days per year and prior BLL, if known, is below 40 µg/dl	<b>Recommended</b> (see above)	BLL and ZPP <b>required</b> ; repeat tests <b>required</b> every two months for six months, then every six months thereafter. Repeat tests <b>recommended</b> every month. Complete lab panel <b>recommended</b> if not done within past year (see above).
Blood lead level 40 to 49 µg/dl**	<b>Required</b> annually (see above)	Complete lab panel <b>required</b> (see above). Repeat BLL and ZPP every two months until two consecutive samples are below 40 µg/dl.
Blood lead level 50 µg/dl or greater-Medical Removal Protection (MRP) required*** (MRP recommended at 40 µg/dl)	<b>Required</b> as soon as MRP initiated (see above)	Complete lab panel <b>required</b> (see above). Repeat BLL and ZPP at least monthly until 2 consecutive tests are at or below 40 µg/dl.
Reports signs/symptoms of lead toxicity, desires advice about effects of lead exposure (on reproductive system, child bearing, etc.), or has difficulty breathing with respirator use	<b>Required</b> as soon as possible (see above)	Complete lab panel <b>required</b> (see above); follow up as indicated.

\*Defined in federal law: 29 CFR 1926.62 (d) (2) [www.osha.gov/html/a-z-index.html#L](http://www.osha.gov/html/a-z-index.html#L)

\*\*µg/dl = micrograms of lead per deciliter of whole blood; µg/m<sup>3</sup> = micrograms of lead per cubic meter of air

\*\*\* MRP is the required removal of an employee from work with lead exposure, with full salary and benefits, until there are two consecutive BLLs of 40 µg/dl or below and the physician authorizes return to the usual work.

**Table 3.** General Industry OSHA Lead Standard  
Schedule for Medical Services

Category of Lead-Exposed Employee	Medical Evaluation	Laboratory Testing
All employees assigned to work involving lead exposure below the Action Level	Recommended Preplacement and annually: General and lead-specific history and physical exam with special attention to hematological, neurological (central and peripheral), pulmonary, cardiovascular, gastrointestinal, musculoskeletal, renal and reproductive systems	Recommended <b>Complete lab panel:</b> BLL, ZPP, CBC with red cell indices and peripheral smear, serum creatinine, BUN, complete urinalysis. Sperm analysis or pregnancy test if employee requests. Spirometry if respirator used. Any other test the physician deems necessary.
Assigned to work with airborne exposure at or above 30 $\mu\text{g}/\text{m}^3$ * for more than 30 days per year	Required preplacement (see above for content)	Complete lab panel required (see above). Repeat BLL and ZPP every six months.
Blood lead level 40 $\mu\text{g}/\text{dl}$ * or greater at last test, but Medical Removal Protection (MRP)** not required	Required annually (see above)	Complete lab panel required if not done within last 12 months (see above). Repeat BLL and ZPP every two months until two consecutive blood lead levels are below 40 $\mu\text{g}/\text{dl}$ .
Single BLL of 60 $\mu\text{g}/\text{dl}$ or greater or average that is 50 $\mu\text{g}/\text{dl}$ or greater, based on the last three BLLs or all BLLs over the previous six months (whichever covers a longer time period) Medical Removal Protection (MRP) required**	Required as soon as MRP initiated (see above)	Complete lab panel required (see above). Repeat BLL and ZPP at least monthly until two consecutive blood lead levels are at or below 40 $\mu\text{g}/\text{dl}$ .
Reports signs/symptoms of lead toxicity, desires advice about effects of lead exposure (on reproductive system, child bearing, etc.), or has difficulty breathing with respirator use	Required as soon as possible (see above)	Complete lab panel required (see above); follow up as indicated.

\*  $\mu\text{g}/\text{dl}$  = micrograms of lead per deciliter of whole blood

$\mu\text{g}/\text{m}^3$  = micrograms of lead per cubic meter of air

\*\* Medical Removal Protection is the required removal of an employee from work with lead exposure, with full salary and benefits, until there are two consecutive BLLs of 40  $\mu\text{g}/\text{dl}$  or below and the physician authorizes return to the usual work.



## Medical Treatment

The primary treatment for lead poisoning is cessation of exposure. Prophylactic chelation therapy to prevent the rise of blood lead levels should never be performed, and is illegal under the lead standards.

In adults, the use of chelation should be reserved for those with significant symptoms or signs of severe toxicity (see Table 1). Chelation should be considered only on a case-by-case basis and in consultation with medical providers knowledgeable in the treatment of adult lead poisoning. The Massachusetts Occupational Lead Poisoning Registry can provide such referrals: 617-969-7177; [www.state.ma.us/dos/leaddocs/Lead-registry.htm](http://www.state.ma.us/dos/leaddocs/Lead-registry.htm).



### Plan

#### Diagnosis

1. Order blood lead and ZPP tests.
2. Ask 5 brief screening questions in the History Taking section to explore/confirm work-relatedness. Identify specific activities causing exposure to lead (eg., scraping paint, plending lead pigment). Probe to identify factors that may contribute to patient's over-exposure:
  - Does employer provide respiratory protection and other protective equipment?
  - Does employer provide training?
  - Does employer provide washing facilities/ shower and clothes changing facilities?
  - Does employer provide separate eating area?
  - Does patient eat, drink, smoke on the job or before washing hands and face?
  - Does patient wash up/ shower and change clothes before going home?
3. Inform the patient about claiming medical benefits from the employer's workers' compensation carrier. This may help the patient obtain wage replacement benefits if needed in the future.

#### Prevention

4. With patient's consent, recommend worksite improvements to the employer. Potential recommendations are listed in the table on Page 6. See sample letter in Sample Letters to Employers in this guide.
5. Counsel your patient about reducing other exposures to lead (e.g., home repairs, shooting) and reducing take-home exposure to family members. If you suspect take home exposures, arrange BLL tests.
6. Encourage your patient to consult MassCOSH (617-825-SAFE or [www.masscosh.org](http://www.masscosh.org)). If your patient belongs to a union, encourage him or her to contact the steward or union representative. If your patient agrees, consider contacting the union directly with information about hazards, health effects, and recommended interventions.
7. Call OSHA (617-565-6924) if your patient or their co-workers are at imminent risk of serious health effects.

## Potential Recommendations to the Employer

Some exposures to lead dust and fumes can be controlled at the source. Methods for modifying the work environment, such as substituting safer processes and improving ventilation, are preferred means of reducing exposure. Some sources of exposure such as dry sanding and torch burning present the highest risk of exposure - these should be replaced with safer methods (see table below).

Process in Use	Recommended Action
Dry sanding, dry scraping, abrasive blasting, torch burning to remove old paint	Switch to wet sanding or wet scraping
Removal using powered tools such as powered sander  Any activity that creates lead dust or fumes including hand sanding, scraping, welding, etc.	Use high efficiency (HEPA) vacuum attachment to powered tool Control exposures by: <ul style="list-style-type: none"> <li>◆ Local exhaust ventilation</li> <li>◆ Respirator with HEPA filters for toxic dusts/fumes</li> <li>◆ Facilities for washing/showers and changing clothes</li> <li>◆ Separate eating areas for workers</li> <li>◆ Wet mopping and HEPA vacuuming of contaminated areas</li> <li>◆ Protective clothing</li> <li>◆ Medical monitoring program</li> </ul>

## Resources

Massachusetts Occupational Lead Poisoning Registry 617-969-7177,  
[www.state.ma.us/dos/leaddocs/Lead-registry.htm](http://www.state.ma.us/dos/leaddocs/Lead-registry.htm)

OSHA's Lead Standards (29 CFR): on the web at: [www.osha.gov/html/a-z-index.html#L](http://www.osha.gov/html/a-z-index.html#L) Choose Lead under the alphabetical index. Then click on General Industry, Maritime or Construction

National Lead Information Center 800-424-LEAD

Hu H (2000). Exposure to metals. *Primary Care* 27(4):983-996.

Schettler T, Stein J, Reich F, Valenti M, Wallinga D (2000). In *Harm's Way: Toxic Threats to Child Development*. Boston: Greater Boston Physicians for Social Responsibility;  
[www.envirohealthaction.org/children/heavy\\_metals/](http://www.envirohealthaction.org/children/heavy_metals/)



Musculoskeletal disorders include a group of conditions that involve the nerves, tendons, muscles, and supporting structures. MSDs represent a wide range of conditions that can differ in severity from mild periodic symptoms to severe chronic and debilitating conditions. MSDs, if left untreated, can become extremely painful, disabling conditions that impair work and daily life tasks. Chronic conditions that have developed over time can require months or years for recovery.

Different patients may respond to different treatments for MSDs. You may wish to present the patient with options including NSAIDs, orthopedic devices, and complementary alternative therapies. Surgery should be a last resort for many upper extremity MSDs because surgical interventions can be associated with side effects, lost function, or relapse. Some patients benefit from complementary therapies, including yoga, movement therapies (Feldenkrais, Alexander Technique, Shiatsu, etc.), or acupuncture.

Alleviation of symptoms may require long periods of time and experimentation with different treatments. For some patients with severe injuries, common therapies such as stretching and strengthening may be very painful. Therapy should be approached slowly for those experiencing pain while completing activities of daily living.

It is important to refer the patient to a physical therapist or an occupational therapist when possible. Occupational therapists can help patients adjust home activities to limit exacerbation of their injuries. Organizations such as MassCOSH can help patients find ways to substitute tools or modify workstations.

If use of splints is prescribed, patients will probably need teaching from a physical therapist or a qualified nurse or physician. Splints must be fitted correctly, preferably by an occupational therapist, and worn correctly, only during inactivity.

Note:

*Use of poorly fitted splints or wearing splints during use of the hands may exacerbate symptoms.*

## Signs and Symptoms

Accurate diagnosis is crucial to the successful treatment of MSDs. It is important to resist the temptation to use an inexact term (i.e. not everything involving the wrist is “carpal tunnel syndrome”). These disorders can present differently from day to day, depending on variations in your patient’s work and activities.

Patients may report numbness, tingling, swelling, excessive warmth, etc. before experiencing pain. It is important to recognize these early symptoms to prevent progression of the injury.



### Signs and symptoms of MSDs can include

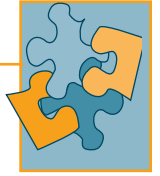
- ◆ Weakness in the hands or forearms that makes it difficult to lift or carry normal things
- ◆ Tingling, pins and needles
- ◆ Numbness
- ◆ Clumsiness: dropping, having to concentrate on holding things
- ◆ Difficulty using hands for ordinary activities
- ◆ Avoidance of using hands for common tasks
- ◆ Waking up at night with hand, shoulder, or elbow pain
- ◆ Hands cold or tender
- ◆ Chronic pain that gets worse

### Some MSDs

- ◆ DeQuervain’s disease
- ◆ Extensor tendinous disorders (tendinosis, tenosynovitis, tendinitis)
- ◆ Flexor tendinous disorders (tendinosis, tenosynovitis, tendinitis)
- ◆ Lateral epicondylitis
- ◆ Medial epicondylitis
- ◆ Thoracic outlet syndrome
- ◆ Median nerve injury
- ◆ Radial nerve injury
- ◆ Ulnar nerve injury
- ◆ Hand/arm vibration syndrome
- ◆ Carpal tunnel syndrome
- ◆ Tarsal tunnel syndrome
- ◆ Patellofemoral pain syndrome

If possible, prompt referral to both occupational medicine specialists and physical/occupational therapists is recommended to ensure accurate diagnosis and appropriate treatment. This is especially important since the signs and symptoms can also result from other illnesses or from exposures associated with additional health effects. References listed below also describe diagnostic procedures.

## Association with Work



MSDs are often associated with exposure to multiple risk factors, hand- or arm-intensive work, or repetitive work. Ask about work tasks performed or take an occupational history to identify tasks or movements that may be the source of the MSD risk. Also ask about changes in symptoms away from work, on vacations, and at night. With early disease this may help with diagnosing work-relatedness and treatment.

### **Risk Factors for MSDs**

#### ◆ **Awkward postures**

examples: stooping; working with the neck twisted or craned; working overhead; using tools that are the wrong size or shape for the job or the user; using tools that require abnormal flexion, extension or lateral deviation to use; typing on a high desk; processing poultry with cutters that keep the wrist bent; mopping while bent; etc.

#### ◆ **Forceful exertion**

examples: moving patients; carrying construction materials; carrying food and dishes; forcing tools or equipment that are improperly lubricated or powered; screwing; lathing; pushing; pulling

#### ◆ **Static postures**

examples: standing all day on an assembly line; looking through a microscope for one or more shifts in electronics assembly; sitting all day; standing on a hard floor for hours in a hair salon or in the operating room; feeding residents in a nursing home

#### ◆ **Repetitive motion**

examples: constant scissoring and twisting of curling irons in salons; making the same cutting motion in poultry plants or food services; screwing nuts and bolts in construction; clicking the mouse on the computer or typing on the keyboard; assembly operations in a manufacturing facility or food processing firm.

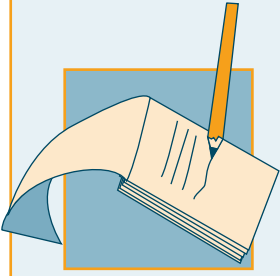
#### ◆ **Vibration**

examples: jackhammering; chiseling; sanding; grinding; polishing; lathing; buffing; using chainsaw; mowing grass; using leaf blower

## Musculoskeletal Disorders and Computer Use

When MSDs result from use of personal computers, redesign of the workstation with an ergonomist or by following published ergonomic guidelines may prevent exacerbation of symptoms. If the worker is very symptomatic, however, then positive changes may not be sufficient to prevent symptoms if he or she has not had an opportunity to fully recover from the injury. If keyboarding continues to cause pain, the patient may wish to try voice-activated software.

Some patients may experience injuries linked almost solely to use of a computer mouse. Key issues include mouse type, mouse location (arm extended/abducted), hand angle on mouse, and amount of clicking and dragging on the mouse. A variety of types of mice on the market present a range of alternatives for different people's needs. For example, many have eliminated the need to click and drag. Track balls can also reduce several risk factors.



## Plan

### *Diagnosis*

1. Take an occupational history to identify jobs and tasks involving risk factors described above. Ask patients to demonstrate the postures associated with their tasks.
2. If possible, refer to specialists (orthopedists, occupational medicine physicians) to ensure accurate diagnosis. If not, consider a wide range of possible injuries.
3. Inform the patient about claiming medical benefits from the employer's workers' compensation carrier. This may help the patient obtain wage replacement benefits if needed in the future.
4. If carpal tunnel syndrome, public health law requires reporting to the MDPH Occupational Health Surveillance Program. Use the Confidential Report of Occupational Disease and Injury included in the Mandatory Reporting section of this guide.

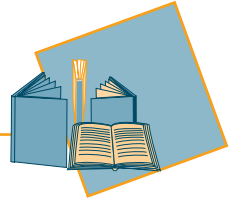
### *Treatment and Management*

5. Refer immediately to physical therapy or occupational therapy when possible.
6. Present the patient with treatment options, including routine use of ice or, alternatively, hot/cold compresses as per the diagnosis, NSAIDs, or orthopedic devices, and complementary alternative therapies (yoga, movement therapies, acupuncture). Surgery should typically be presented as a last resort appropriate for only certain conditions. Slow or discontinue therapies that cause pain. A variety of different treatments may be necessary during prolonged recovery.
7. If splints are indicated, ensure that they are fitted correctly, preferably by an occupational therapist, and are worn correctly, only during inactivity.
8. If indicated, provide written directions for respite from specific activity (light duty). Specify the amount of time for recovery or the nature of restrictions on work. Ask your patient about the amount and type of work he or she can perform comfortably. See sample letters in Sample Letters to Employers in this guide.
9. If indicated, prescribe time off work. If more than 5 days away from work are indicated, provide information about partial lost wage replacement through workers' compensation.
10. If obtaining workers' compensation seems infeasible, discuss with the patient how much work he or she can afford to miss. Ask if the employer provides disability benefits. Social Security Disability benefits may be available if you determine that an MSD totally disables a patient from working and is likely to do so for at least 12 months. If the company employs at least 50 people within 75 miles, provide information about the Family and Medical Leave Act (see Legal Rights to Safety and Health in this guide). Discuss strategies for gaining employer support for a recovery and return to work plan.

### *Prevention*

11. With patient's consent, write a letter to the employer describing the risk to employees and requesting the employer to maintain, reposition, or change equipment or change the pace of work associated with the patient's injury. See sample letters in Sample Letters to Employers in this guide.
12. Ask your patient to describe to what degree he or she is able to alter the pace of work, scheduling of tasks, or tool use on the job. People with some control over their own work may be able to redesign their work or substitute tools with the advice of an ergonomist. You can contact MassCOSH (617-825-SAFE) or any of the occupational medicine clinics listed in the Resource section of this guide.  
In jobs where people have little control over the work environment or tools, time away from work may be the most feasible prevention. You will need to trust your judgement and the patient's experience to decide how much time is appropriate.
13. If your patient belongs to a union, encourage him or her to contact the steward or union representative. If your patient agrees, consider contacting the union directly with information about hazards, health effects, and recommended interventions. MassCOSH (617-825-SAFE) can also offer assistance about hazards, potential health effects and resources.
14. Patients often benefit from exchanging information with others affected by MSDs. You can encourage patients to establish communication with other injured workers by contacting MassCOSH (617-825-SAFE) or, in the case of computer-related upper extremity disorders, RSI Action (617-247-6827).

## Resources



### Diagnosis and Management

Mani L, Gerr F (2000). Work-related upper extremity musculoskeletal disorders. *Primary Care* 27(4):845-864.

Piligian G et al. (2000). Evaluation and management of chronic work-related musculoskeletal disorders of the distal upper extremity. *American Journal of Industrial Medicine* 37(1):75-93.

Benetti MC, Marchese T (1996). Primary care for women: management of common musculoskeletal disorders. *Journal of Nurse-Midwifery* 41(2):173-187.

### Resources for Workers and Employers

American Federation of State, County, and Municipal Employees. Ergonomics: preventing strains, sprains and back injuries. [www.afscme.org/health/safe08.htm](http://www.afscme.org/health/safe08.htm).

The Handle With Care campaign at the American Nurses Association website has a variety of publications on safe patient handling: [www.nursingworld.org/handlewithcare/](http://www.nursingworld.org/handlewithcare/).

Pascarelli E, Quilter D. Repetitive Strain Injury: A Computer User's Guide. Chichester and New York: John Wiley and Sons; 1994.

Damany S, Bellis J, Cherniak M. It's Not Carpal Tunnel Syndrome: RSI Theory and Therapy for Computer Professionals. Philadelphia: Simax; 2001.

"Computer-related repetitive strain injury": [eeshop.unl.edu/rsi.html](http://eeshop.unl.edu/rsi.html).

Fact sheets on computer setup: [www.healthycomputing.com/office/setup](http://www.healthycomputing.com/office/setup).

NIOSH's "Elements of ergonomics programs": [www.cdc.gov/niosh/ephome2.html](http://www.cdc.gov/niosh/ephome2.html) or call 800-35-NIOSH (800-356-4674).

NIOSH factsheet: work-related musculoskeletal disorders: [www.cdc.gov/niosh/muskdfs.html](http://www.cdc.gov/niosh/muskdfs.html).



Exposure to neurotoxicants occurs in many occupations. Types of exposures that can result in neurological sequelae among workers include: heavy metals,\* organic chemicals such as pesticides and solvents, carbon monoxide, and ergonomic stressors.\* Early identification of work-related neurologic disease, removal from continued exposure hazards, and appropriate follow-up to specialists and agencies are essential to the treatment, management and prevention of neurological disease.



The diagnosis of work-related neurological disease requires careful determination of workplace exposure due to the complexities of patient presentation:

Symptoms may be subtle or nonspecific, and may include

- ◆ peripheral weakness or numbness
- ◆ unsteadiness when walking
- ◆ lethargy
- ◆ short-term memory loss
- ◆ personality changes
- ◆ features of Parkinsonism.

Problems may be acute, subacute, chronic, reversible or permanent.

Symptoms may mimic ordinary diseases (e.g., carbon monoxide headache).

Symptoms may occur after a prolonged latency period, so that the relationship to work is not initially obvious.

A toxic etiology should be considered in the differential diagnosis of many neurological problems.

\*Note: Lead exposure and musculoskeletal disorders are covered in separate profiles in this guide.

## Signs and Symptoms

Depending on the dose and duration of exposure to the toxicant, complaints of a person with work-related neurological disease may include: unsteady gait, bladder urgency, visual problems, slurred speech, headache, weakness, Parkinsonism, seizures, tremor, or cognitive and behavioral changes. Peripheral neuropathies may be sensory, pure motor (e.g., as in lead exposure) or mixed motor-sensory type. It should be noted that tingling and numbness are often seen with nerve entrapment disorders.\* Acute intoxication may manifest as acute psychosis or emotional lability. Chronic exposure may cause toxicant-induced encephalopathy, manifesting as dementia or behavioral changes.



