



OCCUPATIONAL HEALTH RISKS REFRIGERATION 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** (coke ovens, refineries, chemical plants, glass plants, factories, cement plants, pulp and paper mills, power plants)
- ▶ **Awkward postures, vibration, and hazardous noise** when using power tools, grinders, saws, and mobile equipment
- ▶ **Dust and insulation fibres** on construction sites.

Installation, removal, or repair of equipment

- ▶ **Asbestos** (could be part of the equipment—especially as pipe insulation—or in building materials)
- ▶ **Refractory ceramic fibres** (used for high temperature insulation)
- ▶ **Glass and mineral wool**
- ▶ **Hydrochlorofluorocarbon (HCFC) and hydrofluorocarbon (HFC) refrigerants**
- ▶ **Refrigerants** will decompose when exposed to high temperatures. Do not attempt to continue working in these fumes; they can injure you.
- ▶ **Ammonia**
- ▶ **Refrigerants**
- ▶ **Biological materials** on surfaces and in industrial plants
- ▶ **Legionella.**

Welding, torch cutting, soldering, brazing, grinding

- ▶ **Lead**
- ▶ **Welding fumes, ultraviolet (UV) light, heavy metals, and chlorinated compounds.**

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 proper **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 personal protective equipment (PPE), such as a hard hat, safety glasses, reflective vest, and safety boots, where necessary.
- ▶ Wear eye protection when using a hammer to remove or install pins, or when working with solvents/additives, caustics, and acids.
- ▶ Wear fall protection equipment where necessary, including a harness.
- ▶ Wear gloves, coveralls or welding jackets, or use barrier creams to protect the **skin**.
- ▶ 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
Ontario Ministry of Labour: 1-877-202-0008, www.labour.gov.on.ca
Workplace Safety and Insurance Board: 1-800-387-5540, www.wsib.on.ca

Occupational diseases and hazardous agents encountered by refrigeration workers

Job function

Refrigeration and air conditioning mechanics install, maintain, repair, and overhaul residential central air conditioning systems, commercial and industrial refrigeration and air conditioning systems, and combined heating, ventilation and cooling systems.

Asbestos-related Diseases

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

Cancer

- ▶ Lung – *asbestos, diesel exhaust, environmental tobacco smoke, silica*
- ▶ HCFC-123 chronic exposure linked to the risk of liver injury
- ▶ Refractory ceramic fibres (RCFs) – *Results of long-term inhalation experiments in animals have shown that RCFs can produce lung cancer, mesothelioma, and lung fibrosis following long-term inhalation of very high concentrations.*

Miscellaneous Disorders

- ▶ Infertility, male – *lead, chlorinated solvents*
- ▶ Cardiac sensitization – *Inhalation of refrigerant (HCFC and HFC) vapours may produce heartbeat irregularities (cardiac sensitization).*
- ▶ Gastroenteritis – *bacteria, animal waste*
- ▶ Hantavirus, histoplasmosis, leptospirosis – *rodent/bird/bat droppings*
- ▶ Renal disease – *cadmium, lead, degreasers, solvent*
- ▶ Noise-induced hearing loss – *power tools, heavy machinery, grinders, industrial noise.*

Respiratory Diseases

- ▶ Bronchitis, chronic – *silica dust, environmental tobacco smoke*
- ▶ Hypersensitivity pneumonitis (HP) acute/chronic – *fungi/mould*
- ▶ Metal fume fever – *metallic oxide fumes such as zinc, copper or magnesium from welding*
- ▶ Pontiac fever, Legionnaires' disease – *Legionella.*

Neurological

- ▶ Hand-arm vibration syndrome – *vibrating tools*
- ▶ Neuropathy, toxic – *lead*
- ▶ Parkinsonism – *manganese (scientific evidence inconclusive).*

Skin Disorders

- ▶ Dermatitis, allergic/contact – *hexavalent chromium, epoxies, degreasers, glues*
- ▶ Contact urticaria – *animal dusts*
- ▶ In liquid form, refrigerants can freeze skin or eyes on contact, causing frostbite
- ▶ Temporary irritation of skin – *fibre insulation.*

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. 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

Cardiac sensitization

Inhalation of high concentrations of hydrocarbons refrigerants in the presence of high blood levels of the body's adrenaline may result in serious heart irregularities and possible death, an effect known as cardiac sensitization. Because of possible disturbances of cardiac rhythm, catecholamine drugs such as epinephrine should be considered only as a last resort in life-threatening emergencies.

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>

Metal fume fever

Metal Fume Fever. A flu-like illness with a metallic taste in the mouth, throat irritation, and dry cough; Leucocytosis is common; normal chest x-ray. Occurs 3-10 hours after heavy exposure to zinc oxide fume or dust (e.g., after welding or flame cutting of galvanized steel). Resolves spontaneously within 48 hours.

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.

http://www.wsib.on.ca/files/Content/Fact%20Sheet_English0619A/0619A_Asthma_and_Work.pdf

Source: Occupational asthma: An approach to diagnosis and management. Tarlo and Liss. *Canadian Medical Association Journal*. Apr 1, 2003. 168(7);867-71.

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