Silicosis

What is silicosis?

Silicosis is an incurable lung disease caused by inhaling dust that contains free crystalline silica. Silicosis is the result of the body's response to the presence of the silica dust in the lung. Silica dust particles are small in size and can reach deep into the lungs (to the alveoli). The dust particles which land on these surfaces are removed by white blood cells known as macrophages. However, particles of free crystalline silica cause the macrophages to break open, which form scar-like patches on the surface of the alveolus. When a large number of these "scars" form, the alveolar surface becomes less elastic. This effect reduces the transfer of gases, which can lead to shortness of breath.

There are three major types of silicosis: acute, chronic, and accelerated.

- Acute Silicosis occurs after a few months or as long as 2 years after exposures to extremely high concentrations. Signs and symptoms of acute silicosis include shortness of breath, weakness, fever, cough, and weight loss. Generally, people with acute silicosis have stable health; however, for some it may lead quickly to death.
- Chronic Silicosis is the most common, and occurs after 15–20 years of moderate to low exposures. Symptoms may or may not be obvious; therefore, workers need to have a chest x-ray to determine if there is lung damage. As the disease progresses, the worker may experience shortness of breath when exercising and have clinical signs of poor oxygen/carbon dioxide exchange. In the later stages, the worker may experience fatigue, extreme shortness of breath, chest pain, or respiratory failure.
- Accelerated Silicosis quicker than chronic silicosis, and can be detected after 5–10 years of high exposures. Symptoms include severe shortness of breath, weakness, and weight loss.

What causes silicosis?

Development of silicosis is influenced by several factors, which include:

- Amount and kind of dust inhaled
- Amount of free crystalline silica in the dust
- Form of the silica
- Relative size of the inhaled particles
- Length of exposure
- Individual resistance
- Smoking habits
- Disease status

- Age of worker

Who is at risk of developing silicosis?

Exposure to crystalline silica may occur in a number of industries and occupations due to its wide and variable use. Regulators estimates that approximately 380,000 Canadians are occupationally exposed to silica; 93% of these workers are male. The largest occupational groups exposed to silica were construction trades labourers, heavy equipment operators, and plasterers and drywallers. However, workers can also be exposed in industries such as mining, agriculture, and various manufacturing industries. Tasks such as abrasive blasting, cutting, sawing, demolishing, drilling, grinding, jackhammering, milling, mixing, polishing, roofing, sanding, and sweeping can also be a risk for workers and to those working around them.

How can we prevent silicosis?

There is no effective treatment for silicosis. As such, the only way to protect workers' health is the control to exposure to silica-containing dusts.

Workplace exposure to crystalline free silica can be controlled by several ways. Workplaces should try to eliminate or reduce exposure by as many means as possible.

- **Eliminating or substituting** hazardous products that contain silica with safer alternatives.
- **Engineering controls** are selected to control emissions at their source. These options may include any or all of the following:
- Process selection / workplace design
- Equipment selection
- Modification of existing equipment or processes
- Ventilation
- **Work practices and procedures** include:
- Safe handling, use, and disposal of materials containing silica
- Housekeeping
- Maintenance
- **Personal hygiene facilities and practices:** Clean washing facilities, and eating facilities should be provided. Note that keeping clothing clean is important as dust can remain on clothing. Exposure can occur when the clothing is moved or removed and the dust enters the air again.
- **Education and training:** Provide workers with appropriate information and instruction on the hazards posed by crystalline free silica, measures needed to reduce or control exposures to acceptable levels, and the need for worker co-operation in seeing that the controls are put into action effectively.
- **Personal Protective Equipment** may include eye and face protection, skin protection, and respiratory protection (which is dependent on air monitoring results).

What should be included in a medical surveillance program?

Medical surveillance programs can be used to track the effects of exposure to silica. It can help protect the health of workers by:

- Identifying workers with conditions that may be aggravated by exposure to silica and establishing baseline measures for determining changes in health.
- Evaluating the effect of silica on workers.
- Providing health education.

Medical surveillance programs can include the following:

- Pre-employment and pre-placement medical examinations.
- Periodic medical examinations.
- Clinical tests (e.g., chest x-rays and pulmonary function tests).

- Health education.
- Record keeping.