\*Note: Neurological sequelae of musculoskeletal disorders are not covered here.

### Physical exam

*If neurotoxicity is suspected, the physical exam should assess*

- ◆ mental status
- ◆ visual acuity
- ◆ pupillary response
- ◆ funduscopy to rule out papilledema seen with increased intracranial pressure
- ◆ cranial nerves
- ◆ eye movements, nystagmus
- ◆ sensation (pain, temperature, touch)
- ◆ motor function (strength, tone, tremor, cogwheeling)
- ◆ reflexes
- ◆ cerebellar function (gait, heel-to-shin, and finger-to-nose testing).

Some neurotoxicants may cause non-neurological signs and symptoms as well (e.g., GI symptoms and hypertension caused by lead, cholinergic syndrome caused by organophosphate pesticides, and many organ systems affected by various solvents).

Table 1. Neurotoxicants and their Findings

Symptoms/Findings	Toxicant
<b>General Symptoms</b>	
Headache	Lead, Organotin compounds, Solvents, Carbon monoxide, Methylene chloride
Increased intracranial pressure	Lead, Organotin compounds
Seizures	Lead, Organic mercurials, Organochlorine insecticides, Organotin compounds, Carbon monoxide
<b>Eye/Vision Symptoms</b>	
Impaired visual acuity	N-hexane, Mercury, Methanol
Nystagmus	Mercury
Opsoclonus	Chlordecone (Kepone)
Constricted visual fields	Mercury
<b>Neuropathies</b>	
Cranial neuropathy	Carbon disulfide, Trichlorethylene
Peripheral neuropathy	Metals: Lead (esp. wrist extensors), Mercury, Arsenic; Acrylamide, Carbon disulfide, Carbon monoxide, DDT, n-Hexane and Methyl n-butyl ketone (MnBK), Some organophosphate insecticides, Ethylene oxide
Bladder neuropathy	Dimethylaminopropionitrile (DMAPN)
<b>Movement Disorders</b>	
Ataxic gait	Acrylamide, Chlordane, Chlordecone (Kepone), DDT, N-hexane, Manganese, Mercury (esp. methyl mercury), Methyl n-butyl ketone, Toluene
Tremor	Carbon disulfide, Chlordecone (Kepone), DDT, Manganese, Mercury, Carbon monoxide
Parkinsonism	Carbon disulfide, Carbon monoxide, Manganese, Methylene chloride
Myoclonus	Benzene hexachloride, Mercury
Paraplegia	Organotin compounds
<b>Cognitive, Behavioral and Psychiatric Symptoms</b>	
Acute psychosis or marked emotional instability	Carbon disulfide, Manganese, Toluene, Mercury
Acute intoxication	Organic solvents, Carbon monoxide, Many substances with high enough exposure
Chronic behavioral symptoms	Acrylamide, Arsenic, Lead, Manganese, Mercury, Methyl n-butyl Ketone, Organotin compounds, Pesticides
Chronic toxic encephalopathy	Organic solvents (e.g., Mixtures, Toluene, Styrene, Carbon disulfide), Lead, Mercury, Pesticides



## Mercury Exposure

Routes of Exposure: vapor inhalation, ingestion, injection, or dermal absorption.

### Types of mercury and clinical presentation

- ◆ *Inhaled elemental mercury exposure can lead to pulmonary, cutaneous, and neurological symptoms.*

The classic triad found in chronic toxicity is tremors, gingivitis, and erethism (insomnia, shyness, memory loss, emotional instability, depression, anorexia, vasomotor disturbance, uncontrolled perspiration, and blushing). Dental workers can be exposed to toxic amounts of aerosolized elemental mercury. Ingestion of elemental mercury from a broken thermometer will be poorly absorbed by the GI tract and should have no toxic effect; however, exposure to vapors can occur. Sources: barometers, batteries, dental amalgams, electroplating, fluorescent and neon lamps, fluorescent bulb recycling, jewelry making, paints, paper pulp production, photography, semiconductors, thermometers.

- ◆ *Inorganic mercury or mercuric salts are corrosive to the GI tract.*

Symptoms of acute poisoning may include ashen-gray mucous membranes secondary to precipitation of mercuric salts, hematochezia, vomiting, abdominal pain, and hypovolemic shock. Acrodynia ("Pink disease"), considered a mercury allergy, presents with erythema of the palms and soles, edema of the hands and feet, desquamating rash, hair loss, pruritus, diaphoresis, tachycardia, hypertension, photophobia, irritability, anorexia, insomnia, poor muscle tone, and constipation or diarrhea. Sources: chemical laboratory work, disinfectants, cosmetics, explosives, embalming, fur hat processing, ink manufacturing, mirror silvering, taxidermy.

- ◆ *Organic mercury poisoning may result from dermal absorption or ingestion.*

Symptoms usually begin days to weeks after exposure. They are typically neurological and include visual disturbances (e.g., scotomata, visual field constriction), ataxia, paresthesias (early signs), hearing loss, dysarthria, mental deterioration, muscle tremor, movement disorders, and, with severe exposure, paralysis and death. Sources: seafood, antiseptics, embalming, agriculture, insecticidal products, chemistry laboratories, paper manufacturing, pathology products, wood preservatives, and thimerosal (vaccine preservative).

Because of its insidious onset and variable signs and symptoms affecting multiple organ systems (e.g., CNS, renal, mucous membranes), chronic mercury toxicity is often misdiagnosed. In the elderly, for example, it may be confused with dementia or Parkinson's.

## Organic Solvent Exposure

**Routes of Exposure:** Solvents enter the body via inhalation of vapors (most important route), dermal absorption and ingestion (rare), and subsequently rapidly cross into the bloodstream and distribute throughout the body. Hence, solvents traverse the blood-brain barrier within minutes.

### ***Effects of work environment and conditions:***

High concentrations of airborne solvents can be due to large surfaces of solvent that are inadequately enclosed or insufficiently ventilated with fresh air. High temperature will volatilize solvents and increase vapor concentration. Physically demanding work can result in increased respiration of vapors. Also, cut, abraded or wet skin can increase dermal uptake of solvent.

### ***Symptoms:***

Initial CNS stimulation or disinhibition occurs, producing alcohol-like effects such as giddiness, dizziness, slurred speech, staggering gait, euphoria, impulsiveness, and excitement. Increased levels lead to a general anesthetic effect and respiratory depression that may lead to cerebral hypoxia.

### ***Clinical presentation:***

Headache, fatigue, dizziness, irritability, mood changes. Altered mental status (from confusion to coma), and cognitive deficits (orientation, attention, concentration, recent memory, and calculations).

Hallucinations and seizures may also occur; cranial nerve dysfunction (nystagmus, sensory loss, loss of hearing, loss of vision). Examples of solvents that can have PNS effects:

- ◆ Hexane: Mixed peripheral motor (distal weakness, neurogenic atrophy) and sensory (stocking-glove touch and pin-prick impaired, vibration and joint position intact) defects; reflexes may be hypoactive; may cause a high-stepping gait.
- ◆ Toluene: Reflexes may be hyperactive; Affects balance and cerebellar testing (finger-to-nose, heel-to-shin, Romberg, ataxic gait).

### ***Solvents carry many other potential health risks.***

Acute toluene toxicity, for example, may present as: neuropsychiatric symptoms (altered mental status, headache, LOC, and ataxia); profound weakness secondary to hypokalemia and hypophosphatemia; or GI symptoms (abdominal pain, nausea, and vomiting). Toluene can also produce mixed metabolic acidosis, rhabdomyolysis, dysrhythmias, and, with chronic exposure, distal RTA. Many solvents are eye, nose, throat and pulmonary irritants and may cause bronchial and laryngeal spasm. Some solvents are reproductive toxins; some solvents cause dermatitis. Some chlorinated hydrocarbons produce liver and renal toxicity. It is now believed that chronic exposure to elevated levels of virtually all organic solvents carries a risk of CNS damage. This may include cognitive deficits, progressive irreversible encephalopathy, cranial nerve dysfunction, peripheral neuropathy, and cerebellar ataxia.

### ***Uses and Sources:***

Organic solvents are used in many industrial processes, usually to dissolve fats, oils, waxes, pigments, varnishes, rubber and other materials. Commonly used organic solvents include trichloroethylene (TCE), perchlorethylene, methyl ethyl ketone, toluene, hexanes, heptanes, ethyl acetate, isopropyl acetate, acetone, methylene chloride and xylene. Solvent mixtures such as mineral spirits, Stoddard solvent, or naphtha may also be used. Products containing solvents include liquefied domestic gas, adhesives, spray applications, dip tanks, petrol, some paints, paint thinners, dry cleaning agents, lighter fuel, varnishes, varnish removers, degreasers, and shoe and metal polishes.

## Association with Work



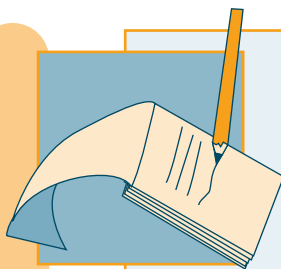
An atypical illness, or symptoms with no obvious etiology, may be a clue to exposure to a toxicant. Assessing whether a work exposure caused a neurological condition in a given patient poses a challenge. For example, a toxicant's effect from a work or home exposure may sometimes present simply as the worsening of an underlying condition.

### A determination of causality requires:

- ◆ Presence of a neurotoxicant: Does patient work with or near potentially neurotoxic materials? Is there a likely mode of bodily entry through inhalation, dermal absorption, or ingestion?(e.g., eating at the workplace)?
- ◆ Consistency between the known effects of a toxicant and the patient's illness. Online resources, occupational/environmental medicine specialists, toxicologists, governmental agencies, and industrial hygienists can provide descriptions of the health effects of various toxic agents. See the Resources section of this guide for additional assistance.
- ◆ A plausible time frame for the exposure to have caused the effect. Note that in many cases symptoms may improve on non-work days or vacations, but prolonged exposure can lead to continuous symptoms even after leaving the work. Symptoms can be acute or chronic.

Table 2. Occupations with Risks of Exposure to Neurological Toxicants

Exposure	Occupation
Lead	Painters, auto workers, plumbers, battery makers, welders. See "Lead Exposure" profile in this guide for treatment, management and prevention of lead poisoning.
Solvents	Painters, printers, auto workers, plumbers, carpenters, wood workers, varnish makers, dry cleaners, janitors, dye workers, glass workers, railroad workers, manufacturing workers.
Carbon Monoxide	Workers exposed to combustion exhaust fumes
Mercury	Laboratory workers, fluorescent bulb recyclers and makers, semiconductor makers, felt makers, dental workers. See box on Page 3 of this profile for more sources, and types of mercury exposure
Pesticides	Agricultural workers



## Plan

### Diagnosis

1. Ask 5 brief screening questions in the History Taking section of this guide. If needed, a thorough occupational history should be taken. If mercury exposure is suspected, ask about seafood intake.
2. Appropriate testing and treatment for work-related neurological disease requires detailed knowledge of the specific toxins involved. Testing, such as biomarker analysis, may be done both for clinical decision-making and to allow documentation and exposure quantification. Such steps are important in determining causality. The following tests for neurotoxicants or their effects may be performed in the clinical setting:
  - ◆ Carboxyhemoglobin for carbon monoxide toxicity. CO in the blood has a half-life of approximately four hours in room air.
  - ◆ Urine arsenic is a good marker for recent but not past exposure. Recent seafood consumption adds nontoxic organified arsenic that increases total urine arsenic.
  - ◆ Blood manganese levels.
  - ◆ Blood and urine mercury levels.
  - ◆ Urine level of metabolites of certain solvents (e.g., hippuric acid for toluene).
  - ◆ Blood lead level (BLL) and ZPP (zinc protoporphyrin).
  - ◆ Red blood cell cholinesterase levels for organophosphate pesticides.
  - ◆ Tests for toxic effects or end-organ damage (e.g., CBC, electrolytes, renal and liver function tests).
  - ◆ Tests such as EEG, EMG, nerve conduction studies, auditory/visual evoked potentials, CT/PET/SPECT scanning, neuropsychological testing, nerve/muscle biopsy etc.) are usually conducted by specialists
3. Specialized treatments (such as chelating agents for metals, hyperbaric oxygen for acute carbon monoxide poisoning, and atropine for organophosphates) may be available for some exposures.
4. Public Health Law requires reporting of all cases of suspected or confirmed work-related acute chemical poisoning to the MDPH Occupational Health Surveillance Program. Use the Confidential Report of Occupational Disease and Injury in the Mandatory Reporting section of this guide or download the form at [www.state.ma.us/dph/bhsre/ohsp/crodi.pdf](http://www.state.ma.us/dph/bhsre/ohsp/crodi.pdf)

### Treatment and Management

#### — If suspected CO poisoning

5. Treat with 100% oxygen; do not delay awaiting results of a blood test.
6. Take venous blood sample for carboxyhemoglobin (COHb). Smokers may have COHb as high as 5-9%. Non-smokers should have a COHb of less than 5%. Levels over 25% should be evaluated for possible hyperbaric treatment. Massachusetts General Hospital has a hyperbaric treatment center: 617-573-4411.

#### — If suspected mercury poisoning

Acute mercury toxicity should be treated in an emergency department with poison center consultation. Suspected chronic mercury toxicity should be referred to an occupational and environmental medicine specialist. In certain situations, chelating agents may be needed.

#### The following tests may be useful in the outpatient setting:

- ◆ Whole blood mercury level: helpful for recent exposures and for determining if toxicity is secondary to organic or inorganic mercury. May be high in people with high dietary intake of fish.
  - ◆ Urine mercury level: good indicator of inorganic and elemental mercury exposure, unreliable for organic mercury (methylmercury) since elimination occurs mostly in the feces.
  - ◆ Hair mercury analysis: may sometimes appropriately accompany blood and urine testing.
- CBC: to rule out anemia secondary to GI hemorrhage.

(continued following page)

(continued from page 6)

- ◆ Chemistries: to look for renal failure and electrolyte abnormalities.
- ◆ Pregnancy test: all forms of mercury may be fetotoxic even in an asymptomatic patient.
- ◆ Abdominal x-ray: ingested elemental mercury will appear radiopaque.

— *If suspected organic solvent exposure*

Beyond removal from contact with the offending agent, treatment of solvent-related neurotoxicity is generally supportive. While most effects are reversible with time, permanent damage can also result. Neuropsychiatric testing is often helpful in determining dysfunction.

**Helpful lab tests may include**

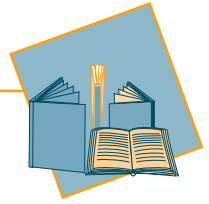
- ◆ Renal and liver function tests may be elevated especially in chronic chlorinated HC exposure.
- ◆ Electrolytes (e.g., hypokalemia, hypophosphatemia with toluene).
- ◆ CBC (benzene/gasoline may cause aplastic anemia or leukemia).
- ◆ Creatinine kinase level if rhabdomyolysis is suspected.
- ◆ Carboxyhemoglobin after methylene chloride exposure.
- ◆ Urinary pH for renal tubular acidosis (RTA) with toluene exposure.  
Biomarkers of solvents or their metabolites (e.g., urinary hippuric acid for toluene) are sometimes possible to measure after acute exposure, but are generally used only for monitoring or to document industrial exposure, not to guide treatment. The best time for obtaining urine or blood samples for organic solvents is at the end of the work shift.

**Prevention**

7. Steps should be taken to reduce contact with the aggravating material and/or increase fresh-air flow and ventilation of the work area. Ask patient to obtain Material Safety Data Sheets for chemicals used at work, or if the patient can identify the substances used, find MSDS's at [www.hazard.com](http://www.hazard.com). If the patients can't obtain this information, with the patient's permission, you can call or write the employer asking for information regarding chemical usage. Exposure to many airborne chemicals including carbon monoxide, solvents, and mercury is regulated by OSHA. Your patient may need assistance from his or her union, MassCOSH (617-825-SAFE) or OSHA (617-565-6924) to reduce exposure in the workplace.
8. If you feel your patient or his/her co-workers are at imminent risk for serious health effects, you can call OSHA at 617-565-9860 (regional office)

## Resources

Massachusetts and Rhode Island Poison Center  
300 Longwood Avenue  
Boston, MA 02115  
Phone: 800-222-1222 or TTY 888-244-5313  
Education/Information Line: 617-355-2227  
Email: [avery.adam@tch.harvard.edu](mailto:avery.adam@tch.harvard.edu)  
Web: [www.maripoisoncenter.com](http://www.maripoisoncenter.com)



### **Databases**

The Agency for Toxic Substances and Disease Registry (ATSDR ) produces extensive "toxicological profiles" for hazardous substances; includes descriptions of typical worksite exposures and their toxicity.  
[www.atsdr.cdc.gov/toxpro2.html](http://www.atsdr.cdc.gov/toxpro2.html) ATSDR Region I, Phone: (617) 918-1495

Environmental Protection Agency's Integrated Risk Information System (IRIS). An electronic database containing information on human health effects from various substances. [www.epa.gov/iriswebp/iris/index.html](http://www.epa.gov/iriswebp/iris/index.html)

The Association of Occupational and Environmental Clinics (AOEC) contains a database of health-harming chemicals associated with occupational exposures.  
[www.aoec.org](http://www.aoec.org) (202) 347-4976

### **Articles**

Xiao, JQ and Levin SM, The diagnosis and management of solvent-related disorders, *American Journal of Industrial Medicine*, 37:44-61(2000)

Reproductive and developmental hazards include chemical, physical, and biologic exposures that may impair the female or male reproductive systems or affect fetal or child development, or even affect future offspring. In the Boston area, common reproductive and developmental hazards may affect workers connected with health care: clinicians, janitors, laundry workers, laboratory technicians, and biotechnology workers. The electronics industry also employs large numbers of workers in Eastern Massachusetts and uses a variety of chemicals that can present reproductive and developmental hazards. However, any job involving regular or intermittent unprotected exposure to industrial chemicals may result in exposure to a reproductive or developmental hazard.

In men, exposures to reproductive hazards may affect sperm count or quality, fertility, libido, or potency. In women, menstrual irregularities or infertility may result. Exposure to developmental hazards may result in miscarriage, stillbirth, retarded fetal growth, birth defects, or childhood cancer. Birth defects include not only abnormalities of physical development but also abnormal functioning of the brain or immune, reproductive, or endocrine systems in offspring. Some of these impacts may only become apparent years after birth.

Bioaccumulated chemicals from past exposures, as well as maternal exposures during pregnancy, can be transferred to the fetus and affect development. In addition, residues on work clothes and storage of work chemicals at home can expose other family members and children to toxicants.

Because both men and women can be affected by toxic chemicals, “fetal protection” policies, in which employers exclude pregnant or potentially pregnant women from certain jobs, are considered unsound public health practice as well as discriminatory. Rather, protection from exposure to toxic chemicals should be provided to all workers.

Health care providers should also consider non-occupational risks to reproduction and development, including exposures from food, water, and air. For example, fish contaminated with chemicals such as mercury and PCBs represents a well-documented risk to fetal development when eaten by pregnant women or women of childbearing age. Home exposures to other substances, including house and garden pesticides, lead during remodeling, or solvents during painting and cleaning, may pose risks to adults and children. Substance abuse, such as “huffing” of solvents, may also result in harmful exposures.

## Signs and Symptoms

Patients indicating any of the following for themselves or their partners should be assessed for potential exposure to reproductive and/or developmental hazards:

- ◆ Planned pregnancy
- ◆ Pregnancy
- ◆ Difficulty conceiving
- ◆ Spontaneous abortion/miscarriage
- ◆ Decreased libido
- ◆ Impotence
- ◆ Menstrual irregularities
- ◆ Breastfeeding

### *Biological monitoring can confirm exposure to certain compounds:*

- ◆ Blood lead concentrations of 40 µg/dl are associated with abnormal semen characteristics in men; lower levels have been demonstrated to affect fetal and child development. Even lower maternal levels may impair fetal brain development. During pregnancy, lead stored in maternal bone is mobilized and may result in significant fetal exposures. Women who are considering becoming pregnant or who are pregnant should be tested for blood lead levels if they are now or were previously potentially exposed to lead in the workplace or at home.
- ◆ Serological testing for virus-specific IgM and IgG differentiates women who are immune, susceptible, or currently infected with hazardous viruses.
- ◆ Blood and breast milk can be analyzed for mercury if occupational or dietary history suggests the possibility of excessive exposures.

## Association with Work

1. Identify physical and biological agents present in both partners' current and past workplaces (see tables and references below).
2. Identify chemicals present in both partners' current and past workplaces (see tables and references below).



