

New Brunswick has seen a slight increase in occupational respiratory diseases in recent years. This pamphlet outlines the causes and preventive measures workplaces can use to reduce the risk of contracting these diseases.



Occupational respiratory disease is often contracted by inhaling biological and chemical agents. These agents can be particulates (e.g. wood dust, metal fumes, paint mist), gases and vapours, as well as airborne bacteria and molds. Depending on the amount of exposure and the specific chemical and physical characteristics, the contaminants may:

- be immediately exhaled with little or no health effects.
- enter the blood stream, and possibly cause disease elsewhere in the body.
- cause respiratory disease.

Respiratory Diseases

The main occupational respiratory diseases are:

1. Respiratory tract irritation
2. Asthma
3. Chronic obstructive pulmonary disease
4. Infections
5. Hypersensitivity pneumonitis
6. Inhalation fevers
7. Pneumoconiosis
8. Cancer

Respiratory tract irritation

Runny nose and scratchy throat are the most common symptoms of upper respiratory tract irritation. Cough and shortness of breath are common symptoms of lower respiratory tract irritation. Mild exposures are usually self-limiting: people move away from the source of contamination to avoid the discomfort.

More severe exposures may produce non-allergic asthma, scarring of the lung (fibrosis) and respiratory distress syndrome, which could lead to death.

Ammonia, chlorine, sulphur dioxide, nitrogen dioxide and smoke are common respiratory irritants.

Asthma

Asthma is a condition where air passages narrow, and breathing becomes more difficult, with wheezing, chest tightness, and persistent dry cough. In mild asthma, the narrowing is reversible. In severe asthma, the narrowing may be partially reversible.

Hundreds of occupational agents (biological, and chemical) have been associated with asthma. Biological agents include grains, flours, plants, fur, feathers, insects, fungi, drugs, enzymes, and various types of wood. Some examples of chemical agents include pesticides, alcohols, isocyanates such as paints, and metal anhydrides that are found in plastic. Metal agents include chromium, nickel and welding fumes.

Occupational asthma may be allergic or non allergic.

Allergic asthma involves a process called sensitization. After exposures to sensitizers, the body's immune system produces antibodies. Sensitization may occur after only a few exposures or may develop after long-term exposure. When a sensitized person is re-exposed, the antibodies react with the sensitizer and an asthmatic reaction occurs. After sensitization to an agent, the worker's exposure to the agent must be controlled.

Examples of Exposures to allergic asthma-producing agents

| Agent (sensitizer) | Product | Workplace |
|--------------------|------------------------------|---|
| Crab protein | Crab | Processing |
| Latex | Gloves | Health care |
| Isocyanates | Paints, foams and glues | Auto body repair shops |
| Wood dust | Softwood and Hardwood lumber | Sawmills, Planer Mills, furniture and cabinetry |
| Wheat | Flour | Bakeries |
| Chromium | Corrosion-resistant | Plating, Welding |

Non-allergic asthma occurs much less frequently. One form is Reactive Airway Dysfunction Syndrome (RADS), and usually occurs within 24 hours of exposure to a high concentration of a strong respiratory irritant. Another form is a chemical trigger of airway narrowing (e.g., organophosphates).

Examples of Exposures to non-allergic asthma-producing agents

| Agent (irritant) | Workplace |
|------------------|--|
| Chlorine | Water treatment facilities, pulp mills |
| Ammonia | Ice-making plants |
| Organophosphates | Pesticide application |

Chronic obstructive pulmonary disease (COPD)

Chronic obstructive pulmonary (or lung) disease is an irreversible obstruction of airflow in the lungs. Breathlessness, cough, and sputum production are the main symptoms. COPD includes two related conditions: chronic bronchitis and emphysema.

Chronic bronchitis is marked by a persistent cough that produces sputum. Cigarette smoking is the most common cause. Other workplace sources include aldehydes, welding fumes and grain dust.

Emphysema can develop after years of exposure to common agents such as asbestos and silica. Symptoms include cough, fatigue, chest tightness and difficulty breathing.

Hypersensitivity pneumonitis

Hypersensitivity pneumonitis results from an allergic reaction to any of a wide variety of organic dusts, bacteria or fungi. The body becomes sensitized just like allergic asthma. When a sensitized person is re-exposed the person may develop flu-like symptoms such as fever, malaise and shortness of breath.

