



## OCCUPATIONAL HEALTH RISKS **ELECTRICAL WORKERS**

**A diagnostic toolkit for physicians  
and primary health providers.  
Prevention information for workers.**

**Give pages 3 and 4 of this booklet to your doctor.  
They give your doctor information about the health risks of your job.**

This booklet was prepared by the Ontario construction industry's Occupational Disease and Research Labour-Management Health and Safety Committee with assistance from the Infrastructure Health & Safety Association (IHSA), the Ontario Ministry of Labour (MOL), the Workplace Safety and Insurance Board (WSIB), and labour and employers in Ontario construction.

The information presented here is for general information only. It should not be regarded or relied upon as a definitive guide to health risks in the trade. This information is, to the best of our knowledge, current at the time of publication. For more information, contact the Infrastructure Health & Safety Association.

## Tasks and possible hazards

### All tasks

- ▶ **Hazardous materials from industrial worksites** (refineries, chemical plants, glass plants, factories, cement plants, pulp and paper mills, and power plants)
- ▶ **Hazardous material from soldering, transformers, light fixtures, cutting, threading and installing conduit, and powder-actuated tools**
- ▶ **Awkward postures** while pulling, installing, maintaining, and repairing electrical wiring, equipment and fixtures
- ▶ **Vibration, and hazardous noise** while using power tools, grinders, saws, and mobile equipment
- ▶ **Dust** and **insulation fibres** on construction sites.

### Installing or removing

- ▶ **Asbestos** (could be part of the equipment—especially as insulation—or in building materials)
- ▶ **Polychlorinated biphenyls (PCBs)** from transformers and capacitors, fluorescent lights ballasts, and other old electrical devices
- ▶ **Solvents/epoxy** from adhesives, glues, cleaners, cutting fluids, lubricants
- ▶ **Diisocyanate** from polyurethane sealants
- ▶ **Biological materials (moulds, bacteria, and viruses)** on surfaces and in industrial plants
- ▶ **Exhaust fumes** from gas- or diesel-powered equipment.

### Welding and soldering

- ▶ **Colophon** from soldering
- ▶ **Welding fumes, ultraviolet light, heavy metals, and chlorinated compounds**
- ▶ **Dust** from power tools and equipment and grinding activities.

## How to protect your health

- ▶ Ask your supervisor or employer for safe work **instructions** and training.
- ▶ Consult industrial clients on site-specific health and safety **procedures**.
- ▶ Ask about any hazardous materials or unknown chemicals when **entering** an industrial site for work.
- ▶ Ensure adequate **ventilation**.
- ▶ Wear a proper **respirator** when
  - you suspect asbestos may be a hazard
  - working in dusty atmospheres
  - welding
  - using solvents, adhesives, or other hazardous substances.
  - using metalworking fluids (cutting oils).
- ▶ Wear rubber gloves, coveralls, welding jackets, or use barrier creams to protect the **skin**.
- ▶ Wear **hearing protection** when exposed to loud noise.
- ▶ Consult material safety data sheets (**MSDSs**) for information about hazardous chemicals used at work, and obey workplace health and safety rules.
- ▶ **Never eat, drink, smoke, or chew gum** in areas contaminated with asbestos, lead, or toxic chemicals.
- ▶ **Wash or wipe hands** clean before eating, drinking, and smoking, and always clean up and change out of contaminated **clothing** before going home at the end of the shift.
- ▶ Wash work clothes **separately** from casual and other family members' clothes.
- ▶ **Report** hazards to your employer.

Workers who are without symptoms and who have been exposed to asbestos may participate in a research study at Princess Margaret Hospital by volunteering to be screened for mesothelioma/asbestos.  
Phone: 416-340-5686 Fax: 416-340-4964

**For more information about health and safety in your job, contact your union or**

Infrastructure Health & Safety Association: 1-800-263-5024, [www.ihsa.ca](http://www.ihsa.ca)  
Ontario Ministry of Labour: 1-877-202-0008, [www.labour.gov.on.ca](http://www.labour.gov.on.ca)  
Workplace Safety and Insurance Board: 1-800-387-5540, [www.wsib.on.ca](http://www.wsib.on.ca)

## Occupational diseases and hazardous agents encountered by electrical workers

### Job function

Electrical workers do wiring layouts for new and existing installations. They install, replace, and repair lighting fixtures and electrical control and distribution equipment such as switches, relays, and circuit-breaker panels.