Obtain Material Safety Data Sheets (MSDSs) for all chemicals used at the patient's job. MSDSs describe health effects associated with exposure and required safety measures. Employers are required by law to make them readily accessible to employees. You can

- ◆ Ask your patient to obtain MSDSs for chemicals used at his or her job or work area; or
- ◆ Ask your patient if he or she belongs to a union. If so, the patient can contact the steward or field representative to help obtain the MSDSs; or
- ◆ Ask your patient's permission for you to write a letter to the employer to request the MSDSs (see Sample Letters to Employers in this guide); or
- ◆ Ask the patient to note down product names and numbers from the labels of substances used. You can then obtain most MSDSs from the database at the website [hazard.com](http://hazard.com).

Note:

*You do not have to provide a reason for the request and the patient does not have to inform the employer about a pregnancy or planned pregnancy.*

3. The Material Safety Data Sheets (MSDSs) should indicate reproductive or developmental toxicity but may be incomplete or outdated. Additional sources of reproductive and developmental toxicity data include

- ◆ The Pregnancy Environmental Hotline: [www.thegenesisfund.org/Hotline/faq.htm](http://www.thegenesisfund.org/Hotline/faq.htm); 800-322-5014
- ◆ REPROTOX: [reprotox.org](http://reprotox.org); 202-293-5137
- ◆ The Association of Occupational and Environmental Clinics (AOEC): [www.aoec.org](http://www.aoec.org); 202-347-4976; fax, 202-347-4950
- ◆ Organization of Teratology Information Services: [www.otispregnancy.org/](http://www.otispregnancy.org/)
- ◆ Medline: [www.nlm.nih.gov](http://www.nlm.nih.gov)
- ◆ Toxline: [toxnet.nlm.nih.gov/](http://toxnet.nlm.nih.gov/)

4. Does the patient exhibit acute signs of exposure to reproductive or developmental toxins? See MSDSs for associations with acute effects including dermatitis, CNS effects, eye irritation, nausea, or kidney damage.

Note:

*Adverse impacts on reproduction or fetal development may occur at levels of exposure that cause no symptoms in adults.*

5. Estimate extent of exposure to the identified toxins based on the nature of the patient's work.

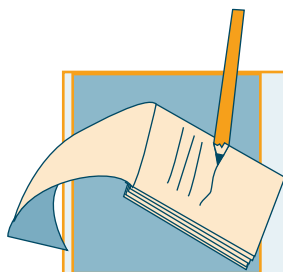
a. Useful questions to determine possibility of occupational exposure to identified chemicals:

- ◆ Does ventilation carry the chemical vapors away? Does it carry the chemicals up past your face or away from you?
- ◆ Do the chemicals get on your skin? Have you noticed skin irritation from using them?
- ◆ Do you experience headaches or nausea when you work with these chemicals? Eye irritation? How about coughing or trouble breathing?
- ◆ Do any of your co-workers have similar problems?
- ◆ What types of personal protective equipment does your employer provide? Does the company provide masks, gloves, respirators, or other protective gear? What are they made of? Can you write down what the label says on a box of gloves or bring it in?

b. To describe the dose, ask questions about the duration, frequency, or quantity of use:

- ◆ How do you use the chemical? Do you spray it or brush it on? What do you use to apply it?
- ◆ How much of the chemical do you use?
- ◆ How often do you use it?
- ◆ In surgical settings:

Is recovery room air monitored for anesthetic gases? What are the results? What kind of ventilation serves the recovery rooms? Is the ventilation system running properly?



### Plan

#### Diagnosis

1. Identify potential chemical, physical, and biological hazards to reproduction or development present at the patient's work place.

#### Prevention

2. If indicated and your patient agrees, write a letter to the employer requesting changes in the patient's job responsibilities during or before pregnancy or while breastfeeding. (e.g., increased break time, a temporary transfer away from using certain materials, light duty, exposures to be avoided). See sample letter in Sample Letters to Employers in this guide.



3. If a male patient planning parenthood is exposed to spermatotoxic or mutagenic compounds, discuss with him ways to avoid exposures during the 3 months before attempts to conceive.
4. If a patient planning parenthood is non-immune and potentially exposed to viruses, offer vaccinations against rubella and hepatitis B at least 3 months before conception.
5. Sonographic imaging of fetal development may be indicated for pregnant women exposed to potential teratogens or chemicals associated with fetal growth deficits.
6. Nursing mothers who lose weight rapidly may experience increased concentrations of fat-soluble toxins in breast milk. Breast milk analysis may be indicated.
7. You may wish to refer potential cases of occupational exposures to reproductive and developmental hazards to the occupational medicine clinics listed in the Resources section of this guide.
8. Discuss with your patient the option of your writing a letter to the employer to describe the risk to others and direct the employer to eliminate the hazardous chemical, practice, or material. See Sample Letters to Employers in this guide.
9. If it is not feasible to eliminate the hazardous exposure, discuss with the patient your recommending that the employer take other steps to limit the levels of exposure to all employees.
10. If your patient belongs to a union, encourage him or her to contact the steward or union representative. If your patient agrees, consider contacting the union directly with information about hazards, health effects, and recommended interventions. MassCOSH (617-825-SAFE) can also offer assistance about hazards, potential health effects and resources.
11. If indicated and if your patient is eligible, help the patient use medical leave through the Family and Medical Leave Act (FMLA) or Massachusetts Maternity Leave Act (MMLA) (see box below and Legal Rights to Safety and Health section).

### Medical Leave Laws

Patients who work for public agencies or private employers with 50 or more employees within a 75-mile radius are covered by the Family and Medical Leave Act (FMLA) (see Legal Rights to Safety and Health section). FMLA grants employees the right to unpaid leave for up to 12 weeks per year for serious medical conditions, for pregnancy, and for the birth of a child. FMLA also requires covered employers to reduce employees' hours when required by serious medical conditions. To qualify for FMLA leave an employee must have worked at least 1,250 hours in the previous 12 months.

You can help your patients take FMLA leave by writing a letter describing their conditions, stating that they cannot work or cannot work their full hours, and estimating the duration of their disability.

Female patients who work for a company too small to be covered by FMLA, or who have not worked 1,250 hours in the previous year, may be covered by the Massachusetts Maternity Leave Act (MMLA). The MMLA grants eight weeks unpaid maternity leave at companies with six or more employees, for workers who have completed their probationary periods or have worked full time for at least three consecutive months.



**Table 1. Selected Chemical Hazards to Reproduction and Development**

Thousands of chemicals used in workplaces have never been tested for reproductive or developmental effects in humans. This table lists just some common chemicals that have been studied.

Exposures	Industry/Occupation/Source Compounds	Associated Outcomes
Anti-neoplastics Cytotoxics	Hospitals Medical clinics Pharmaceutical manufacture	Spontaneous abortion Congenital malformations including cleft lip Contamination of breast milk
Arsenic and Arsine	Anti-fouling paints Enamels Glasses Integrated circuits Metal alloys Pesticides Semi-conductor devices Weed killers	Spontaneous abortion Low birth weight Birth defects Contamination of breast milk
Anesthetic gases	Chemical plants Dental clinics Medical clinics Hospital OR, recovery rooms	Decreased sperm count Spontaneous abortion (self and partner) Stillbirth Birth defects
Benzene	Chemical plants Laboratories Paint thinners Spray paints	Menstrual abnormalities Mutations Low birth weight Birth defects
Cadmium	Artists Electrical workers Metal machining Paint and pigment manufacture Welding	Damaged sperm Reduced libido Impotence Menstrual irregularities Spontaneous abortion Stillbirth Contamination of breast milk Learning and developmental disabilities in offspring
Carbon disulfide	Electrical workers Laboratories Medical clinics Pesticide manufacture and application Refineries Rubber manufacture Textile manufacture	Spermatotoxicity Reduced libido Decreased fertility Menstrual irregularities Damage to fetus Spontaneous abortion
Carbon monoxide	Auto repair Fire fighters Fork lift operators Traffic police Truck drivers Tunnel workers Work near tobacco smoke	Decreased fertility Low birth weight Birth defects Fetal death Infant death Neurological and growth deficits

Exposures	Industry/Occupation/Source Compounds	Associated Outcomes
Chloropropene	Manufacturing: Adhesives Epoxy resins Glycerol Insecticides Pharmaceuticals Varnishes	Spermatotoxicity
Dibromochloropropane	Pesticide manufacture and application	Spermatotoxicity
Epichlorohydrin	Manufacturing: Dyes Electrical machinery Glycerol Metal fabricated products Pharmaceuticals Plasticizing Resins	Sterility Chromosomal aberrations
Estrogenic agents: Oral contraceptives Stilbene derivatives Organohalide pesticides (e.g., methoxychlor, DDE, DDT, DBCP, EDB,2,4-D)	Pesticide manufacture Pesticide application Pharmaceutical manufacture	Hormonal changes Reduced libido Impotence Menstrual disorders Reduced fertility Spontaneous abortion Developmental/behavioral disabilities in offspring
Ethylene glycol ethers (" Cellosolves"): 2-methoxyethanol, 2-ethoxyethanol, and their acetates	Manufacturing: Auto Chemical Electronics General Semiconductor	Spermatotoxicity Testicular damage, atrophy Female infertility Spontaneous abortion Low birth weight Some evidence for congenital malformations, including orofacial clefts
Ethylene oxide	Ethylene oxide Chemical manufacture Food workers Health care Pesticide application Pesticide manufacture	Mutations Spontaneous abortion Animal studies indicate decreased fertility, sperm damage, fetal death, birth defects
Formaldehyde	Adhesives Cosmetics manufacture Particle boards Pathology laboratories Permanent press fabrics Resin manufacture	Menstrual irregularities Mutations
Lead	Auto radiator repair Bridge painters Deleaders House painters Smelters Stained glass or ceramics Welders	Decreased fertility Damaged or decreased sperm Reduced libido Impotence Menstrual irregularities Growth deficits Birth defects Neurobehavioral impairment, cognitive deficits, in offspring Kidney cancer in offspring

Exposures	Industry/Occupation/Source Compounds	Associated Outcomes
Mercury	Chemical workers Dental clinics Electrical workers Medical clinics Pesticide application Pesticide manufacture Pharmaceutical workers Thermometer manufacture	Reduced libido Impotence Menstrual irregularities Spermatotoxicity Spontaneous abortion Learning and developmental disabilities in offspring of exposed women Contamination of breast milk (organic forms): CNS deficits/cerebral palsy with maternal poisoning
Methyl ethyl ketone (MEK, 2-butanone)	Degreasing General manufacturing Paint manufacture Plastics manufacture Textile manufacture	Increased rate of leukemia among offspring of exposed men Animal evidence for damage to fetus
Methylene chloride (Dichloromethane)	Chemical manufacturing Furniture stripping	Evidence for spermatotoxicity including oligospermia
N-methyl pyrrolidinone/ pyrrolidinone (NMP)	Graffiti removal Metal cleaning Microelectronics manufacture Pesticide formulation Petroleum refining Veterinary medicine	Evidence for fetotoxicity
Perchloroethylene (Perc, Tetrachloroethylene)	Degreasing Dry cleaning	Reduced fertility Spontaneous abortion
Pesticides: Organophosphates such as chlorpyrifos, diazinon 2,4-D DBCP DDE, DDT EDB Methoxychlor	Agriculture Golf course maintenance Lawn care Pesticide application Pesticide formulation	Birth defects Developmental/behavioral disabilities in offspring
Polychlorinated biphenyls (PCBs)	Fire fighters Manufacture and removal of transformers and ballasts Railroad workers Utility workers Waste removal workers	Possible association with endometriosis Spontaneous abortion Congenital syndrome with maternal poisoning Learning/behavioral disabilities in offspring
Styrene	Manufacture of fiberglass boat and construction materials Paper workers Plastics workers	Some evidence for menstrual irregularities, congenital abnormalities Developmental disabilities in offspring

Exposures	Industry/Occupation/Source Compounds	Associated Outcomes
Toluene	Chemical manufacture General manufacturing Laboratory workers Printing Shoemaking	Some evidence for reduced fertility, congenital malformations Delays in fetal growth Spontaneous abortion Learning/developmental disabilities in offspring High or chronic exposure: teratogenicity similar to that of Fetal Alcohol Syndromes
1,1,1-Trichloroethane (Methyl chloroform)	Manufacturing	Animal evidence for damage to fetus, congenital malformation, mutations
Trichloroethylene	Dry cleaning Electronics Metal degreasing Thinners for paints, varnishes	Some evidence for spermatotoxicity Spontaneous abortion Congenital malformations including cardiac malformation, cleft palate Developmental disabilities in offspring
Xylene	Adhesives Cements Laboratory work Lacquers Paints Pharmaceuticals Plastics manufacture Synthetic textiles Varnishes	Menstrual irregularities Learning/developmental disabilities in offspring

**Table 2.** Selected Physical Hazards to Reproduction and Development

Exposures	Industry/Occupation/Source Compounds	Associated Outcomes
Non-ionizing radiation (microwaves, radiofrequency)	Airline workers Fire fighters Food workers Glass and pottery manufacture Paper workers Utility workers	Animal evidence for testicular damage, congenital malformations
Ionizing radiation (x-rays and other)	Dental Clinics Food workers Medical clinics Nuclear plants	Spermatotoxicity CNS and growth deficits (high doses) Genetic effects, childhood leukemia at doses <50 mGy
Heat	Many	Spermatotoxicity
Physically demanding work: Standing for long durations Repetitive lifting Long hours	Many	Preterm delivery Low birthweight

**Table 3. Selected Biological Hazards to Reproduction and Development**

Exposures	Associated Outcomes
Cytomegalovirus	Fetal death Congenital malformations, including neurological damage and hearing loss
Hepatitis B	Spontaneous abortion Stillbirth Low birth weight Preterm birth Congenital malformations Liver disease in offspring Active infection in offspring
HIV	Transmission to fetus Contamination of breast milk
Human Parvovirus B19	Some evidence for spontaneous abortion Non-immune hydrops fetalis Fetal death Rarely: congenital anomalies
Rubella	Fetal rubella syndrome: cardiovascular, CNS, hearing defects; retinopathy
Varicella Zoster	Congenital malformations, including those of the brain, eyes, and limbs

**Resources**

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Schettler T, Solomon G, Valenti M, Huddle A. *Generations at risk: reproductive health and the environment*. Cambridge, Massachusetts: MIT Press; 1999.

Shortridge-McCauley LA (1995). Reproductive hazards: an overview of exposures to health care workers. *AAOHN Journal*;43(12):614-621.

Sommer SM (1995). Reproductive hazards facing female health care workers in the hospital: how the nurse practitioner can help. *Nurse Practitioner Forum* 6(2):99-105.

Worthington K (2001). Reproductive hazards on the job. *American Journal of Nursing* 101(10):104.

**Websites**

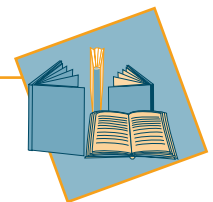
Association of Occupational and Environmental Clinics (AOEC): [www.aoec.org](http://www.aoec.org) ; 202-347-4976; fax, 202-347-4950.

Organization of Teratology Information Services: [www.otispregnancy.org/](http://www.otispregnancy.org/).

Pregnancy Environmental Hotline: [www.thegenesisfund.org/Hotline/faq.htm](http://www.thegenesisfund.org/Hotline/faq.htm); 800-322-5014.

REPROTOX: [reprotox.org](http://reprotox.org); 202-293-5137.

Toxline: [toxnet.nlm.nih.gov/](http://toxnet.nlm.nih.gov/).





## Section 4 -

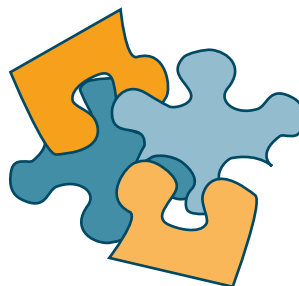
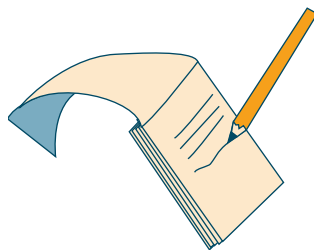
# Workers' Compensation

**Contents of this Section**

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*Workers' Compensation*

*Patient Handout: Workers' Compensation*







## **Workers' compensation is the insurance program that covers**

- ◆ costs of medical treatment for injuries or illnesses caused or aggravated by work
- ◆ partial wage replacement for workers who are disabled for more than five calendar days because of an injury or illness caused or aggravated by their job (in Massachusetts; these details differ by state)

All private sector employers are required to carry workers' compensation insurance regardless of the number of people they employ. Workers' compensation insurance covers private sector and some public sector workers regardless of their hours of work, term of employment, citizenship or immigration status, or access to other forms of health insurance. Federal employees are covered by federal compensation programs. (Railroad workers, police officers, firefighters, independent contractors, some municipal workers, and a few other special categories are not covered.)

If an employer fails to carry workers' compensation insurance, an employee can file a compensation claim with the Workers' Compensation Trust Fund of the Massachusetts Division of Industrial Accidents ([www.state.ma.us/dia](http://www.state.ma.us/dia)).

Insurance companies have worked to create a public impression that many workers abuse workers' compensation, seeking cash payments or medical coverage for conditions that are not real or work-related. In fact, research shows that workers affected by occupational illnesses and even acute traumatic injuries are vastly underserved by workers' compensation (see references below).

## **The Role of the Primary Care Clinician**

Injured and ill workers frequently depend upon coverage by workers' compensation insurance to obtain the care and benefits they need.

If medical care for a work-related condition is not charged to workers' compensation, an injured or ill worker may face many obstacles to obtaining:

- ◆ medical services not fully covered by his or her health insurance
- ◆ physical or occupational therapy
- ◆ occupational medicine services
- ◆ rehabilitation services
- ◆ lost wage replacement

If the illness or injury is exacerbated in the future or results in disability, an affected worker may not be able to demonstrate the work-relatedness of the condition if the original treatment is charged to ordinary medical insurance. This can prevent the worker from receiving medical, rehabilitative, and career services as well as insurance payments.

Finally, properly charging workers' compensation prevents the improper shifting of costs from workers' compensation insurance companies to MassHealth, Medicare, Free Care, and other strained public funds.

You do not have to prove that an injury or illness was completely caused by work to classify it as a workers' compensation case. Nor is it always necessary to identify a specific moment or incident that caused the condition. Many conditions develop over time. Treatment should be charged to workers' compensation if you suspect that the disorder was either caused or aggravated by the patient's work.

## **Basic Steps in Using Workers' Compensation**

1. Take an occupational health history (see the History Taking section in this guide).
2. If you suspect that the patient's condition was caused or aggravated by work, consider charging the care to the employer's workers' compensation insurance carrier.
3. Inform your patient that he or she must inform the employer of his or her health problems to obtain benefits.
4. Encourage your patient to document everything: how, where, and when he or she was hurt or made ill; who witnessed the events; etc.
5. Provide basic patient education about rights to compensation (see Patient Handout on Workers' Compensation). Explain that patients have the right to a second opinion about the work-relatedness of a condition and appropriate time off or work restrictions.
6. Decide whether the patient requires time away from work or work restrictions (see below).
7. Consider potential changes in the patient's working conditions, workstation, or tools. You may wish to refer to MassCOSH (617-825-SAFE) or Occupational Medicine to recommend specific changes.

8. Use other professionals, such as occupational therapists, physical therapists, and chiropractors. OTs may do good investigations of workplace factors associated with the patient's condition.
9. If the patient is concerned about problems at work because of using workers' compensation, encourage him or her to contact MassCOSH. MassCOSH has access to compensation lawyers, immigrant organizations, and counseling.
10. If the patient belongs to a union, encourage him or her to contact the union about the hazards. With the patient's consent, any materials you send to the employer should also be sent to the union.

### Considerations in Prescribing Time Away From Work or Light Duty

No dependable formula can consistently determine whether and when patients should return to work or what types of work restrictions they require. You will have to rely on your judgment, your patients' opinions, and the information you can gather about their jobs. If you feel unsure of your judgment, you may wish to refer to Occupational Medicine (see list of Boston-area clinics in the Resources section in this guide).

- ◆ Ask your patients to describe or demonstrate what they do at work that they think caused or aggravated their condition.
- ◆ Do they have the option to pace their work or stop to rest as needed, or are they forced to work at a certain pace?
- ◆ Also ask them about activities indirectly related to their work that might affect their condition. For example, might they have to sit in a car for an hour to get to and from work? Do they have to walk on icy streets or carry a child to day care to get to work?
- ◆ Consult with your patients about what they consider reasonable restrictions to their work or reasonable time off.
- ◆ Find out whether your patients have some mechanism for avoiding catastrophic loss of income resulting from lost work time. Do their jobs offer sick days? Short term disability coverage? Can they afford to lose the five days' income not covered by workers' compensation or the portion of their wages (40%) never replaced by compensation?
- ◆ Consult with employers to determine whether light duty is available and what it entails.
- ◆ Consider workplace light duty or "back to work" programs critically. They may not provide the conditions necessary to help your patients recover. You may decide to recommend a period of complete rest despite the advice of employers.
- ◆ Once workers return to work, they will most likely face pressure from employers and co-workers to work beyond their restrictions. Encourage them not to work beyond their limits.