Examples of Exposures that may cause Hypersensitivity pneumonitis

| Condition | Source |
|------------------------|------------------------------|
| Farmer's lung | Hay, straw |
| Mushroom worker's lung | Compost |
| Animal handler's lung | Animal saliva, dander, urine |

Infections

Biological agents that can enter the body through the lungs and cause respiratory diseases include bacteria, viruses and fungi (spores).

Respiratory diseases caused by bacteria are tuberculosis (TB) and anthrax. Health-care workers and prison guards are examples of occupations at risk of contracting TB. Workers who handle animals may be at risk of contracting anthrax.

The influenza (flu) virus spreads quickly where people work close to each other.

Only a few fungi can cause diseases when inhaled. Diseases from fungi include histoplasmosis, which may result from exposure to bird droppings. Symptoms range from flu-like symptoms to severe lung damage.

Inhalation fevers

Symptoms are similar to the flu. Onset is within 3-10 hours of exposure. Symptoms peak around 18 hours and disappear between 24-28 hours.

This condition is caused by exposure to zinc oxide fumes, organic dusts (grains, fungi, cotton, hemp) and to Teflon fumes during welding and metal refining.

Pneumoconiosis

Pneumoconiosis are diseases in which the lungs become scarred and lose their elasticity. Breathing is more difficult and the heart must work harder. This causes the lungs to become scarred and lose their elasticity. This condition occurs after years of exposure to specific dusts such as asbestos and silica.

Asbestosis and silicosis are the most common kinds of pneumoconiosis.

Asbestos exposures occur most frequently in buildings containing asbestos where demolition and maintenance work takes place.

Silica exposure is common in sandblasting and hard rock mining. This disease is progressive. Once established, it continues to worsen even if exposure ceases.

Cancer

Common workplace agents that may cause lung cancer include: arsenic, asbestos, beryllium, cadmium, chrome VI, coal tar and coal tar pitch, carbon black, products of incomplete combustion, second hand smoke, and quartz. Recently, some hardwood dusts have been identified as lung carcinogens.

Additional hazard

Workers with any lung condition may be more susceptible to the effects of agents that affect respiration.

Furthermore, workers who smoke are at greater risk of lung disease than non-smokers. For example, a smoker who works with asbestos is much more likely to develop asbestos-related diseases than a worker who does not smoke.

Preventive measures

Under the *Occupational Health & Safety Act* employers are responsible to determine the risk of occupational diseases to employees. The first step in determining the risk is to identify chemical substances, biological agents, dusts and irritants in your workplace that can cause respiratory diseases. The next step is to evaluate the level of risk through air sampling. The results of the air sampling must be compared to the allowable exposure limits (Threshold Limit Value "TLV") where one exists. If a problem is identified, the employer is obligated to take measures to minimize the risk.

The most effective way to prevent occupational respiratory diseases is to eliminate the hazard or substitute with a less hazardous material. If this is not possible, the use of engineering controls, such as isolating the worker from the contaminant, process enclosure, and local exhaust ventilation will significantly reduce the risk. Engineering

controls must be designed and maintained to keep worker exposure to the contaminants as low as possible. These contaminants should not exceed occupational exposure limits. Also, administrative controls may be used to limit worker exposure to a contaminant.

Examples include:

- Scheduling maintenance and other high exposure operations for times when few workers are present (such as evenings, weekends).
- Using job-rotation schedules that limit the time an individual worker is exposed to a hazardous substance.
- Using a work-rest schedule that limits the length of time a worker is exposed to a hazard.

Respiratory protective equipment is required if the above methods cannot adequately control worker exposures. Where an employer is required to provide respiratory protective equipment, the employer shall establish a written code of practice covering the proper selection, care, use, maintenance and fitting of the equipment.

Additional measures include instituting a smoking cessation program that would reduce the risk of respiratory diseases caused by smoking as well as minimize the synergistic effects from smoking for workers exposure to contaminants known to cause respiratory diseases.

Maintaining good housekeeping and following safe working procedures will also reduce the risk of exposure.

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OCCUPATIONAL RESPIRATORY DISEASE

