Occupational Cancer Research Centre

CAREX CANADA

Diesel Engine Exhaust

Burden of Occupational Cancer Fact Sheet

WHAT IS DIESEL ENGINE EXHAUST?

The combustion of diesel fuel in engines produces diesel engine exhaust, a **complex mixture of gases and particulates**. This mixture can contain other known and suspected carcinogens such as benzene, polycyclic aromatic hydrocarbons (PAHs), metals, and particulate matter.

The composition of the mixture depends on a number of factors including the type of engine (heavy or light duty), the type of fuel and oil, sulphur levels, speed and load of operation, and emission control systems.

The International Agency for Research on Cancer classifies diesel engine exhaust as a **known carcinogen** (IARC 1).

WHAT ARE ITS HEALTH EFFECTS?

- Lung cancer
- Irritation to eyes, throat, and bronchi
- Light-headedness, nausea, cough, and phlegm
- Allergic reactions

THE BURDEN OF LUNG CANCER FROM WORKPLACE EXPOSURE TO DIESEL EXHAUST IN CANADA

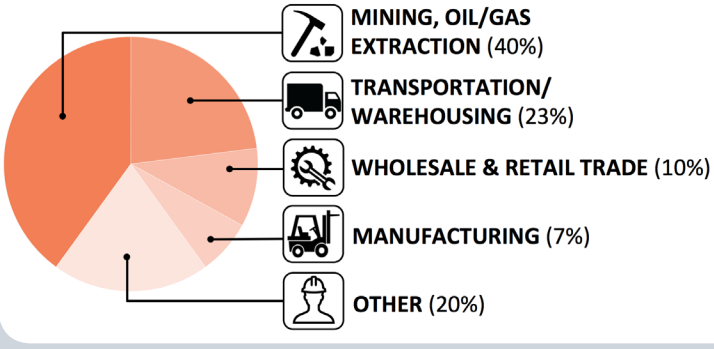
The term 'burden' refers to the human impact (deaths, illness, years of life lost) and the economic costs (health care, productivity) associated with a cause or group of causes of disease.

560
Lung cancers caused by workplace diesel exposure

Results show that approximately **560 lung cancers** and **200 suspected bladder cancers** are attributed to occupational exposure to diesel engine exhaust each year in Canada, based on 2011 cancer statistics. This amounts to **2.4% of lung cancer cases** diagnosed annually.

WHAT WORKERS ARE MOST AFFECTED?

Most occupational lung cancers associated with diesel engine exhaust occur among workers in the **mining and oil and gas extraction sector** (see pie chart on right). These cancers also occur among workers in the transportation and warehousing, wholesale and retail trade, and manufacturing sectors. Some of the other sectors affected include construction, forestry and logging, and public administration.



CAREX CANADA ASSESSMENT OF OCCUPATIONAL EXPOSURE TO DIESEL ENGINE EXHAUST

Inhalation is the most common route of occupational exposure to diesel engine exhaust.

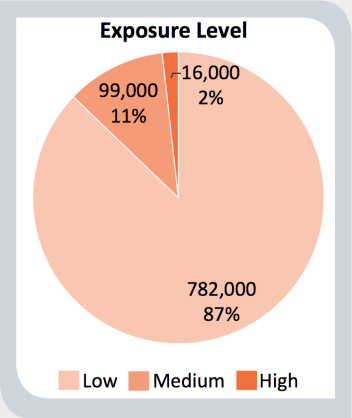
Approximately 897,000 Canadians are exposed to diesel engine exhaust at work.

Industries with the largest number of exposed workers in Canada include:

- **Truck transportation** (206,000 people exposed)
- **Transit and ground passenger transportation** (110,000 exposed)
- **Public administration** (42,000 exposed)

Occupations with the largest number of exposed workers include:

- **Truck drivers** (305,000 exposed)
- **Heavy equipment operators** (83,000 exposed)
- **Transit operators** (79,000 exposed)



Results show the majority of workers exposed to diesel engine exhaust are in the low exposure level category, with a significant number at risk for moderate to high exposure (see pie chart above. To learn more about how these exposure levels are defined, visit the CAREX Canada website.

HOW CAN EXPOSURE BE REDUCED?

There is currently no appropriate occupational exposure limit for diesel engine exhaust, apart from a few provinces where diesel particulate matter is regulated in underground mines. However, diesel-related cancers can be prevented by reducing the number of workers exposed and ensuring that the levels of exposures are as low as reasonably achievable (ALARA). Organizations should evaluate the risk of exposure in the workplace and implement the hierarchy of controls to address the safety needs of workers.

ABOUT THE BURDEN OF OCCUPATIONAL CANCER STUDY

The Burden of Occupational Cancer Study aims to quantify the number of cancers that are caused by exposure to carcinogens in the workplace in order to identify priority areas for prevention. It is a collaboration between researchers at OCRC, CAREX Canada, the Institute for Work & Health, University of British Columbia, Université de Montréal, Institut de recherche Robert-Sauvé en santé et en sécurité du travail, and Imperial College London.

For more information, please visit OCRC at www.occupationalcancer.ca or CAREX Canada at www.carexcanada.ca.

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Canadian Cancer Society / Société canadienne du cancer

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