### Wording Work Restrictions

It is important to write recommendations that cannot be misinterpreted.

Workers told MassCOSH the story of a physician who wrote orders for a patient to restrict use of the right hand. The patient switched to the left hand and sustained the same injury. The provider then had to restrict use of the left hand.

### Resources

Providing Medical Care for Job-Related Injuries and Illnesses: A Practical Guide for Health Professionals. Brochure produced by the Workers' Compensation Health Initiative, University of Massachusetts Medical School.

Schwartz RM. Workers' Comp: A Massachusetts Guide. Cambridge, Massachusetts: Work Rights Press; 2002.

### Selected References on Underutilization of Workers' Compensation

Morse TF, Dillon C, Warren N, Levenstein C, Warren A (1998). The economic and social consequences of work-related musculoskeletal disorders: the Connecticut upper-extremity surveillance project (CUSP). *International Journal of Occupational and Environmental Health* 4:209-216.

Pransky G, Snyder T, Dembe A, Himmelstein J (1999). Under-reporting of work-related disorders in the workplace: a case study and review of the literature. *Ergonomics* 42(1):171-182.

Rosenman KD et al. (2000). Why most workers with occupational repetitive trauma do not file for workers' compensation. *Journal of Occupational and Environmental Medicine* 42(1):25-34.



# MassCOSH

Massachusetts Coalition for Occupational Safety and Health

## Workers' Compensation Fact Sheet

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### What is Workers' Compensation?

- Workers' compensation, often referred to as "workers' comp," is a type of insurance for job-related injuries and/or illnesses that most employers in Massachusetts must buy for their employees.
- All employers are required to post a sign in a visible location with the name of their Worker's Compensation insurance company and policy number.

### Who is eligible?

- Almost all workers are covered, no matter how many hours you work or how you get paid.
- If you volunteer or work for no pay, you are still covered for injury on the job.
- If you are not a U.S. citizen, you are covered. Undocumented immigrants are entitled to full workers' compensation benefits.
- If you are self-employed, you are covered only if you buy your own Workers' Compensation insurance.

### What do Worker's Compensation benefits include?

- Payment of medical bills, even if you do not miss any work
- Lost pay of 60% of your wages if you miss work for 5 or more days. These 5 days do not need to be in a row.
- Reasonable cost of travel to and from medical appointments
- Death benefits for your family if your injury is fatal

### Checklist:

#### What To Do If You Get Hurt Or Sick On The Job

- Tell your employer immediately if you get hurt, even if you don't need to stop working or if you feel all right. If you wait, you may not be able to prove you were injured at work. It is best if you can get an incident report in writing.
- Get medical care immediately. Your employer might require that you see a "preferred provider" or company doctor for the first visit. After that, you can see a doctor of your choice even if your employer encourages you to see a "preferred provider" or company doctor.
- Get a letter from your doctor describing your injury or illness. It should say clearly how long you will be out of work and any job restrictions you might need to follow when you return.
- Document everything:
  - a. Report the incident to your employer in writing and save a copy of your letter.
  - b. Copy anything you are asked to sign.
  - c. Write down the names of any witnesses to your injury.
  - d. Start a daily diary of your symptoms.
  - e. Get copies of all medical bills, accidents reports, etc.
  - f. If you are in a union, report your injury to your union representative right away.
- If you miss 5 or more days of work, you are eligible to receive 60% of the wages you lose after the first 5 days. Your employer must file a "First Report of Injury" (Form 101) with the insurance company and the DIA within 7 days of your absence. If your employer does not, you should report the injury to the insurer in a letter. The insurance company must accept or reject your claim within 14 days of receiving the First Report. If your claim is rejected, you can get help from someone on the resource list on the back of this fact sheet.
- When you are ready to return to work, talk to your doctor about what parts of your job you can and can not do. Have your doctor include this information in the letter to your employer.
- Don't hesitate to ask for an interpreter if you need one.

## A Summary of Your Rights

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### You have a right to:

- Know the name and policy number of your employer's Workers' Compensation insurance company
- Get medical treatment for workplace injuries paid for by this insurance company
- Receive a portion of your lost pay if you are out of work for 5 or more days
- Choose your own doctor to treat you for injuries that occur on the job
- File a Workers' Compensation claim even if your employer does not have insurance  
*Remember that it is illegal for your employer not to have Workers' Compensation insurance.*
- Get a copy of your case record from the DIA
- Return to work. *It is illegal for your employer to fire or discriminate against you if you file a claim.*
- Reasonable Accommodation, including changes in your work place, activities, or schedule, so that you can still perform your job safely
- Speak up if you think your workplace may be unsafe. *It is illegal for your employer to fire you if you talk to your supervisor, co-workers, or union about workplace safety.*

**You might have been injured because your workplace is unsafe. To learn more about laws applying to workplace safety and how to make your workplace safer for you and other workers, contact MassCOSH.**

## Resources

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### **Massachusetts DIA, the state agency that runs Workers' Compensation**

Department of Industrial Accidents (DIA)

600 Washington Street, 7<sup>th</sup> Floor

Boston, MA 02111

[www.state.ma.us/dia](http://www.state.ma.us/dia)

617-727-4900 x470 or 1-800-323-3249 x470

### **Massachusetts Coalition for Occupational Safety and Health (MassCOSH)**

12 Southern Avenue

Dorchester, MA 02124

[www.masscosh.org](http://www.masscosh.org)

617-825-SAFE (7233)

MassCOSH is a non-governmental organization that helps workers with health and safety problems on the job. MassCOSH can provide referrals to clinics, legal help, and much more. Staff speak English, Spanish, and Haitian Creole.

### **RSI Action**

617-247-6827 (voice mail only)

[www.rsiaction.org](http://www.rsiaction.org)

RSI Action, a program of MassCOSH, is an all-volunteer group that offers resources and support for office workers with repetitive strain injuries (RSIs) (also called musculoskeletal disorders or sprain and strain injuries).



# Section 5 - Prevention Tools

## Contents of this Section

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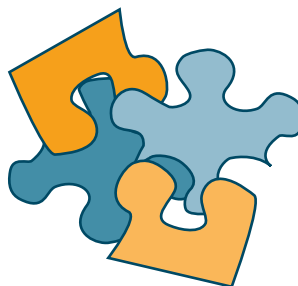
*Referring Your Patients*

*Legal Rights to Safety and Health*

*Provider Factsheet: Protecting Working Teens*

*Patient Handout: Your OSHA Rights in a Nutshell*

*Patient Handout: Workplace Violence*





### Referring to Occupational Medicine

- Q.** My patient has work-related symptoms and I would like to work with an occupational physician. How can I find someone in the area?
- A.** The Resources section in this guide lists the occupational health clinics in Eastern Massachusetts and the specialties of affiliated physicians.
- Q.** When should I consider referring to an occupational medicine specialist?
- A.** If feasible, consider referring to an occupational medicine physician when you are unable to provide any of these services:
- ◆ Diagnosing a work-related condition
  - ◆ Performing specialized diagnostic tests
  - ◆ Establishing the work-relatedness of an injury or illness
  - ◆ Identifying the workplace hazards associated with the patient's conditions
  - ◆ Recommending workplace hazard abatement to the patient's employer
  - ◆ Advocating on behalf of your patient with employers or agencies

It is important that the primary provider document work-relatedness (i.e., caused or exacerbated by work) of patients' conditions; charge the employer's workers' compensation insurers for their medical care; and help patients access workers' compensation partial wage replacement if they need to miss 5 or more days of work (see Workers' Compensation section). However, if the insurer challenges your findings of work-relatedness or need to stay away from work, an occupational medicine specialist may be able to help the patient obtain proper benefits.

### Contacting the Employer About Workplace Hazards

- Q.** My patient has a work-related illness and I am interested in speaking with her employer. My patient doesn't want me to do that. Are there guidelines for deciding how to pursue this concern?
- A.** Many patients are fearful of jeopardizing their jobs if a physician becomes involved. In many cases they are justified in their fears. You should explain to your patient the consequences of failing to attribute her symptoms or condition to the associated exposure. You should also consider referring your patient to an advocacy group that can assist her with these issues. See the Resources section in this guide. You should not contact the employer without your patient's consent.

### Contacting Other Agencies About Workplace Hazards

- Q.** My patient is being exposed to conditions on the job that I suspect are violations of OSHA standards. Should I report these conditions to a regulatory agency?
- A.** You should discuss the issue with your patient, understanding that many workers are concerned that their employers will believe that they were responsible for an inspection by a regulatory agency. Many workers do lose their jobs, particularly if they have informed their employer of their work-related illness or injury. Sometimes workers are fired or disciplined even if they were not actually responsible for the government inspection. (Firing, disciplining, or harassing a worker for reporting workplace hazards or health problems is illegal according to the OSH Act, but enforcement is inadequate.) If your patient is concerned about possible consequences you can inform him or her that OSHA will keep his or her name confidential upon request.

You can also contact the appropriate government agency if your patient does not object to your becoming involved. You may want to consider protecting him or her by asking to report the employer without revealing the name of the employee. However, OSHA will not normally inspect a worksite reported by someone who is not an employee; it will just send the employer a fax requiring that concerns be addressed.

If you and your patient believe that a worksite hazard presents an imminent danger of death or serious injury to employees, you should contact OSHA and stress the severity of the hazard.

**Q.** My patient has agreed to my calling a government agency about his working conditions. Which agency shall I call?

**A.** Please refer to the Resources section in this guide for contact information.

- ◆ The Occupational Safety and Health Administration has jurisdiction over most work-related safety and health issues in private sector workplaces. OSHA accepts reports from physicians of workers who are exposed to workplace hazards, but are obligated to inspect only when the report comes from a worker.
- ◆ There are some areas where OSHA does not have specific regulations, such as general indoor air quality in offices, schools, and other non-industrial buildings. For these situations you would contact the Occupational Hygiene Program of the Massachusetts Division of Occupational Safety (617-969-7177).
- ◆ The Occupational Hygiene Program may also be contacted for all work-related health problems in the public sector, such as state, county, and municipal agencies.
- ◆ For safety issues in the public sector, you may contact the Massachusetts Attorney General's Office, Division of Fair Labor and Business Practices.
- ◆ If you are unsure of which agency to call, contact MassCOSH for further advice (617-825-SAFE).

**Q.** My patient does not want me to contact a government agency, but would like to speak with someone about his situation. Where can I refer him?

**A.** You can refer him to MassCOSH (617-825-SAFE) or to another advocacy group that can help strategize regarding his particular situation (see the Resources section in this guide).

Nature of Hazard	Type of Workplace	Government Agency
Most health and safety	Private, Federal	OSHA
Air quality	Non-industrial	Occupational Hygiene Program of the Mass. Division of Occupational Safety
Most health and safety	Public Sector	Occupational Hygiene Program of the Mass. Division of Occupational Safety
Safety	Public Sector	Division of Fair Labor and Business Practices, Mass. Attorney General's Office

## Reporting Work-Related Conditions to Workers' Compensation and the Commonwealth

**Q.** I have diagnosed a patient with work-related asthma, but she doesn't want to use workers' compensation to cover her office visits and treatment, preferring to use her standard health insurance. I don't think this is appropriate. Am I obliged to report the case to Workers' Compensation?

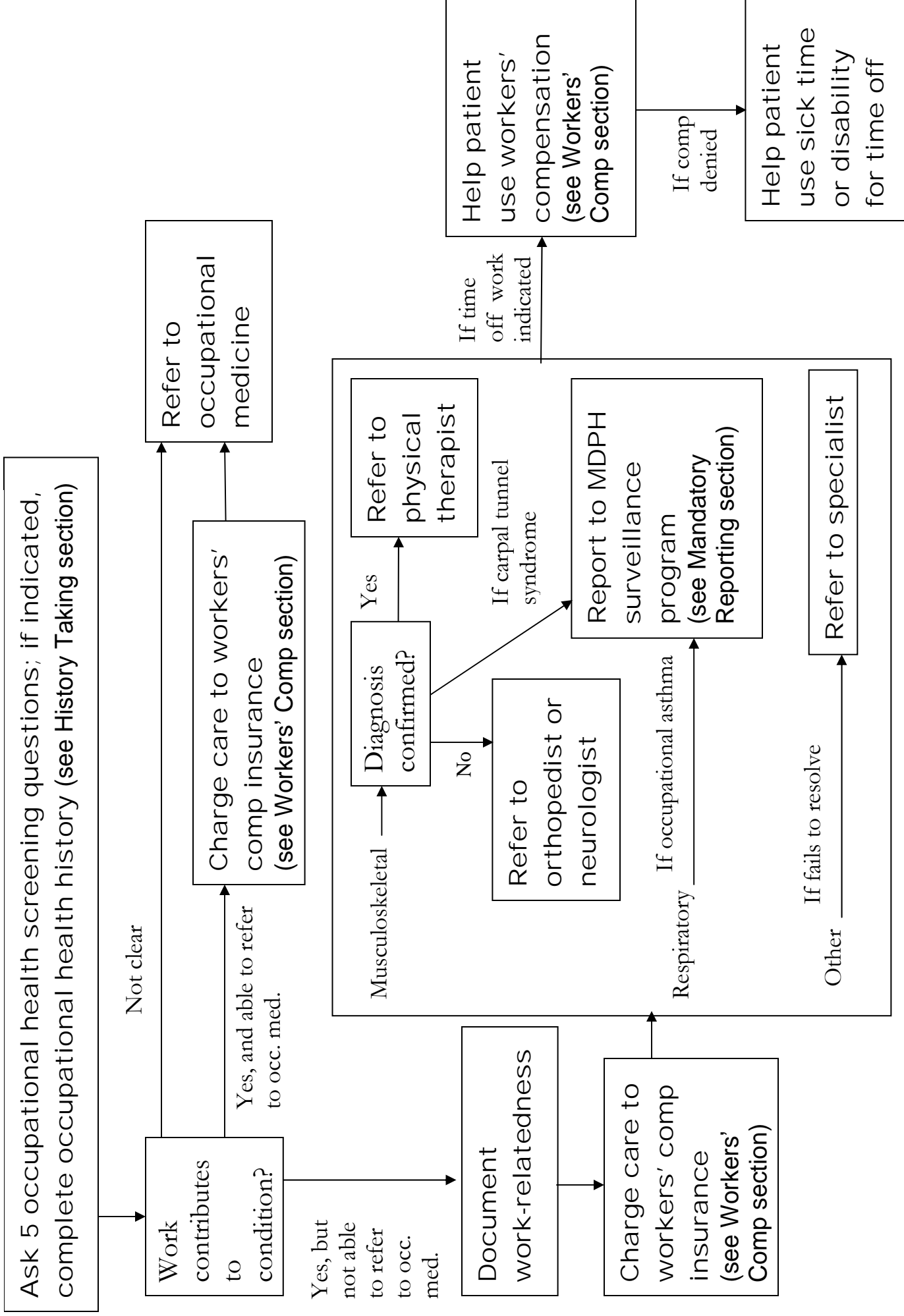
**A.** Most health insurance companies send forms to patients asking if injuries were related to incidents that involved work or a motor vehicle collision. The patient is obliged to respond to these questions. In addition, Massachusetts has a mandatory reporting standard that requires physicians to report certain work-related injuries and illnesses to the Occupational Health Surveillance Program of the Massachusetts Department of Public Health. Please see the Mandatory Reporting section in this guide, which lists the conditions that must be reported to OHSP/DPH.

**Q.** My patient is very upset about the conditions at work that have led to her chronic medical condition. She has expressed a desire to sue her employer. How can I refer her?

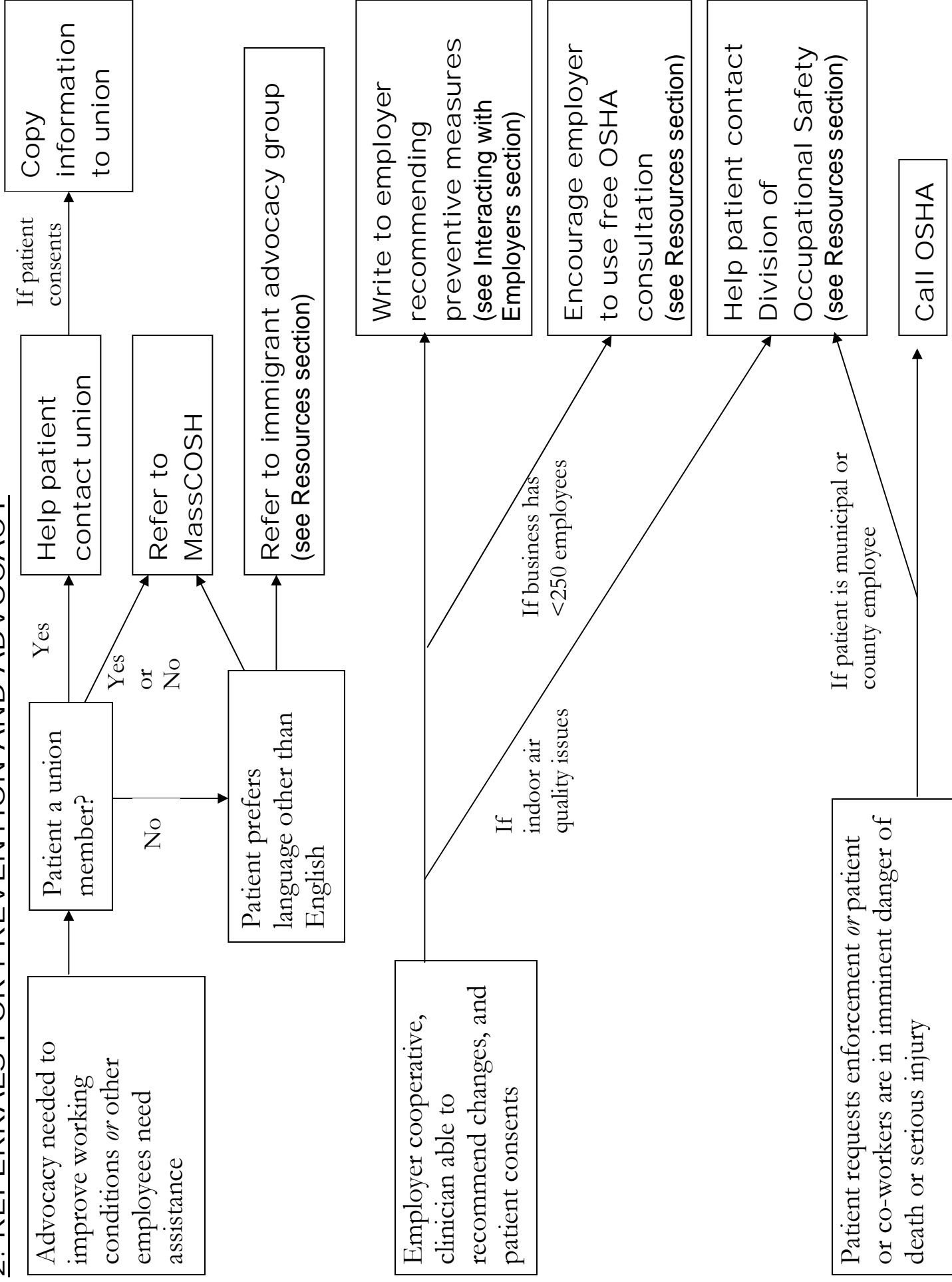
**A.** Workers' compensation is the exclusive legal remedy for most employees who want to take legal action against their employers for work-related illness or injury. Employers are required to report most work-related injuries and diseases to their workers' compensation insurer. In some situations the medical condition may have been caused by a condition at work that was the responsibility of a third party, such as the manufacturer of a chemical or a piece of equipment. In such situations, the employee may sue that third party. It is best, under those circumstances, for the employee to engage an attorney. In many situations it is probably best to engage an attorney for workers' compensation cases as well. MassCOSH has a lawyers committee whose members may be able to advise your patient.



# 1. REFERRALS TO DIAGNOSIS AND TREATMENT



## 2. REFERRALS FOR PREVENTION AND ADVOCACY



Everyone who works in the U.S., including U.S. citizens, legally documented immigrants who are not U.S. citizens, and undocumented immigrants, has a legal right to safety and health in the workplace. These legal protections cover regular permanent employment, temporary or casual employment, and even under-the-table work. You can refer to these laws in letters to employers requesting information, improved conditions, accommodations for disabilities, or leave from work.