### Asbestos-related Diseases

- ▶ Asbestosis
- ▶ Cancer (lung, mesothelioma, gastrointestinal)—*asbestos*.

### Cancer

- ▶ Lung—*asbestos, diesel exhaust, environmental tobacco smoke, silica, nickel, hexavalent chromium*
- ▶ Gastrointestinal—*asbestos, hexavalent chromium*

Although not conclusive, studies have reported that that PCBs are associated with malignant melanoma, and that electrical workers may be at slightly increased risk of developing these cancers.

- ▶ Nasal—*nickel, hexavalent chromium*
- ▶ Skin—*ultraviolet light*.

Workers exposed to high levels of PCBs have been found to have an increased risk of liver cancer.

### Neurological

- ▶ Central Nervous System (CNS) effects—*solvents, degreasers, thinners, chlorinated solvents, mercury*
- ▶ Hand-arm vibration syndrome—*vibrating tools*.

### Miscellaneous Disorders

- ▶ Gastroenteritis—*bacteria, animal waste*
- ▶ Infertility, male—*chlorinated solvents*
- ▶ Noise-induced hearing loss—*noise, power tools, heavy machinery, grinders, industrial noise*
- ▶ Renal disease—*cadmium, degreasers, solvents*
- ▶ Inhalation of extremely hot air or vaporized metal fumes from an arc flash can cause significant damage to the lungs.

### Respiratory Diseases

- ▶ Bronchitis, chronic—*silica dust, environmental tobacco smoke, welding fumes*
- ▶ Asthma, occupational—*fungi/mould, chromium, epoxies, diisocyanate, colophony*
- ▶ Hypersensitivity pneumonitis (HP) acute/chronic—*fungi/mould, wood dust, diisocyanate (polyurethane foam insulation), metalworking fluids*
- ▶ Polymer fume fever—*PVCs, plastics, teflon*
- ▶ Pulmonary edema—*cadmium, chlorine decomposition*
- ▶ Metal fume fever—*welding fumes*.

### Skin Disorders

- ▶ Dermatitis, allergic/contact—*epoxies, paints, degreasers, glues, lubricants*.
- ▶ Chloracne and rashes—*extremely high levels of PCBs*
- ▶ Contact urticaria—*animal dusts*.

The next page provides important diagnostic criteria for screening, early detection, and diagnosis.

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## Asbestos disease

Asbestos-caused fibrosis of the lungs and pleura may lead to shortness of breath. It usually takes 15 or more years from the onset of exposure for radiographic abnormalities and symptoms to arise. Radiologists should be alerted to the suspected diagnosis. Electricians occupationally exposed to asbestos are at increased risk of cancers of the lungs and pleura. Screening for cancer has not been proven to reduce mortality; however, it can result in early detection.

If there is any suspicion of asbestos-related illness (i.e., not screening scenario), patients may be referred directly to Princess Margaret Hospital's program where immediate assistance, rapid assessment and specialized treatments are available. Phone 1-877-LUNG 911 (5864 911) Fax 416-340-3353. Asbestos-exposed workers should be counseled about smoking cessation. [http://www.wsib.on.ca/files/Content/OccDiseaseAsbestos/Asbestos\\_Related%20Diseases.pdf](http://www.wsib.on.ca/files/Content/OccDiseaseAsbestos/Asbestos_Related%20Diseases.pdf)

## Contact dermatitis

Contact dermatitis is an inflammatory skin reaction to direct contact with noxious agents in the environment. Substances that produce this condition after single or multiple exposures may be either irritant or allergic in nature. Irritant contact dermatitis (ICD) results from contact with external agents that directly damage the epidermis, in contrast to allergic contact dermatitis (ACD) in which the damage occurs through the host's immune response as a result of a delayed type hypersensitivity reaction.