Workers, however, may not be able to enforce these rights without help. You can refer patients with work-related health problems to non-governmental advocacy organizations listed in the Resources section in this guide, including MassCOSH (for any hurt or sick workers, especially those who speak English, Spanish, or Haitian Creole), the Chinese Progressive Association (for Chinese speakers), the Brazilian Immigrant Center (for Portuguese or Cape Verdean Creole speakers), or the Irish Immigration Center. If your patient belongs to a union, it is important to encourage communication with the union around hazards at work.

### The Right to a Safe and Healthy Workplace: Employees of Private Companies

The Occupational Safety and Health Act (OSH Act), administered by the Occupational Safety and Health Administration (OSHA), requires that all private employers “furnish to each employee a place of employment which is free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees.” OSHA has also implemented hundreds of standards regulating exposure to specific chemicals, safety specifications of machinery, housekeeping, and other health and safety issues.

Workers can call or e-mail OSHA to request an inspection of their workplace. In general, they will need to be able to communicate in English to do so. They can ask OSHA to keep their names confidential.

A clinician or any third party can also request OSHA to inspect a workplace. However, unless you notify the agency that the workplace presents imminent danger of death or serious injury, your request will probably result in OSHA faxing a notice of concern to the employer rather than inspecting the workplace.

You can learn more about OSHA and find regulations governing specific hazards at [www.osha.gov](http://www.osha.gov).  
North Boston area office: 617-565-8110; fax: 617-565-8115.  
South Boston area office: 617-565-6924; fax: 617-565-6923.

### The Right to a Safe and Healthy Workplace: Public Employees

State, county, and municipal employees in Massachusetts are not covered by OSHA. They are covered by Massachusetts General Laws, including Chapter 149, Sections 6 and 113, which require employers to maintain safe, well-ventilated, and sanitary working conditions. The Massachusetts Attorney General and the Division of Occupational Safety are responsible for enforcing these laws.

Since many public sector employees in Massachusetts belong to unions, it is important to encourage patients with occupational health problems to contact their unions. You, the clinician, should consult with the patient about copying to the union the same information you send to an employer.

Workers in any private or public sector workplace who are affected by poor air quality can request inspections by the Indoor Air Quality Program of the State’s Division of Occupational Safety, [www.state.ma.us/dos/](http://www.state.ma.us/dos/); 617-969-7177.

### The Right to Information About Hazardous Chemicals

OSHA’s Hazard Communications Standard requires private sector employers to train employees about the hazards of the chemicals they use. This Standard also requires employers to provide employees with ready access to Material Safety Data Sheets (MSDSs) on hazardous chemicals they use. MSDSs describe the types of protective equipment, work practices, and personal protective clothing necessary to protect workers from hazardous exposure. Finally, this Standard requires clear labels for all chemical containers.

The Hazard Communications Standard is widely violated, especially in small workplaces and low-wage industries. Your patients should know, however, that they have the legal right to this information, especially to the MSDSs that can inform your diagnoses and treatment plans. You can find MSDSs for many chemicals at [hazard.com](http://hazard.com).

State, county and municipal workers in Massachusetts, who are not covered by OSHA, are covered by the Massachusetts Right to Know Law. This law also mandates access to MSDSs, labeling on containers of chemicals, and training on safe use of chemicals. For more information, see [www.state.ma.us/dos/iaqdocs/IAQ-397.htm](http://www.state.ma.us/dos/iaqdocs/IAQ-397.htm).

### The Right to Freedom From Retaliation

Section 11(c) of the OSH Act forbids employers from harassing, discriminating against, firing, or punishing workers for asserting their rights to a safe and healthy workplace. The National Labor Relations Act also forbids employers from retaliating against workers who join with other workers to improve conditions on the job.

These laws are widely violated. Support from advocacy groups such as those listed above and from unions can be important to enforce them. Private sector workers who have experienced retaliation can also file a complaint with OSHA.

### The Right to Medical Care for Work-Related Injuries and Illnesses

All private sector workers, regardless of type of employment or immigration status, are entitled to coverage of medical expenses through workers' compensation if their medical conditions are caused or exacerbated by a job. Covering treatment of work-related health problems with workers' compensation rather than with other insurance or Free Care can help the patient obtain benefits if occupational conditions disable them in the future. See the Workers' Compensation section in this guide for further details.

### Rights to Medical Leave from Work

If private sector workers are disabled for five days or more because of work-related injuries or illnesses, they are entitled to partial wage replacement through workers' compensation. See the Workers' Compensation section in this guide for further details.

If workers miss work due to non-work-related medical problems, they may have rights to sick or disability leave under certain conditions:

- ◆ If they are union members, their union contracts or benefits may provide for sick leave or short-term disability
- ◆ If they are not union members, their company personnel policies may provide for sick or disability leave
- ◆ If they work at a private workplace with 50 or more employees within 75 miles or for a public agency, worked for at least 12 months prior to the illness or injury, and worked at least 1,250 hours during those 12 months, then they are covered by the Family and Medical Leave Act (FMLA)

FMLA grants 12 weeks of unpaid leave per year for absences due to disabilities caused by serious health conditions, or to care for family members disabled by serious health conditions (also to care for newborn, adopted, or foster children).

Workers covered by FMLA are also covered by the Massachusetts Small Necessities Leave Act, which grants up to 24 hours unpaid leave per year to accompany children or elderly relatives to medical or dental appointments.

### The Right to Vocational Rehabilitation

If a physician determines that a patient cannot or should not return to a job due to work-related illness or injury, the patient can apply for vocational rehabilitation services. These services assist injured workers in finding new jobs. You can learn more about these services at [www.state.ma.us/dia/Employee/VRBrochure.htm](http://www.state.ma.us/dia/Employee/VRBrochure.htm) or by calling the Office of Education and Vocational Rehabilitation at the Department of Industrial Accidents: 800-323-3249; 617-27-4900.

If the workers' compensation insurer refuses to assume liability for the injury or refuses to recognize its work-relatedness, the patient may be eligible for general vocational rehabilitation services through the Massachusetts Rehabilitation Commission. See [www.state.ma.us/mrc/vr/services.htm](http://www.state.ma.us/mrc/vr/services.htm), 800-245-6543; 617-204-3600.

### The Right to Reasonable Accommodation

The Americans with Disabilities Act (ADA) covers private sector employers with 15 or more employees and all public sector employers. The ADA requires covered employers to make reasonable workplace accommodations to allow people with substantially limiting physical or mental disabilities to perform the essential functions of a job. It also forbids employment discrimination against qualified disabled individuals.

"Substantially limiting" disabilities include those that prevent the performance of a broad range of jobs in various classes, or which prevent the performance of an entire class of jobs.

The Massachusetts Fair Employment Practices Act (FEPA) extends ADA rules to workplaces with 6 or more employees. In addition, FEPA requires employers to make reasonable accommodations for workers with occupational injuries or illnesses, regardless of the degree or time span of resulting limitations.



### Resources

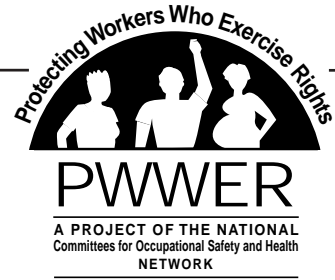
Schwartz RM. Your Rights on the Job: A Practical Guide to Employment Laws in Massachusetts, 4th ed. Boston: The Labor Guild of Boston; 2000.





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# Your OSHA Rights In A Nutshell



FACTSHEET OF THE “PROTECTING WORKERS WHO EXERCISE RIGHTS” PROJECT OF THE NATIONAL COSH NETWORK

## Right to a Safe and Healthy Workplace

You have a right to work in a workplace that does not make you hurt or sick. OSHA (the Occupational Safety and Health Administration) requires employers to provide a workplace that is free of recognized hazards.

## Right to Information

You have a right to ask for and get information from your employer about:

- chemicals used at work
- injuries and illnesses that happened at work to co-workers or past employees
- your medical records
- tests your employer has done to measure chemical, noise, and radiation levels

## Right to Know about Chemical Hazards

Your employer is required to make sure you have full information about the chemical hazards in your work area before you are exposed to any of them. This includes:

- having available Material Safety Data Sheets (MSDS) on all chemicals you work with or are exposed to
- ensuring the proper labels are on all hazardous chemicals
- training you about the health effects of the chemicals you work with, and ways you can protect yourself.

## Right Not to be Discriminated Against for Health and Safety Activity

You have a right to demand a safe workplace without fear of punishment. You should not be transferred, denied a pay raise, have your hours reduced or be fired as a result of health and safety action. [See factsheet on “Using Section 11(c) of the Occupational Safety and Health Act.”]

## Right to Health and Safety Training

Your employer is required to provide training on safety and health hazards at your workplace. Examples of topics include how to safely handle chemicals and lockout/tagout procedures for when you use machinery.

## Right to File an OSHA Complaint

You have a right to file a complaint with OSHA if you think your workplace is unsafe. You can file a complaint either in writing or by telephone. If you want OSHA to come and make an inspection of your workplace, put your complaint in writing and send it to the OSHA office nearest you.

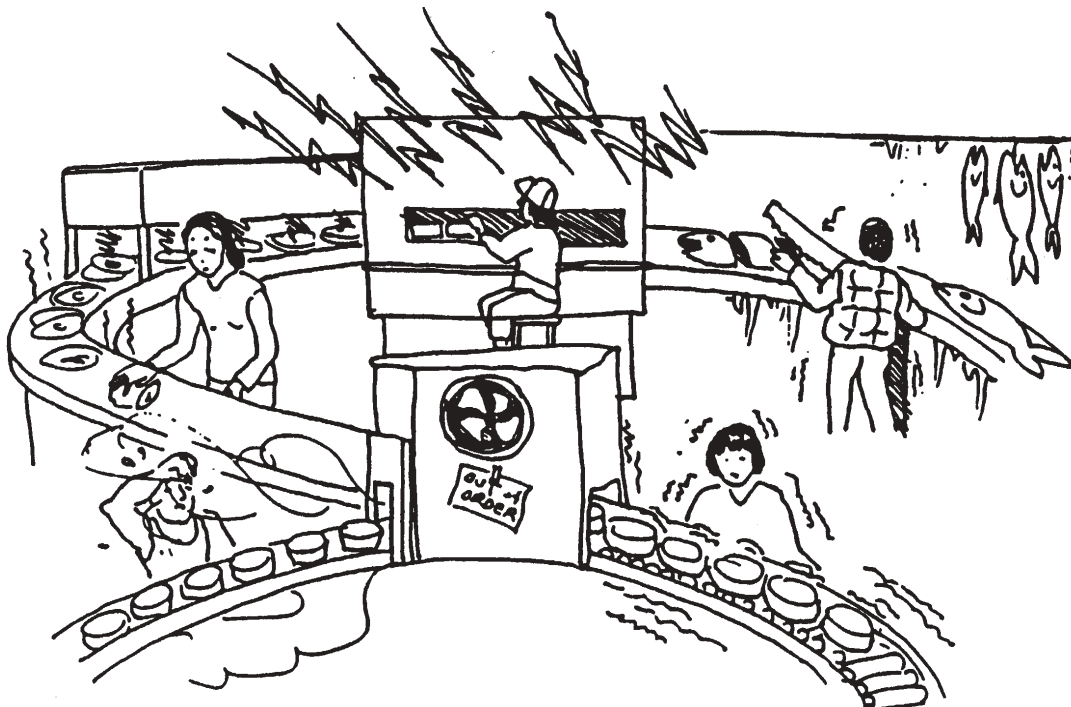
Call 1-800-321-OSHA to get the location of the nearest OSHA office. (See factsheet on “How To File A Complaint With OSHA.”)

(over)

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## Right to OSHA Inspections

You have a right to an OSHA inspection of your workplace. Request an inspection by writing the OSHA office nearest you. You can make the inspection most effective by participating in the inspection process. (See "The OSHA Inspection" factsheet.)



### Who Can Help

#### When You Want to Use Your OSHA Rights

- ☎ **Call your union**, if you have one.
- ☎ **Call the COSH group** (Committee for Occupational Safety and Health) nearest you. To find the number of the COSH group, call NYCOSH at (212) 627-3900. Ask the COSH group for their "Resource List" of organizations that help workers to know and use their legal rights.
- ☎ **Call OSHA**. For the office nearest you, call 1-800-321-OSHA.





# OSHA **FACT** Sheet

## Workplace Violence

### What is workplace violence?

Workplace violence is violence or the threat of violence against workers. It can occur at or outside the workplace and can range from threats and verbal abuse to physical assaults and homicide, one of the leading causes of job-related deaths. However it manifests itself, workplace violence is a growing concern for employers and employees nationwide.

### Who is vulnerable?

Some 2 million American workers are victims of workplace violence each year. Workplace violence can strike anywhere, and no one is immune. Some workers, however, are at increased risk. Among them are workers who exchange money with the public; deliver passengers, goods, or services; or work alone or in small groups, during late night or early morning hours, in high-crime areas, or in community settings and homes where they have extensive contact with the public. This group includes health-care and social service workers such as visiting nurses, psychiatric evaluators, and probation officers; community workers such as gas and water utility employees, phone and cable TV installers, and letter carriers; retail workers; and taxi drivers.

### What can these employers do to help protect these employees?

The best protection employers can offer is to establish a zero-tolerance policy toward workplace violence against or by their employees. The employer should establish a workplace violence prevention program or incorporate the information into an existing accident prevention program, employee handbook, or manual of standard operating procedures. It is critical to ensure that all employees know the policy and understand that all claims of workplace violence will be investigated and remedied promptly. In addition, employers can offer additional protections such as the following:

- Provide safety education for employees so they know what conduct is not acceptable,

what to do if they witness or are subjected to workplace violence, and how to protect themselves.

- Secure the workplace. Where appropriate to the business, install video surveillance, extra lighting, and alarm systems and minimize access by outsiders through identification badges, electronic keys, and guards.
- Provide drop safes to limit the amount of cash on hand. Keep a minimal amount of cash in registers during evenings and late-night hours.
- Equip field staff with cellular phones and hand-held alarms or noise devices, and require them to prepare a daily work plan and keep a contact person informed of their location throughout the day. Keep employer-provided vehicles properly maintained.
- Instruct employees not to enter any location where they feel unsafe. Introduce a “buddy system” or provide an escort service or police assistance in potentially dangerous situations or at night.
- Develop policies and procedures covering visits by home health-care providers. Address the conduct of home visits, the presence of others in the home during visits, and the worker’s right to refuse to provide services in a clearly hazardous situation.

### How can the employees protect themselves?

Nothing can guarantee that an employee will not become a victim of workplace violence. These steps, however, can help reduce the odds:

- Learn how to recognize, avoid, or diffuse potentially violent situations by attending personal safety training programs.
- Alert supervisors to any concerns about safety or security and report all incidents immediately in writing.

- Avoid traveling alone into unfamiliar locations or situations whenever possible.
- Carry only minimal money and required identification into community settings.

## What should employers do following an incident of workplace violence?

- Encourage employees to report and log all incidents and threats of workplace violence.
- Provide prompt medical evaluation and treatment after the incident.
- Report violent incidents to the local police promptly.
- Inform victims of their legal right to prosecute perpetrators.
- Discuss the circumstances of the incident with staff members. Encourage employees to share information about ways to avoid similar situations in the future.
- Offer stress debriefing sessions and post-traumatic counseling services to help workers recover from a violent incident.
- Investigate all violent incidents and threats, monitor trends in violent incidents by type or circumstance, and institute corrective actions.
- Discuss changes in the program during regular employee meetings.

## What protections does OSHA offer?

The *Occupational Safety and Health Act's (OSH Act)* General Duty Clause requires employers to provide a safe and healthful workplace for all workers covered by the *OSH Act*. Employers who do not take reasonable steps

to prevent or abate a recognized violence hazard in the workplace can be cited. Failure to implement suggestions in this fact sheet, however, is not in itself a violation of the General Duty Clause.

## How can you get more information?

OSHA has various publications, standards, technical assistance, and compliance tools to help you, and offers extensive assistance through its many safety and health programs: workplace consultation, voluntary protection programs, grants, strategic partnerships, state plans, training, and education. Guidance such as *OSHA's Safety and Health Management Program Guidelines* identify elements that are critical to the development of a successful safety and health management system. This and other information are available on OSHA's website at [www.osha.gov](http://www.osha.gov).

- For a free copy of OSHA publications, send a self-addressed mailing label to this address: OSHA Publications Office, P.O. Box 37535, Washington, DC 20013-7535; or send a request to our fax at (202) 693-2498, or call us at (202) 693-1888.
- To file a complaint by phone, report an emergency, or get OSHA advice, assistance, or products, contact your nearest OSHA office under the "U.S. Department of Labor" listing in your phone book, or call us toll-free at **(800) 321-OSHA (6742)**. The teletypewriter (TTY) number is (877) 889-5627.
- To file a complaint online or obtain more information on OSHA federal and state programs, visit OSHA's website.

This is one in a series of informational fact sheets highlighting OSHA programs, policies, or standards. It does not impose any new compliance requirements or carry the force of legal opinion. For 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. Voice phone: (202) 693-1999. See also OSHA's website at [www.osha.gov](http://www.osha.gov).





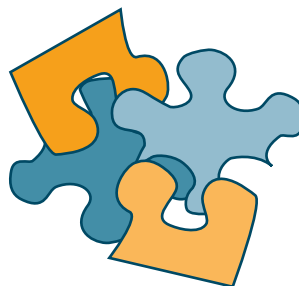
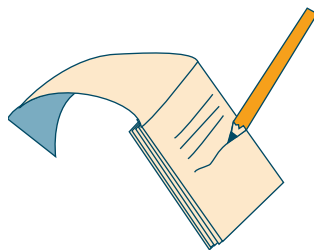
# Section 6 - Employer Interactions

**Contents of this Section**

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*Interacting with Employers*

*Sample Letters to Employers*





# Interacting With Employers

Employers are required to:

1. Provide a safe and healthy workplace for all employees
2. Use their workers' compensation insurance to
  - Pay for medical care for employees' work-related conditions
  - Provide partial wage replacement during the time the employee is out of work (after the first 5 calendar days)

These last responsibilities drive the employer's interest in good medical care and an early return to work for the employee.

## 1. Specifying Work Restrictions

Many employers have "restricted duty" or "light duty" programs. These should allow the employee to return to work that is medically safe. In order to assign the employee to appropriate work, most employers seek written guidelines from the treating provider specifying the duties that an injured or ill employee can safely perform.

*It is important for the provider to be precise with respect to restrictions, using best medical judgment, rather than merely recommending that the patient be assigned to "light duty."* For example, the treating provider should indicate a specific weight that the employee can lift or carry and should specify which actions can be performed repetitively, occasionally, or not at all. Often there are no clear standards or formulas for these types of specifications. You should rely on your clinical judgment, your patients' assessments of what causes or exacerbates their conditions, and your patients' detailed descriptions of acting out of their job tasks. It is important to note that the most hard-working and conscientious workers often try to minimize the severity of their injuries and overestimate their capacity to work while injured.

Sometimes patients report that the employer does not have restricted duty available. If feasible, the provider or a case manager should confirm this with the employer. If not, tell the employee that you are writing down what he or she can do safely and that it is the employer's responsibility to decide whether an accommodation can be made. If the appropriate accommodation is not available, the employer needs to keep the injured worker out of work. If you feel the injured worker shouldn't work in any capacity, then clarify in writing that he or she should not work.

## 2. Determining Work-Relatedness

Employers rightfully expect that the treating provider will make a reasonable determination as to whether the condition is work-related, and the medical record should document the rationale for this determination. The standard of proof in workers' compensation requires that the treating provider have an opinion that the condition is "probably" (i.e. more likely than not) related to the work (see Workers' Compensation section). It does not require scientific certainty. In some cases, the employer or designated representative will ask the treating provider for more explanation of his or her opinion regarding causality.

See the History Taking section for questions useful in determining probable work-relatedness.

It is important to document determinations of work-relatedness in writing. This documentation may be vital if the employee is to obtain necessary medical care or time away from work.

### **3. Protecting Confidentiality**

It is important to avoid sharing with the employer any medical diagnoses not related to the injury (i.e. hepatitis C, HIV, alcoholism, drug use, diabetes, etc., if these are not pertinent to the current medical problem). Functional state is generally the only information that should be shared.

Only the work capacity form should be shared with the employer, not the medical records. Only medical records *directly related to work-related conditions* may be shared with workers' compensation personnel or with the employer's medical personnel if the employer has a medical department. This information should never be shared with supervisors or managers.

### **4. Following Up on Work Restrictions**

Employers do not always adhere to clinicians' work restrictions, and employees are not always able to insist on following them. The provider should support the patient in writing and with a telephone call, if necessary, to ensure that the patient is assigned to appropriately safe work duties.

### **5. Addressing Underlying Causes**

In some cases, the history of the injury or the working conditions may suggest the presence of a serious occupational hazard in the workplace. The treating provider may be in an ideal position to provide effective prevention of injuries — or reduction of risk — to other workers.

Generally, a careful discussion with the employee will be necessary to decide on an appropriate action, which might include calling the employer or reporting the employer to OSHA (which can be done confidentially). The provider should not contact the employer without first discussing this option with the patient and obtaining permission. Factors to consider include the reported commitment of the employer to health and safety in the workplace, the seriousness of the hazard, the number of employees exposed, and your patient's preference.

If your patient is a union member, it is important to encourage your patient to contact the union about the workplace issue. Both union members and non-members may benefit from advocacy by MassCOSH or other groups.

### **6. Billing**

It is important to obtain workers' compensation insurance information from the employer. This will allow proper billing, which may have important implications in the long run for the employee, especially if the condition turns out to be serious or long term (see Workers' Compensation section). In some cases this may present the treating physician with administrative difficulties, but often this is straightforward and is nearly always important for the patient's future opportunities for employment, benefits, and medical care.

Please note that employees are eligible for workers' compensation regardless of their immigration status, temporary employment status, or eligibility for other types of insurance coverage, and regardless of the number of workers employed by an employer. If an employer does not carry the legally required workers' compensation insurance, a state fund is available for the employees. The self-employed are one of the few groups without this coverage.

Some workers might plan to use leave under the Family and Medical Leave Act (FMLA) instead of workers' compensation if they are too injured or ill to work. This leave is unpaid, however, while workers' compensation pays a portion of lost wages after the first five days of work missed. Also, because FMLA offers only a limited amount of leave per year, workers who use this mechanism improperly, for work-related injuries or illnesses, may find that they have no more leave time left for legitimate family and non-work-related medical issues (see Legal Rights section).

Sometimes employers instruct employees to avoid charging workers' compensation for their medical care for work-related conditions. It is important to educate patients about the reasons to use workers' compensation. If a worker refuses to do so, however, the provider cannot realistically demonstrate work-relatedness and charge the compensation insurer.

# Sample Letters to Employers

## Sample Recommendations for Changes to the Work Environment

Date: \_\_\_\_\_

Dear \_\_\_\_\_:

In my medical opinion, there is a high likelihood that \_\_\_\_\_  
(patient)  
has been affected by \_\_\_\_\_.  
(hazard)

This hazard might also affect the health of other employees.

Keeping employees working in a highly productive manner with maximum safety is a benefit to everyone. In general it has been shown that the safer the work environment the more productive it becomes for the benefit of the company.

I would like to take this opportunity to stress the importance of  
**[examples of recommendations:**

- implementing a work site ergonomic evaluation of \_\_\_\_\_ work station. It is  
(this patient's)  
a measure of preventive medicine to reduce the high probability of his/her sustaining a severe back injury.
- taking advantage of the free consultation plan that OSHA runs for businesses with up to 250 employees. This service can provide professional advice to your company at no cost. The consultation service does not penalize or cite employers in any way. For more information, call (617) 969-7177, e-mail [Masscon@state.ma.us](mailto:Masscon@state.ma.us), or read about the program on the internet: [www.state.ma.us/dos/Consult/Consult.htm](http://www.state.ma.us/dos/Consult/Consult.htm).
- providing adjustable work stations for all employees.
- cleaning all ventilation filters regularly.]

Without \_\_\_\_\_,  
(the recommended intervention)  
productivity will deteriorate.

Please do not hesitate to call if you would like to discuss any matter further.

Very truly yours,

## Additional Optional Language For Recommendations for Workplace Changes

The OSHA Act provides that each employer “shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious harm to his employees” (section 5, (a) (1)). This has been construed by the OSHA Review Commission and the courts as a general duty imposed by Congress on private sector employers that is legally enforceable by OSHA without need of standards or other regulatory action. I would like to work with you to reduce your potential legal exposure under this “general duty clause.”

## Sample Letter Requesting Personnel Assignment to Another Work Area

Date: \_\_\_\_\_

Dear \_\_\_\_\_:

In my medical opinion, there is a high likelihood that \_\_\_\_\_  
(patient)  
has been affected by \_\_\_\_\_.  
(hazard)

I would like to recommend immediate transfer of this individual to a work area that will reduce his/her exposure to \_\_\_\_\_.  
(hazard)

Specifically, this work area should have the following characteristics:

\_\_\_\_\_  
(requirements for new work area)

Without \_\_\_\_\_ the likelihood is great that this patient's health and  
(the recommended intervention)  
productivity will deteriorate.

Please do not hesitate to call if you would like to discuss any matter further.

Very truly yours,

## Sample Letter Prescribing Time Off Work to Establish Baseline Breathing/Skin Condition

Date: \_\_\_\_\_

Dear \_\_\_\_\_:

I am providing medical care for \_\_\_\_\_.

This patient is experiencing a medical condition which requires him/her to be absent from work for \_\_\_\_\_ days.

Yours truly,



## Sample Letter Describing Sensitizers and Associated Risks

Date: \_\_\_\_\_

Dear \_\_\_\_\_:

In my medical opinion, there is a high likelihood that \_\_\_\_\_  
(patient)  
has been affected by \_\_\_\_\_.  
(name of substance)

This hazard might also affect the health of other employees now or in the future.

This substance is a **sensitizer**. This means that employees may have no reaction when they are first exposed to this material but can become sensitized, that is, develop an allergic response over time. When people are sensitized to a substance they can become ill if they are exposed to even very small amounts of the substance.

Over time, exposure to sensitizers can cause health problems including asthma and dermatitis. In some cases these problems may be serious or even life threatening. It is therefore best to eliminate sensitizers from use when possible. When it is not possible to eliminate them, proper controls should be used to keep exposure levels for all employees as low as possible.

\_\_\_\_\_ is known to cause the following health problems when  
(name of substance)

people are exposed to it and become sensitized: \_\_\_\_\_.

I would like to take this opportunity to stress the importance of protecting your employees from exposure to this substance. For free information on options for preventing exposure to this substance, please see the following materials, which are attached if checked:

\_\_\_ Description of the free consultation plan that OSHA runs for businesses with up to 250 employees. The consultation service is not part of OSHA's enforcement branch and does not penalize or cite employers in any way.

\_\_\_ Brochure on the Massachusetts Toxics Use Reduction Institute, which helps Massachusetts employers identify and use alternative chemicals.

Please do not hesitate to call if you would like to discuss any matter further.

Very truly yours,



## Sample Request for Material Safety Data Sheets

Date: \_\_\_\_\_

Dear \_\_\_\_\_:

I am providing medical care to \_\_\_\_\_. To provide the best possible care, I would like to request information about the materials he/she might be exposed to at work. I also hope to be able to use this information to make recommendations that can help keep your other employees safe.

I would appreciate your sending me the following materials by \_\_\_\_\_:  
(date)

1. A list of all chemicals and substances that this person might be exposed to during work. Please include chemicals and substances used by other people in the same work area.
2. The Material Safety Data Sheets for these materials.

Keeping employees working in a highly productive manner with maximum safety is a benefit to everyone. In general it has been shown that the safer the work environment the more productive it becomes for the benefit of the company.

Thank you in advance for your assistance.

Yours truly,

## Sample Letter Documenting Patient's Eligibility to Use the Family and Medical Leave Act

Date: \_\_\_\_\_

Dear \_\_\_\_\_:

I am providing medical care for \_\_\_\_\_.

This patient is experiencing a serious medical condition which makes him/her unable to perform essential functions of his/her position.

Yours truly,

## Sample Response to Request for Confidential Information

Date: \_\_\_\_\_

Dear \_\_\_\_\_:

I am responding to your letter of \_\_\_\_\_.  
(date)

The information you request is highly sensitive and confidential. In my opinion it falls under the heading of medical records. Therefore, I cannot allow the information that you requested from us to be shared. That information can only be obtained with the consent of the individuals concerned.

Confidentiality of medical records is a highly sensitive issue, increasingly the subject of litigation. To avoid such problems, \_\_\_\_\_ attempts to balance your  
(health center)  
legitimate needs to know and the employee's legitimate zone of privacy.

It is therefore our policy not to release medical information in excess of the limits described in our Release of Information form.

I hope that you understand our policy and the reasons behind it. If you have any questions or concerns, please contact me at our clinic.

Sincerely,



## Section 7 -

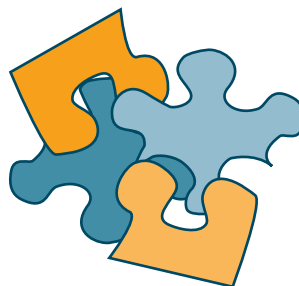
# Mandatory Reporting

### Contents of this Section

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*Mandatory Reporting of Work-Related Conditions*

*Reporting Form for Work-Related Conditions*





## Mandatory Reporting

Public health law 105 CMR 300 requires health care providers to report certain work-related conditions to the Massachusetts Department of Public Health. These include:

- **Work-related asthma**, confirmed or suspected  
Work-related asthma includes new-onset asthma, work aggravated asthma and Reactive Airways Dysfunction Syndrome (RADS).
- **Other work-related lung diseases**, including asbestosis, silicosis, chemical pneumonitis and beryllium disease
- **Work-related carpal tunnel syndrome**
- **Serious work-related traumatic injury to teens <18-years-old**
- **Acute chemical poisoning**, carbon monoxide, pesticide or other
- **Mercury and cadmium absorption from work**
  - mercury (blood greater than or equal to 15 micrograms per liter, urine greater than or equal to 35 micrograms per gram creatinine)
  - cadmium (blood greater than or equal to 5 micrograms per liter, urine greater than or equal to 5 micrograms per gram creatinine)
- **Clusters of cases of any work-related condition**

Health care provider reports of work-related conditions provide valuable information to the Massachusetts Department of Public Health. These reports help form the basis of our view of occupational health and safety in the Commonwealth. Data from case reports are summarized regularly to identify at-risk occupations and hazards that need to be addressed in Massachusetts. If case reports indicate the presence of serious hazards that place other workers at risk, the MDPH will take steps to ensure that the workplace conditions are investigated and abated. Worker confidentiality is protected in any follow-up activities that are carried out, and health care providers are informed of efforts made on behalf of their patients to remediate workplace hazards.

The reporting form, which includes reporting guidelines for specific conditions, may be downloaded at [www.state.ma.us/dph/bhsre/ohsp/crodi.pdf](http://www.state.ma.us/dph/bhsre/ohsp/crodi.pdf). The form may be mailed or faxed (617-624-5696) or the information provided by telephone at 617-624-5632.

### Reporting cases helps solve problems and prevent work-related disease

“If the problems don’t get reported, it’s almost as though they don’t exist.”

Union representative, 2002

“I knew it was her work, but I didn’t know what I could do about it.”

Asthma nurse, 2003

“Reporting of occupational disease is vital to the state’s efforts to protect the health of its working people.”

Public health official, 2000

Diagnosis, treatment and prevention are enhanced by the collaboration among community health center providers, care-givers and public health practitioners. The reported cases and surveillance by the Department of Public Health are important sources of information to identify the most serious occupational health hazards. Together this information can be used to refer cases for investigation, develop educational materials, assist employers in eliminating hazards, and empower patients and providers to solve patients’ health problems and prevent future problems.





**Occupational Health Surveillance Program  
Massachusetts Department of Public Health  
CONFIDENTIAL REPORT OF OCCUPATIONAL DISEASE AND INJURY**

*INSTRUCTIONS: In accordance with 105 C.M.R. 300.000, healthcare providers must report any patient with a confirmed or suspected diagnosis of any of the diseases or injuries listed below which is believed to have been caused or aggravated by factors in the individual's workplace. Cases should be reported within ten days of diagnosis or identification. PLEASE PRINT.*

**Reporting Source Information**

Reporting Date: \_\_\_\_/\_\_\_\_/\_\_\_\_  
mo. day year

Reporting Physician: \_\_\_\_\_ Name of Institution/Clinic: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: (\_\_\_\_) \_\_\_\_\_ Medical Specialty: \_\_\_\_\_

**Patient Information**

Patient's Name: \_\_\_\_\_  
Last First Middle Initial

Patient's Address: \_\_\_\_\_  
Street City State Zip Code

Home Telephone: (\_\_\_\_) \_\_\_\_\_ Date of Birth: \_\_\_\_/\_\_\_\_/\_\_\_\_ Sex: [ ] Male [ ] Female  
mo. day year

Race: (circle) White Black Asian Other (specify) \_\_\_\_\_ Ethnicity: Hispanic: [ ] Yes [ ] No

Occupation or type of work performed by patient: \_\_\_\_\_

Company where exposure/injury reportedly occurred: \_\_\_\_\_  
Name City State

Type of Business or Industry: \_\_\_\_\_ Is patient still employed at company? [ ] Yes [ ] No [ ] Unknown  
(e.g. electronics manufacturing, automotive repair, health care services)

**Occupational Diagnosis**

Is the diagnosis: [ ] confirmed [ ] suspected

Date of Diagnosis: \_\_\_\_/\_\_\_\_/\_\_\_\_  
mo. day year

[ ] **Work-related asthma** (if checked, please complete the following information) Suspected Agent: \_\_\_\_\_

- [ ] New-onset asthma (due to workplace exposure)
- [ ] Work-aggravated asthma (pre-existing asthma aggravated by workplace exposure)
- [ ] Reactive Airways Dysfunction Syndrome (RADS) (asthma resulting from a one-time acute exposure at work)

[ ] **Other lung disease** (if checked, please complete the following information)

- [ ] Asbestosis [ ] Chemical pneumonitis (suspected agent: \_\_\_\_\_)
- [ ] Silicosis [ ] Beryllium disease

[ ] **Work-related carpal tunnel syndrome**

[ ] **Serious work-related traumatic injury to person <18-years-old** (if checked, please complete the following information)

Diagnosis: \_\_\_\_\_ Cause of injury, if known: \_\_\_\_\_

[ ] **Acute chemical poisoning** (if checked, please complete the following information)

- [ ] Carbon monoxide poisoning
- [ ] Pesticide poisoning
- [ ] Other: \_\_\_\_\_

[ ] **Heavy metal absorption** (if checked, please complete the following information)

- [ ] Mercury level: \_\_\_\_\_ date of test: \_\_\_\_/\_\_\_\_/\_\_\_\_
- [ ] Cadmium level: \_\_\_\_\_ date of test: \_\_\_\_/\_\_\_\_/\_\_\_\_

**Please note: Disease outbreaks/clusters should be reported by phone.**

Remarks: \_\_\_\_\_

**Return this report to MDPH, Occupational Health Surveillance Program, 250 Washington St., 6th floor, Boston, MA 02108. FAX: (617) 624-5696. For more information or to file a report by phone, call: (617) 624-5632. Voicemail is in operation after hours. THANK YOU.**

# OCCUPATIONAL ILLNESS AND INJURY REPORTING GUIDELINES FOR PHYSICIANS

*Healthcare Workers should report all diagnosed OR suspected cases of the reportable conditions.*

## OCCUPATIONAL LUNG DISEASE

### Asthma

Report all persons with:

- A. A physician's diagnosis of asthma; AND
- B. An association between symptoms of asthma and work.

Note: Reportable cases include persons newly sensitized by exposures at work, OR with pre-existing asthma exacerbated by exposures at work, OR persons for whom a one-time exposure to a chemical (s) at work resulted in generalized airway hyperactivity.

### Asbestosis

Report all persons with:

- A. A physician's provisional or working diagnosis of asbestosis; OR
- B. A chest radiograph interpreted as consistent with asbestosis; OR
- C. Pathologic findings consistent with asbestosis.

Note: Persons with asbestos-related pleural disease without parenchymal fibrosis are not required to be reported.

### Silicosis

Report all persons with:

- A. A physician's provisional or working diagnosis of silicosis; OR
- B. A chest radiograph interpreted as consistent with silicosis; OR
- C. Pathologic findings consistent with silicosis.

### Chemical Pneumonitis

Report all persons with:

- A. A physician's provisional or working diagnosis of chemical pneumonitis; AND
- B. A history of recent occupational exposure to a chemical irritant(s).

### Beryllium Disease

Report all persons with:

- A. A physician's provisional or working diagnosis of beryllium disease including:
  1. acute chemical pneumonitis related to beryllium exposure; OR
  2. interstitial lung disease related to beryllium exposure. OR
- B. Pathologic findings consistent with beryllium disease.

## WORK-RELATED HEAVY METAL ABSORPTION

### Cadmium

Report all persons with:

- A. Cadmium: greater than 5 µg/l of blood, OR urine greater than 5 µg/g creatinine; AND
- B. A history of occupational exposure to cadmium or an unknown source of cadmium exposure.

### Mercury

Report all persons with:

- A. Mercury: greater than 15 µg/l of blood, OR urine greater than 35 µg/g creatinine; AND
- B. A history of occupational exposure to mercury or an unknown source of mercury exposure.

### Lead

Massachusetts clinical laboratories report all elevated blood lead levels in persons over age 14 directly to the Massachusetts Occupational Lead Registry. Physicians are not required but may elect to report elevated lead levels in the blood or urine to the Massachusetts Occupational Lead Registry, (617) 969-7177.

### Other Heavy Metals

Report all persons with:

- A. A level of any other heavy metal (e.g. arsenic, manganese, chromium) which exceeds the testing laboratory's reference value; AND
- B. A history of occupational exposure to the heavy metal in question or an unknown source of heavy metal exposure.

## WORK-RELATED CARPAL TUNNEL SYNDROME

Report all persons with:

- A. A physician's provisional or working diagnosis of carpal tunnel syndrome; AND
- B. A history of work involving one or more of the following activities prior to the development of symptoms:
  1. Frequent repetitive movements of the hand(s) or wrist(s) on the affected side(s);
  2. Regular tasks requiring the generation of high force by the hand(s) on the affected side(s);
  3. Regular or sustained tasks requiring awkward hand positions on the affected side(s);
  4. Regular use of vibrating hand-held tools;
  5. Frequent or prolonged pressure over the wrist or base of the palm on the affected side(s).

## SERIOUS WORK-RELATED INJURIES TO PERSONS LESS THAN 18 YEARS OF AGE

Report any minor with a serious work-related traumatic injury. A serious work-related traumatic injury is defined as an injury which results in death or hospitalization, or, in the judgment of the treating physician, results in, or will result in:

- A. Significant scarring or disfigurement; OR
- B. Permanent disability; OR
- C. Protracted loss of consciousness; OR
- D. Loss of a body part or bodily function; OR
- E. Is less significant but similar to injuries sustained by other patients at the same place of employment.

## WORK-RELATED ACUTE CHEMICAL POISONING

### Carbon Monoxide Poisoning

Report all persons with:

- A. A physician's diagnosis of carbon monoxide poisoning; AND
- B. A history of occupational exposure to carbon monoxide or an unknown source of exposure.

### Pesticide Poisoning

Report all persons with:

- A. A physician's provisional or working diagnosis of acute systemic illness or localized finding due to pesticides; AND
- B. A history of occupational exposure to pesticides.

Note: Dermatitis and/or eye injury due to pesticide exposure at work should also be reported.

### Other Acute Poisonings

Report all persons with acute systemic poisoning caused by occupational exposure to any other chemical (e.g. cyanide, hydrogen sulfide, chlorinated hydrocarbon solvents).

Note: Persons with anoxia caused by oxygen deficient work environments should be reported.

## WORK-RELATED DISEASE OUTBREAKS

Report any work-related disease outbreak/cluster, regardless of whether or not the disease is included among the reportable conditions listed above. A work-related disease outbreak is the occurrence of any illness in excess of normal expectation among workers at the same place of employment. Such outbreaks may be caused by exposures to a physical, biological or chemical hazard(s) in the workplace.

*Written materials on reportable conditions and other occupational health issues are available for physicians and their patients. Please contact the Occupational Health Surveillance Program: 250 Washington Street, 6th floor, Boston, MA 02108, (617) 624-5632.*



# Section 8 - Resources

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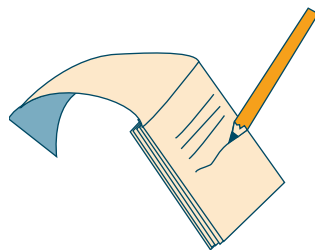
*Government Enforcement Agencies: Health and Safety*

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## Community Organizations

### Massachusetts Coalition for Occupational Safety and Health (MassCOSH)

[www.masscosh.org](http://www.masscosh.org)

**Languages:** English, Haitian Creole, Spanish

12 Southern Avenue, Dorchester, MA 02127

Phone: 617-825-7233 Fax: 617-929-0434

### Western MassCOSH

458 Bridge Street, Springfield, MA 01103

Phone: 413-731-0760 Fax: 413-731-6688

MassCOSH is a non-profit coalition of workers, unions, and health and safety professionals that promotes safe and healthy conditions in the workplace through training, education, and other preventive programs. MassCOSH works to identify, evaluate, and control workplace hazards, with a focus on immigrants and other low-income adults and youth.