The diagnosis of contact dermatitis should be considered when there is a suspected workplace agent (allergen or irritant). Screening should include determination of the following: (A) Did the skin condition start after the worker started the job? OR Did the skin condition become worse after the worker started the job? AND (B) Are symptoms better on weekends or holidays off work? Referral to a specialist with experience diagnosing and treating occupational contact dermatitis should be considered when any of the following are suspected: all cases of possible ACD; ICD with allergic features; chronic ICD; complicated ICD (e.g., not improving, deteriorating, confounded by another skin disease such as psoriasis).

<http://www.wsib.on.ca/en/community/WSIB/ArticleDetail?vnextoid=ff4de35c819d7210VgnVCM100000449c710aRCRD>

## Hand-arm vibration syndrome (HAVS) and vibration-induced white finger (VWF)

HAVS and VWF are the major health hazards related to the use of vibrating tools. If workers develop symptoms of tingling or numbness, or if their fingers occasionally become white, blue, or painful—especially when cold—they should be examined by a doctor who knows about the diagnosis and treatment of these conditions. Diagnostic tests which can be used include plethysmography, arteriography, skin thermography, and sensory tests such as two-point discrimination depth sense, pinprick touch, and temperature sensation. The Occupational Medicine Clinic at St. Michael's hospital in Toronto has diagnostic facilities.

<http://www.wsib.on.ca/en/community/WSIB/OPMDetail?vnextoid=1486fcea9bfc7210VgnVCM100000449c710aRCRD>

## Neurologic effects

**Acute toxic effect of solvents:** Organic solvents are volatile substances commonly used in the workplace as cleaners and degreasers. The systemic symptoms of acute solvent poisoning resemble those of intoxication from alcoholic beverages.

**Toxic Neuropathy:** Chemicals that can cause toxic polyneuropathy include lead and N-hexane. Most symmetrical, sensorimotor neuropathies caused by exposure to chemicals are indistinguishable from similar effects caused by systemic diseases such as diabetes or B12 deficiency. The diagnosis of toxic polyneuropathy is usually made on the basis of symptoms following exposure to the chemical and the resolution of symptoms months to years after cessation of exposure.

## Noise-induced hearing loss

Noise-induced hearing loss (NIHL), is diagnosed by audiometric testing. With NIHL, there is a characteristic dip (notch) at 4 kHz on the audiogram. This contrasts with presbycusis where there is a continuous dropoff as frequency increases.

<http://www.wsib.on.ca/en/community/WSIB/OPMDetail?vnextoid=9956fcea9bfc7210VgnVCM100000449c710aRCRD>

## Occupational asthma

Sensitizer-induced occupational asthma is caused by an immune response to specific workplace agents such as low-molecular-weight chemicals (such as diisocyanates, colophony [a pine resin product used in soldering], or epoxy compounds). Once a person has been sensitized to one of these materials, even exposure to extremely low quantities will exacerbate the asthma. If this form of occupational asthma is suspected from the patient's history, objective investigation is required to confirm or refute the diagnosis.

Patients with confirmed sensitizer-induced occupational asthma should have no further exposure to the causative agent, since the best outcome is achieved with early diagnosis and complete avoidance of exposure. An objectively confirmed diagnosis is very important. Patients with suspected sensitizer-induced occupational asthma should be referred as soon as possible to a specialist (a respirologist, an allergist, or an occupational physician) with expertise in this area. Investigations are most helpful if they can be performed while the patient is still working in the suspected causative work area; the primary care physician may be able to initiate some of these.

Source: Occupational asthma: An approach to diagnosis and management. Tarlo and Liss. *Canadian Medical Association Journal*. Apr 1, 2003. 168(7):867-71. [http://www.wsib.on.ca/files/Content/Fact%20Sheet\\_English0619A/0619A\\_Asthma\\_and\\_Work.pdf](http://www.wsib.on.ca/files/Content/Fact%20Sheet_English0619A/0619A_Asthma_and_Work.pdf)

**For more info about occupational disease and workplace health and safety,  
contact the Workplace Safety and Insurance Board: 1-877-202-0008**