- Conducts training, workshops, and conferences and produces educational materials on health and safety topics in several languages including Spanish, Portuguese, and Haitian Creole
- Assists injured workers with services including referrals to doctors and lawyers for workers' compensation cases
- Assists unions in writing health and safety contract language
- Advocates for workplace safety and health legislation and policies
- Trains clinicians to more effectively identify and address work-related injuries and illnesses, particularly among immigrant and low-wage workers

### Brazilian Immigrant Center

[www.braziliancenter.org](http://www.braziliancenter.org)

**Languages:** English, Portuguese

139 Brighton Avenue #7, Allston, MA 02134

Phone: 617-783-8001 Fax: 617-562-1404

The Brazilian Immigrant Center is a community-based organization working to empower Brazilians in the Greater Boston Area around issues of access to education, workplace rights, and immigration. Approaches include advocacy, education, organizing and leadership/capacity building.

### Chinese Progressive Association (CPA)

[www.cpaboston.org](http://www.cpaboston.org)

**Languages:** English, Cantonese, Mandarin, Toisanese

33 Harrison Avenue, Third Floor, Boston, MA 02111

Phone: 617-357-4499 Fax: 617-357-9611

E-mail: [justice@cpaboston.org](mailto:justice@cpaboston.org)

The Chinese Progressive Association (CPA) is a grassroots community organization that works to improve the living and working conditions of Greater Boston's Chinese community. The CPA Workers Center helps Chinese workers learn about and organize for their rights.

- Promotes awareness of workers' rights
- Provides support for collective action and encourages fuller participation in union activity
- Runs an ongoing Saturday Coffee Hour with activities and workshops to help immigrant workers learn about labor laws and workers' rights

**Irish Immigration Center**

**[www.iicenter.org](http://www.iicenter.org)**

**Languages:** English, Spanish

59 Temple Place, Suite 1010, Boston, MA 02111

Phone: 617-542-7654 Fax: 617-542-7655

The Irish Immigration Center is a self-help organization run by and for the immigrant community of Massachusetts. The Center's mission is to help newly arrived immigrants adjust to a new land. Central to the IIC's vision are an inclusive, non-sectarian philosophy and a commitment to working cross-culturally with other groups.

**Latino Immigrants Committee of the Chelsea Human Services Collaborative**

**[www.chelseacollab.org](http://www.chelseacollab.org)**

**Languages:** English, Spanish

300 Broadway, Chelsea, MA 02150

Phone: 617-889-6080 Fax: 617-889-0559

E-mail: [mail@chelseacollab.org](mailto:mail@chelseacollab.org)

The Latino Immigrants Committee conducts educational and advocacy activities around issues affecting Latino residents of Chelsea and surrounding areas.

- Sponsors Workers' Health and Safety Workshops leading to reforms at workplaces with many immigrant workers (joint project with MassCOSH)
- Leads campaigns to address workplace hazards
- Presents workshops on issues such as workers' rights, citizenship, and immigration law
- Helps to develop English for Speakers of Other Languages (ESOL) classes that further the goals of providing immigrants with safer jobs, better paying jobs with health benefits, and career paths with opportunities for advancement
- Conducts advocacy on state and federal policy regarding immigrants including Temporary Protected Status (TPS), "No-Match" Social Security letters, state and federal benefits restoration, legislation for translators in courts and emergency rooms
- Conducts "Immigration Clinics" to assist immigrants with TPS, income taxes, and other paperwork

**The Workers' Center at the East Boston Ecumenical Community Council (EBECC)**

**Languages:** English, Portuguese, Spanish

P.O. Box 450, 50 Meridian Street, Suite B-1, East Boston, MA 02128

Phone: 617-567-2750 TTY: 617-569-1134 Fax: 617-569-5946

E-mail: [ebecc.admin@verizon.net](mailto:ebecc.admin@verizon.net)

EBECC is a multicultural community organization that provides resources for workers in the Workers' Center. The Workers' Center focuses on workers' advocating for themselves through unionization, relationship building, and English as a Second Language classes.

**Massachusetts Association for the Chemically Injured (MACI)**

**[www.angelfire.com/ma3/maci](http://www.angelfire.com/ma3/maci)**

**Languages:** English, Spanish

P.O. Box 754, Andover, MA 01810

Phone: 978-681-5117 Fax: 978-686-0745

The Massachusetts Association for the Chemically Injured is a non-profit support, education, resource and referral organization for the chemically sensitive and individuals who care about the prevention of multiple chemical sensitivity. MACI offers services to

chemically injured people and their families in Massachusetts and New England. Programs include:

- A volunteer information line and monthly support group meetings
- A speakers program and MACI-sponsored and co-sponsored workshops
- A lending library, educational publications, and newsletter

### **RSI Action**

**www.rsiaction.org**

**Languages:** English, Spanish

P.O. Box 440067, Somerville MA 02144

Phone: (voice mail only) 617-247-6827

E-mail: [cnot@rsiaction.org](mailto:cnot@rsiaction.org)

RSI Action is an all-volunteer group that offers resources and support for workers with Repetitive Strain Injuries/Musculoskeletal Disorders (RSIs).

- Maintains an RSI referral book with patient reviews of physicians and alternative health specialists
- Offers support and resources to injured and at-risk workers
- Organizes monthly informal meetings for people with RSIs, facilitated by injured workers

## **Government Services for Injured Workers and Their Providers**

### **Massachusetts Department of Industrial Accidents**

**www.mass.gov/dia**

**Languages:** English

600 Washington Street, Seventh Floor, Boston, MA 02111

Phone: Boston: 617-727-4900 or 800-323-3249

Fall River: 508-676-3406      Lawrence: 978-683-6420

Springfield: 413-784-1133      Worcester: 508-753-2072

E-mail: [InfoDesk@dia.state.ma.us](mailto:InfoDesk@dia.state.ma.us)

The Department of Industrial Accidents (DIA) oversees workers' compensation in Massachusetts. This includes the system that covers medical costs for patients with work-related conditions, as well as the system that pays workers for a portion of their wages lost due to work-related injury or illness.

The DIA's Health Care Services Board reviews and develops medical treatment guidelines for use by health care providers and the insurance industry. The Board also receives, reviews and investigates complaints against health care practitioners providing services to injured workers.

- Provides claim forms, First Report of Injury forms and mandatory posting materials for employers
- Provides information for injured workers, employers, attorneys and insurers
- Distributes employee and employer guides about workers' compensation rights and laws

### **Massachusetts Rehabilitation Commission**

**www.mass.gov/mrc**

**Languages:** English, Portuguese, Spanish

Fort Point Place - Suite 600, 27 Wormwood Street, Boston, MA 02210

Phone: (Voice or TTY) 800-245-6543 or 617-204-3600 Fax: 617-727-1354

The Massachusetts Rehabilitation Commission (MRC) assists individuals with disabilities to live independently and seek employment. MRC is responsible for Vocational Rehabilitation



Services and for eligibility determination for the Supplemental Security Income and Social Security Disability Insurance (SSI/SSDI) federal benefits programs for Massachusetts residents with disabilities. The MRC's Vocational Rehabilitation division assists people in finding or returning to work despite a disabling condition, and offers assistance for injured workers.

## **Government Agencies that Provide Consultation or Information**

### **Agency for Toxic Substances and Disease Registry (ATSDR)**

[www.atsdr.cdc.gov](http://www.atsdr.cdc.gov)

ATSDR produces Toxicological Profiles and other informational materials on hundreds of toxic substances. See the ATSDR website or call 1-888-422-8737.

### **Massachusetts Division of Occupational Safety: Laboratory**

[www.mass.gov/dos/lab](http://www.mass.gov/dos/lab)

1001 Watertown Street, West Newton, MA 02465

Phone: 617-969-7177 Fax: 617-727-4581

The Division of Occupational Safety (DOS) Laboratory is accredited by the American Industrial Hygiene Association for analysis of metals, asbestos, organic solvents, and environmental lead.

- Provides air sample analysis and technical support to engineers and inspectors within the Massachusetts Department of Labor & Workforce Development, unions, local boards of health, and state agencies
- With physician requests, performs OSHA-approved blood lead tests for workers in industry, construction, and deleading for a small fee

### **Massachusetts Division of Occupational Safety: Occupational Hygiene/Indoor Air Quality Program**

[www.mass.gov/dos/iaq](http://www.mass.gov/dos/iaq)

[www.mass.gov/dos/rtk](http://www.mass.gov/dos/rtk)

1001 Watertown Street, West Newton, MA 02465

Phone: 617-969-7177 Fax: 617-727-4581

This Division of Occupational Safety (DOS) program provides technical assistance, training, and fact sheets on topics including indoor air quality, water damaged materials, material safety data sheets, labeling of chemicals, and training about chemicals in the workplace.

### **Massachusetts Division of Occupational Safety: On-Site Consultation Program**

[www.mass.gov/dos/consult](http://www.mass.gov/dos/consult)

1001 Watertown Street, West Newton, MA 02465

Phone: 617-969-7177 Fax: 617-727-4581

The Division of Occupational Safety (DOS) delivers OSHA's On-Site Consultation Service to employers in Massachusetts. The Consultation Service offers free and confidential advice to small and medium-sized businesses in all states across the country, with priority given to high-hazard worksites. Consultation services are totally separate from enforcement and do not result in penalties or citations. The service informs employers about potential hazards at their worksites and methods to improve their occupational safety and health management systems. Participation may qualify employers for a one-year exemption from routine OSHA inspections.

## **National Institute for Occupational Safety and Health (NIOSH)**

[www.cdc.gov/niosh](http://www.cdc.gov/niosh)

NIOSH New England Field Office, P.O. Box 87040, South Dartmouth, MA 02748-0701

Phone: 508-997-6126 Fax: 508-997-6126

NIOSH conducts research and provides technical assistance on occupational health and safety issues. The NIOSH website includes links to information on a variety of topics and to NIOSHTIC-2, a bibliographic database of occupational safety and health publications. NIOSH conducts health hazard evaluations of workplaces if requested by an employee, employee representative, or employer and the following apply:

- Employees have an illness from an unknown cause
- Employees are exposed to an agent or working condition that is not regulated by OSHA
- Employees experience adverse health effects from exposure to a regulated or unregulated agent or working condition, even though the permissible exposure limit is not being exceeded
- Medical or epidemiological investigations are needed to evaluate the hazard
- The incidence of a particular disease or injury is higher than expected in a group of employees
- The exposure is to a new or previously unrecognized hazard
- The hazard seems to result from the combined effects of several agents

## **Occupational Health Surveillance Program**

[www.mass.gov/dph/bhsre/ohsp/ohsp.htm](http://www.mass.gov/dph/bhsre/ohsp/ohsp.htm)

250 Washington Street, Boston, MA 02108

Phone: 617-624-5632 Fax: 617-624-5676

The Occupational Health Surveillance Program (OHSP) at the Massachusetts Department of Public Health conducts surveillance of selected work-related illnesses and injuries, including fatal occupational injuries, occupational lead poisoning, work-related carpal tunnel syndrome, occupational asthma, acute chemical poisonings, and work-related injuries to youth. Data and information on these topics are available on the OHSP website, which also includes reporting forms for clinicians who diagnose reportable conditions. Data are used to target intervention efforts in Massachusetts, and to develop prevention and education programs.

## **Office of Small Business Assistance**

[www.osha.gov/dcsp/osba](http://www.osha.gov/dcsp/osba)

Office of Small Business Assistance, Directorate of Cooperative and State Programs

Occupational Safety and Health Administration

200 Constitution Avenue, NW - Room N-3700, Washington, DC 20210

Phone: 202-693-2213

OSHA's Office of Small Business Assistance provides outreach and compliance assistance to small businesses and works to develop and enhance relations between the agency and small business employers. OSHA offers many services designed to help small businesses and welcomes comments and suggestions from small business owners and their employees. The Office of Small Business Assistance administers OSHA's nationwide On-Site Consultation Program. In Massachusetts, the Consultation Program is delivered by the Massachusetts Division of Occupational Safety (see above).

## **Government Enforcement Agencies: Health and Safety**

### **Massachusetts Division of Occupational Safety: Lead & Asbestos Program**

[www.mass.gov/dos/asbestos](http://www.mass.gov/dos/asbestos)

[www.mass.gov/dos/lead](http://www.mass.gov/dos/lead)

399 Washington Street, Fifth Floor, Boston, MA 02108

Phone: 617-727-7047 or 617-727-1933 or 800-425-0004

Fax: 617-727-7568 or 617-727-6477

This program of the Division of Occupational Safety (DOS) enforces lead and asbestos contractor licensing requirements:

- Maintains the asbestos abatement licensing program
- Protects worker health and the public through implementation of deleading regulations in the lead abatement industry
- Inspects worksites to assess compliance with requirements
- Maintains the occupational lead registry of adults with work-related lead poisoning

### **Massachusetts Division of Occupational Safety: Occupational Hygiene/Indoor Air Quality Program**

[www.mass.gov/dos/iaq](http://www.mass.gov/dos/iaq)

[www.mass.gov/dos/rtk](http://www.mass.gov/dos/rtk)

1001 Watertown Street, West Newton, MA 02465

Phone: 617-969-7177 Fax: 617-727-4581

This Division of Occupational Safety (DOS) program inspects and enforces health and safety standards in workplaces not covered by OSHA, such as county and municipal workplaces. Specifically, it administers the Massachusetts Right-to-Know Law, which guarantees state, county, and municipal workers access to information about the chemicals with which they work.

The DOS also inspects workplaces for hazards not clearly regulated by OSHA, such as poor indoor air quality.

### **Occupational Health and Safety Administration (OSHA)**

[www.osha.gov](http://www.osha.gov)

#### Boston-North

Valley Office Park, 13 Branch Street, Methuen, MA 01844

Phone: 617-565-8110 Fax: 617-565-8115

#### Boston-South

639 Granite Street, Fourth Floor, Braintree, MA 02184

Phone: 617-565-6924 Fax: 617-565-6923

#### Springfield

1441 Main Street, Room 550, Springfield, MA 01103

Phone: 413-785-0123 Fax: 413-785-0136

OSHA sets and enforces health and safety standards, conducts workplace inspections, investigates complaints, and provides information. In Massachusetts, OSHA covers only workplaces in the private sector.

Workers can file complaints with OSHA by phone, fax, or mail. If they request confidentiality, OSHA will not provide their names to the employer. Clinicians can also file complaints on behalf of a patient, although the agency is less likely to investigate a workplace on this basis. For information on the complaint process see [www.osha.gov/as/opa/worker](http://www.osha.gov/as/opa/worker) or call OSHA.

OSHA produces technical documents, factsheets, reports, training programs, videos, and other resources on safety and health listed on its website. The agency also maintains online records of companies that have been inspected, along with any citations or fines. You can find an employer's inspection record at [www.osha.gov/oshstats](http://www.osha.gov/oshstats).

## **Government Enforcement Agencies: Other**

### **Equal Employment Opportunity Commission (EEOC)**

JFK Federal Building, Boston, MA 02203

Phone: 617-565-3200 or 800-699-4000

The EEOC receives and investigates complaints of discrimination, and enforces the Americans with Disabilities Act of 1990. It provides information on sexual harassment, all forms of discrimination, and the federal Equal Employment Opportunities laws. The EEOC offers fee-based training and technical assistance for employers to facilitate compliance with federal anti-discrimination laws.

### **Massachusetts Commission Against Discrimination (MCAD)**

[www.mass.gov/mcad](http://www.mass.gov/mcad)

One Ashburton Place, Room 601, Boston, MA 02108-1518

Phone: 617-727-3990 or TTY 617-727-3990 x588

MCAD enforces anti-discrimination laws and, investigates complaints of discrimination, and handles questions about employment issues involving race, color, sex, national origin or ancestry, creed, age, sexual orientation, and disability.

### **Massachusetts Department of Environmental Protection**

[www.mass.gov/dep](http://www.mass.gov/dep)

One Winter Street, Boston, MA 02108

Phone: 617-292-5500

The Massachusetts Department of Environmental Protection is responsible for ensuring clean air and water, the safe management and disposal of solid and hazardous wastes, the timely cleanup of hazardous waste sites and spills, and the preservation of wetlands and coastal resources.

- Report oil or chemical spills to the 24-hour DEP Emergency Response at (617) 556-1133 or (888) 304-1133
- Report illegal dumping to the Massachusetts Environmental Strike Force at 617-556-1000 or 888-846-4283 (888-VIOLATE)

### **Massachusetts Office of the Attorney General**

[www.ago.state.ma.us](http://www.ago.state.ma.us)

Fair Labor and Business Practices Division, 200 Portland Street, Boston, MA 02114

Phone: 617-727-3465

The Fair Labor and Business Practices Division of the Attorney General's Office investigates and enforces laws pertaining to workplace safety, child labor, nonpayment of wages, minimum wages, overtime, prevailing wage, legitimate use of unemployment benefits, workers' compensation, and insurance systems.

This program

- Offers brochures on workers' rights in multiple languages
- Investigates complaints about non- or underpayment of wages (website has forms)

- Organizes outreach programs, workshops, and seminars for employer groups, labor organizations, and community associations, with particular emphasis on non-English-speaking and immigrant populations

## Medical Organizations

### **Association of Occupational and Environmental Clinics (AOEC)**

**[www.aoec.org](http://www.aoec.org)**

1010 Vermont Avenue, NW #513, Washington, DC 20005

Phone: 202-347-4976 or 888-347-AOEC (-2632) Fax: 202-347-4950

E-mail: [AOEC@AOEC.ORG](mailto:AOEC@AOEC.ORG)

The AOEC is a network of more than 60 clinics committed to improving the practice of occupational and environmental medicine through information sharing and collaborative research. The Association accepts as members only those clinics that provide a multidisciplinary, patient-centered, prevention oriented, public health approach to care. Applicants for membership are also required to fulfill other criteria related to expertise, quality assurance, and patients' rights.

AOEC members develop curriculum materials in occupational and environmental health and provide Education Activities (EA) programs for primary care practitioners and others. The Association has also established a lending library of course outlines, handouts, slides, and videotapes, and provides cases for the Grand Rounds in Environmental Medicine component of the journal *Environmental Health Perspectives*.

### **New England College of Occupational and Environmental Medicine (NECOEM)**

**[www.aoem.org](http://www.aoem.org) and [www.necoem.org](http://www.necoem.org)**

22 Mill Street, Groveland, MA 01834

Phone: 978-373-5597

E-mail: [necoem@aol.com](mailto:necoem@aol.com)

NECOEM has over 200 physician members who specialize in occupational and environmental medicine. It coordinates conferences on topics in the fields of occupational and environmental medicine and provides ongoing medical education and training for its members.

## Occupational and Environmental Health Clinics

- members of the Association of Occupational and Environmental Clinics (AOEC)

Clinic	Network/Locations	Languages	Public Transit	Reimbursement
<p><b>*Occupational Health Program,</b> Boston Medical Center Cheryl S. Barbanel, MD, MBA, MPH</p>	<p><b>Boston HealthNet</b>  Boston Medical Center 732 Harrison Ave., F-5 Boston, MA 02118 Phone: 617-638-8400 Fax: 617-638-8406 <b>Hours:</b> 9:00 am-4:00pm</p>	<p>English Spanish  Interpreter services available for most languages</p>	<p>Orange Line: Mass Ave. station and take Bus #1 to Boston Medical Center</p>	<p>-Workers' Compensation only  Contact: Susan Friedman</p>
<p><b>*Occupational and Environmental Medicine Consultation Clinic,</b> Cambridge Hospital Rose Goldman MD, MPH</p>	<p><b>Cambridge Health Alliance</b>  Cambridge Hospital 1493 Cambridge St. Cambridge, MA 02139 Phone: 617-665-1580 Fax: 617-665-1672 <b>Hours:</b> Thurs 5:00pm-8:30pm</p>	<p>English Greek Haitian Creole Portuguese Spanish  Interpreter services available for most languages</p>	<p>Red Line: Harvard station  #69 Harvard-Lechmere Bus</p>	<p>-Private insurers -Free Care -MassHealth -Self-pay -Workers' Compensation  Contact: Betty Sagree, 617-665-3589 <i>or</i> 617-665-3200</p>
<p><b>Pediatric Environmental Health Center,</b> Children's Hospital Michael Shannon, MD, MPH Alan Woolf, MD, MPH  www.childrenshospital.org/cfapps/CHprogDisplay.cfm</p>	<p>Children's Hospital Fegan Building, 5th Floor 300 Longwood Ave. Boston, MA 02115 Phone: 617-355-8177 Fax: 617-738-0032  **Children exclusively  To speak with a toxicologist prior to referral, please call: Suzanne Giroux 617-355-8177 (daytime) 888-244-5314 (evening)</p>	<p>Cape Verdean Creole English Spanish Russian  Interpreter services available for most languages</p>	<p>Green Line: Longwood Stop on 'E'; Longwood Stop on 'D'  Buses # 8, 47, 60, 65, CT2, CT3</p>	<p>-Private insurers -Free Care -MassHealth -Self-pay</p>
<p><b>*Good Samaritan Occupational Health Services</b> Robert Naparstek, MD</p>	<p>75 Stockwell Drive, Merchants Build Avon, MA 02322 Phone: 508-427-3900 Fax: 508-427-3905 Email: GSOHS99@aol.com  Nicole Gavazzi <b>Hours:</b> Mon-Fri 7:30am-5:00pm</p>	<p>French Haitian Creole Portuguese Spanish  Others available with advance notice</p>	<p>Brockton Commuter Rail Stop and take taxi or Brockton Area Transit (BAT) Bus</p>	<p>-Workers' compensation only (need authorization from company)  * This center provides primarily occupational health services (workplace physicals, respirator clearance, etc.). It does not provide primary care.</p>

Addressing Work-Related Injuries and Illnesses: A Guide for Primary Care Providers in Massachusetts

<p><b>*Occupational &amp; Environmental Health Network (O.E.H.N)</b>          Thomas Winters, MD, FACOEM          Lee Okurowski, MD, MPH, MBA          Sandra Stratford, MD, MSc</p>	<p>70 Parker Hill Avenue, 5<sup>th</sup> Floor          Boston, MA 02120          Phone: 617-754-6780          Fax: 617-754-6465  <b>Hours:</b> Mon-Fri 8:30am to 5:00 pm</p>	<p>English           Others available with advance notice</p>	<p>Orange Line: Forest Hills station and take Bus #39</p>	<p>-Workers' Compensation          -Self Pay           Contact: Vanessa Halpin</p>
<p><b>*Occupational Medicine Center,</b>          New England Baptist Hospital          Thomas Winters, MD, FACOEM</p>	<p>New England Baptist Hospital          125 Parker Hill Ave.          Boston, MA 02120          Phone: 617-754-5620          Fax: 617-754-6453  <b>Hours:</b> Tue 8:00am-4:00pm</p>	<p>English          Portuguese</p>	<p>Orange Line: Forest Hills station and take Bus #39</p>	<p>-Workers' Compensation          -Free Care          -MassHealth          -Self-pay (in advance)          -Some private insurers</p>
<p><b>*Center for Occupational and Environmental Medicine</b>          David Christiani, MD, MPH, MS,          Director</p>	<p>Northeast Specialty Hospital          2001 Washington Street          South Braintree, MA 02184          Phone: 781-952-2400 (for appointments) or          Phone: 781-952-2445          Fax: 781-843-5445   <a href="http://www.commonwealthcommunity.com/coem">www.commonwealthcommunity.com/coem</a></p>	<p>Cantonese          Creole          English          French          Italian           Language line available for other languages</p>	<p>Red Line: Braintree station and take Bus #230</p>	<p>-Private insurers          -MassHealth          -Workers' compensation          -Self-pay (sliding scale) No Free Care           Contact: Karen Cassidy</p>
<p><b>*Occupational Health Center of Chelsea</b>          Dieter Affeln, MD, MPH, Medical Director</p>	<p><b>Health Resources</b>           1000 Broadway          Chelsea, MA 02150          Phone: 617-660-6360          Fax: 617-660-6365</p>	<p>English          Portuguese          Spanish           AT&amp;T language line available for other languages</p>	<p>Blue Line: Maverick station and take Bus #116 or 117</p>	<p>-Workers' compensation          -Self-pay          -No private insurance          -No Free Care          -No MassHealth          Contact: Steve Calvin</p>
<p><b>*Mt. Auburn Occupational Health Services</b>          Reid Boswell, MD, MPH, Medical Director</p>	<p>777 Concord Ave, Suite 301          Cambridge, MA 02138          Phone: 617-354-0546          Fax: 617-868-4494</p>	<p>English           Interpreter services available for most languages</p>	<p>Red Line: Harvard station and take Bus #74 or 78</p>	<p>-Workers' Compensation only           Contact: Judith Singler</p>
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Addressing Work-Related Injuries and Illnesses: A Guide for Primary Care Providers in Massachusetts

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# Out of Harm's Way:

## Preventing Toxic Threats to Child Development

### *Health Care Provider Fact Sheet*

Your patients are exposed regularly to a wide variety of household and environmental chemicals - in the food they eat, the water they drink and the air they breathe. Many of these chemicals, such as lead, mercury, PCBs (polychlorinated biphenyls), dioxin, pesticides, and solvents are known neurotoxicants. Exposures to these chemicals during critical periods of early brain development can have life-long adverse effects and contribute to learning, behavioral and developmental disabilities. Health care providers can help prevent unnecessary risks to child development by offering simple, common sense guidelines for reducing potentially harmful exposures to known and suspected developmental neurotoxicants. This fact sheet provides busy clinicians with essential information on key toxicants and their effects. It also provides suggestions for routine patient advice and a strategy to help patients identify and reduce potentially harmful exposures.

#### Inside:

Taking an Environmental History

*Frequently Asked Questions from Providers*

*Suggested Routine Questions to Ask Patients*

*Sample Advice*

Preventing Harmful Chemical Exposures

Routine Advice for Patients

*Products to Avoid*

*Dietary Advice*

*Habits*

Key Points

## Taking an Environmental History

### Frequently Asked Questions from Providers

**Q: Do I need to be an expert in environmental health to take an environmental history?**

A: No, many of the routine questions and advice regarding the environment and exposures to toxic chemicals are common sense. For example, an introductory question to a pregnant woman about workplace exposures might ask if there are any persistent, strong odors that might indicate chemical use nearby, from a copy machine or a manufacturing operation, for example. If the answer is yes, the provider can suggest ways to further identify the source of the odor, such as inquiring about previous air monitoring tests at the facility. Employees can also request Material Safety Data Sheets (MSDS). These describe the toxic chemicals used in a workplace, and, by law, must be provided to employees upon request. Even if such information is not available, as is often the case, the provider can help the patient strategize about how to avoid the exposure. For example, a woman who works near a copy machine might move her desk to another room or near a window or vent. Inquiring about exposures and exploring ways to reduce them can and should be a patient-sensitive, supportive discussion.

**Q: How much time does an environmental history take?**

A: Most environmental questions can be easily incorporated into a standard history. You don't really need to factor in a lot more time for this.

**Q: What if I can't answer the questions the patient asks?**

A: Again, most routine advice is common sense, such as suggesting a person use personal protective devices (such as mask or gloves) to avoid chemical exposure during hobby work, limit intake of fatty foods (high in PCBs and dioxins), or ensure that children are not exposed to lead paint. In many cases, there is no one "right way" to reduce an exposure, but rather a variety of options from which the patient can choose. Basic provider responses may be drawn from "Creating a Healthy Environment for Your Child's Development." More detailed information is available from the references provided in the accompanying resource list. Occasionally, patients may be identified with unavoidable exposures of concern that warrant further work up and/or referral.

#### Sample Advice

### The Risks of Eating Tuna During Pregnancy

The Environmental Protection Agency, the Food and Drug Administration and the National Academy of Sciences agree that fetal exposures to mercury can cause lasting impairment of language, attention and memory. In order to protect the developing brain of the fetus, pregnant women should be counseled not to eat fish known to be high in mercury such as swordfish, shark, king mackerel, tilefish, fresh tuna, and many freshwater fish (over 40 states have posted freshwater fish advisories). They should also limit consumption of other fish containing lower but significant levels of mercury, such as canned tuna, which should be limited to less than 7oz./week (about 1 small can).

Some women rely on canned tuna as a low-cost, convenient source of high-quality protein. It is therefore important to suggest affordable alternatives, such as beans, lean chicken and turkey, and eggs (removing part/all of the yolk). More expensive high-quality protein sources include fresh fish such as cod, haddock and pollock.

### Suggested Routine Questions to Ask Patients

Clinicians *without expertise* in environmental and occupational health can screen for exposures of concern and provide common sense responses to most identified exposures. Environmental questions are readily incorporated into a standard history. "CH2OP" provides a framework for inquiring about potentially harmful exposures, (Community, Home/Hobbies, Occupational, Personal. For children, school should also be included). The questions below address each of these areas. Providers can select areas of inquiry that are relevant to a particular patient.

- What is your occupation? What are your hobbies? Do you know if you are exposed at work, home or school to any of these substances of concern:
  - glues, strong cleaning/degreasing agents, paint strippers, paint, varnishes, sealants, art materials, gasoline (likely to contain solvents)
  - fumes, vapors, dusts, strong odors (solvents, metals, particulates)
  - pesticides
  - lead, mercury (metals)

*(A patient may need to collect information from an employer about chemicals used at work and report back. Positive responses will require follow-up inquiry about use of personal protective equipment and availability of workplace monitoring results.)*

- What are the occupation and hobbies of your spouse or others in the home? (Toxicants can be brought home on clothing.)
- Dietary questions—What are your sources of protein? How much/what kind of fish do you eat? Do you take vitamins, or herbal supplements? Do you tend to eat foods high in animal fat (fast food, ice cream, cheese, whole milk, fatty meats and/or fish)?
- Do you smoke, or use alcohol or drugs? (Usually covered in the general history.)
- Was your house built before 1978? If so, has it been tested for lead paint? If your home does have lead paint, is it flaking? Do you grow your own vegetables? (Lead uptake from soil is highest for root crops, then stem crops followed by leafy vegetables, which have the lowest uptake.)
- Do you know of any hazardous waste sites, facilities of concern (auto repair shops, dry cleaners) or major industrial emissions in your neighborhood? Are there any chemical odors at home or common in the community?
- What is the source of your drinking water? If it is municipal, do you have a recent water quality report? If it is a private well, has the water been tested?
- What type of personal care/cosmetic products do you or your children use? (some contain lead/mercury/solvents—see next page)
- Do you have a mercury fever thermometer in the house? (If yes, advise the patient to consider exchanging it for a digital one.)

### Key Points

#### Developmental Health Outcomes

- Nearly 12 million children (17%) in the U.S. under age 18 suffer from one or more learning, behavioral or developmental disabilities.
- Neurologists are increasingly concerned that degenerative neurological diseases that develop in later adult life may be associated with much earlier exposure to neurotoxic chemicals. For example, most cases of Parkinson's disease are not explained by genetic factors. Several studies show an association of Parkinson's with pesticide exposure.

# Routine Advice for Patients

## Products to Avoid

### Pesticides

Many pesticides commonly used in the home, garden, and on pets are neurotoxic. Pesticides are also contained in some head lice treatments.

**ADVICE:** Explore non-chemical alternatives to pesticides for home, garden and pets. If pesticide use is absolutely necessary, use the least toxic alternative. Pregnant women and children should leave and not return until treatment is complete and the house well ventilated. Baits and crack and crevice treatment are preferable to liquids, sprays, powders and dusts. Keep all pesticides out of reach of children and pets. Ask your veterinarian for non-pesticide alternatives for treating fleas and ticks on pets. Head lice can be effectively treated with nit combs, and do not require the use of potentially neurotoxic pesticides. For information on how to treat head lice without chemicals, see, for example, <http://www.pesticide.org/factsheets.html#alternatives>.

### Lead

Lead paint is still a threat in older housing, in pipes with lead solder, and in consumer products such as some candle wicks, pottery with lead glaze, some jewelry, and some personal care products such as hair dyes and lipsticks. Lead may be present in garden soil. This can contaminate garden plants, and can also be tracked into the house. **ADVICE:** Lead paint should be removed by trained personnel. When it cannot be removed, surfaces and floors should be wiped regularly with a damp cloth. Wash children's hands regularly to remove lead dust. If possible, cover leaded surfaces with tile, wallpaper or paneling. Avoid the use of products that contain lead. Run tap water for a minute or two in the morning to discharge water that may be contaminated from lead solder. Have your soil tested for lead. Don't grow vegetables in lead contaminated soil. If you do grow vegetables, remove at least the first 6-inches of soil and replace

with uncontaminated soil, or plant in raised beds. Remove shoes before entering the house helps keep outdoor contaminants (lead and pesticides) from entering the home.

### Mercury

In addition to dietary routes, mercury exposures can occur through occupations, hobbies, and consumer products, such as mercury thermometers. When a mercury thermometer breaks, spilled mercury evaporates and is readily inhaled and absorbed. If disposed of into the waste stream, thermometers become a source of environmental mercury, further contributing to fish-mercury contamination. Fluorescent lamps, some types of batteries, and some skin whitening agents also contain mercury. **ADVICE:** Avoid products that contain mercury. Many communities are organizing mercury thermometer exchanges, where old mercury thermometers can be exchanged for new digital ones. Try to recycle button batteries and fluorescent lamps—check with your community hazardous waste collection, community recycling department, or Department of Public Works.

### Solvents

Alcoholic beverages, gasoline, most furniture strippers, glues, adhesives, sealants, paint thinners, and some paint, cleaning solutions and cosmetics contain solvents. Most dry cleaning is done with a toxic solvent (perchloroethylene). **ADVICE:** Forego all alcohol while trying to conceive and throughout pregnancy. Avoid using cleaning and cosmetic products that may contain solvents, such as nail polish, perfumes, scented soaps and lotions. Avoid home renovations during pregnancy. Avoid installing new carpets that may off-gas solvents (check manufacturing specifications). Try to buy clothes that don't need to be dry-cleaned. If you must dry-clean clothes, remove the plastic when you pick them up, transport them in your car trunk, and air them outdoors before storing indoors or wearing.

### Plastics

Some plastics contain chemicals that may be toxic to the developing fetus. The developing reproductive system is particularly vulnerable. Chemicals in plastic containers and wraps can leach into food products. Plastics that end up in the waste stream can contribute to air pollution and ground contamination. **ADVICE:** Food should not be stored or microwaved in plastic containers or wraps. Ceramic, glass or paper products should be substituted whenever possible.

## Dietary Advice

Eating more beans, grains, fruits, vegetables, and low-fat animal products provides high-quality nutrition and reduces body burdens of toxic chemicals. Since many neurotoxic chemicals concentrate in animal fat, and build up in the body over years or even decades, it is best to reduce animal fat intake beginning in early life, (after 2 years of age). To reduce animal fat, eat fewer animal products in general, and/or choose nonfat or low-fat varieties of animal foods such as skimmed milk and cheese, and lean poultry, beef and fish. It is especially helpful to avoid processed foods made from ground meat and animal parts such as sausage, bologna, hot dogs, and canned, ground lunch-meats which are very high in animal fats.

### 1. Mercury / Fish

Fish is the major dietary source of mercury, which is stored in fish muscle. **ADVICE:** Pregnant women, women of reproductive age, and young children should avoid high-mercury fish including swordfish, shark, king mackerel, tilefish, fresh tuna, and fresh water fish in contaminated regions commonly found throughout the US. (see state advisories [www.epa.gov/ost/fish](http://www.epa.gov/ost/fish)). Canned tuna have moderate mercury levels and should be limited to less than 7 oz./week, (about 1 small can). To meet

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## Windows of Vulnerability

- Normal brain development depends on an integrated, carefully timed sequence of events. Even temporary disruption of any stage of this process can cause lifelong disabilities.
- Brain development is particularly susceptible to disruption by even low-level exposures to neurotoxicants during windows of vulnerability, which occur throughout fetal life, infancy, childhood and adolescence.

## Childhood Exposures

- Pound for pound, children often have higher exposures to toxic chemicals than adults because they eat, drink and breathe more per unit of body weight, due to their faster metabolism. This increases exposure to contaminants in air, food and water. They live closer to floor level, where indoor toxicants can concentrate.
- During puberty/adolescence, the brain is still developing. In addition, chemicals that bioaccumulate during this time can

later be passed to the fetus during pregnancy, and to the infant during breast-feeding. Therefore, reducing toxic exposures can benefit both current and future generations.

- A metabolite of one of the most commonly used organophosphate pesticides is present in the urine of over 80% of adults and 90% of children from population samples.
- Over a million children in the U.S. exceed the currently accepted threshold for blood lead level exposure that affects I.Q.

*continued*

## Routine Advice continued

EPA's mercury exposure guidelines, maximum tuna consumption can be calculated by the formula: maximum tuna (in ounces/week)=person's weight/20. For example, a child weighing 40 pounds can consume 2 oz. (about 2 level tablespoons) per week. Low mercury fish, such as cod, haddock and pollock provide healthy alternatives. Some fatty ocean fish also have low mercury levels, but may contain relatively high levels of PCBs. Pending further testing, frequent consumption of high fat fish (salmon, herring, sardines) may not be advisable.

### 2. Dioxin, PCBs

Fatty meats (beef, pork, poultry, fish) and dairy products are responsible for over 95% of human exposure to dioxin and polychlorinated biphenyls (PCBs). **ADVICE:** Eat lower on the food chain (more vegetables, fruits, grains, beans); choose low or non-fat animal products (lean beef, fish, poultry; minimize high fat cheese; drink low-fat or skimmed milk.) See dietary advice above.

### 3. Lead

Bioaccumulated lead stored in bones can remobilize during pregnancy. **ADVICE:** During gestation and lactation, pregnant women and nursing mothers should maintain sufficient calcium intake to reduce mobilization of bone lead.

### 4. Manganese

Infant formulas contain 10-50 times as much manganese as breast milk, with the largest amounts present in soy formulas. Although some dietary manganese is essential, excessive amounts can be harmful. **ADVICE:** Breast-feeding is best.

### 5. Pesticides

Many foods contain pesticide residues. **ADVICE:** Peeling and/or washing can remove some surface residues. Buy organic fruits and vegetables if possible. Eat a diverse array of fruits and vegetables to provide a variety of nutrients and to avoid high exposure to pesticides on any one type of fruit or vegetable.

### 6. Alcohol

**ADVICE:** Avoid alcoholic beverages while trying to conceive, throughout pregnancy and while breast-feeding.

## Habits

### Smoking

**ADVICE:** Pregnant women should not smoke or be near others who are smoking.

### Drugs

**ADVICE:** During pregnancy avoid drug use. Use pharmaceuticals only if advised to do so by a health care professional.

## Resources

**MEDLINE:** Internet accessible at <http://www.nlm.nih.gov>. 888-346-3656.

**REPROTOX:** Provides summaries of reproductive and developmental data to health care providers. <http://www.reprotox.org>.

**Pesticide Hotline:** 800-858-7378 – Internet accessible at <http://www.ace.orst.edu/info/nptn>.

### Pregnancy/Environmental Hotlines:

Organization of Teratology and Information Services - <http://www.otispregnancy.org/> for state hot line numbers.

### Association of Occupational and Environmental Clinics : 202-347-4976

<http://www.aoc.org> – Provides list of clinics and specialists around the country and has an extensive lending library including case studies.

References for Key Points can be found in the report **In Harm's Way: Toxic Threats to Child Development**, GBPSR, May 2000. The report can be downloaded for free or ordered at <http://www.igc.org/psr>.

References for Routine Advice to Patients can be found in **Generations at Risk: Reproductive Health and the Environment**. MIT Press, 1999. Authors Ted Schettler MD MPH, Gina Solomon MD MPH, Maria Valenti and Annette Huddle MES, and "Creating a Healthy Environment for Your Child's Development," GBPSR, 2001 (a companion fact sheet in the In Harm's Way series).

Keypoints, continued

## Parental Exposures

- Lead stored in the bones of pregnant women from earlier exposures may leach into the bloodstream during pregnancy resulting in fetal exposures.
- Although chemical contaminants are contained in breast milk, breast-feeding is still recommended as most beneficial to the developing child.
- About 6 million women in the U.S. in their childbearing years eat sufficient amounts of mercury-contaminated fish to put their children at risk for learning and attention problems.

## Chemicals and Testing

- Most pesticides have not been subjected to neurodevelopmental testing.
- Over a billion pounds of registered pesticides are applied commercially each year.
- About 3000 of a total of 80,000 chemicals in commerce are produced in very high volumes (more than one million pounds per year). Only a small fraction of the 3000 have been adequately tested for their toxicity to humans and far fewer for neurotoxicity. A proposed voluntary testing program would not require that such chemicals be tested for effects on the developing brain and nervous system.

This fact sheet has been written as a companion to the report **In Harm's Way: Toxic Threats to Child Development**, issued by Greater Boston Physicians for Social Responsibility (GBPSR) in May, 2000. The 140-page report can be viewed, downloaded, or ordered at <http://www.igc.org/psr/>. It is part of a series of fact sheets developed by GBPSR in collaboration with the JSI Center for Environmental Health Studies, for the project **In Harm's Way Training Materials for Health Professionals**.

For more information on this and other fact sheets in the series, contact: Greater Boston Physicians for Social Responsibility, 11 Garden St., Cambridge, MA 02138. 617-497-7440. [psrmabo@igc.org](mailto:psrmabo@igc.org).

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