



Polycyclic Aromatic Hydrocarbons

Burden of Occupational Cancer Fact Sheet



WHAT ARE POLYCYCLIC AROMATIC HYDROCARBONS?

Polycyclic aromatic hydrocarbons (PAHs) are a **group of over 100 chemicals formed during the incomplete burning of coal, oil, gas, wood, garbage, and other organic substances** such as tobacco and charbroiled meat. PAHs occur naturally and generally exist as complex mixtures (i.e. combustion products). They can also be manufactured for a variety of industrial purposes.

Most PAHs are by-products found in many substances including coal tar, coal tar pitch, creosote, bitumen, and asphalt. Coal tar products may be used as fuel, to pave roads and roofs, to manufacture carbon electrodes, and to preserve wood.

The International Agency for Research on Cancer has classified different PAHs as **known, probable, and possible carcinogens** (IARC 1, 2A, 2B), while others lack enough evidence to be classified (IARC 3).

WHAT ARE ITS HEALTH EFFECTS?

- Lung cancer
- Skin cancer
- Bladder cancer (suspected)
- Skin inflammation and lesions
- Reduced lung and immune function

THE BURDEN OF CANCER FROM WORKPLACE EXPOSURE TO PAHS 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.

130
Lung cancers due to workplace PAH exposure

Approximately **130 lung cancers, 50 skin cancers**, and possibly **80 suspected bladder cancers** are due to occupational exposure to PAHs each year in Canada, based on past exposures (1961-2001). This amounts to **0.6% of all lung cancers, 0.1% of all skin cancers, and 1% of all bladder cancers** diagnosed annually.

WHAT IS THE ECONOMIC IMPACT?

Work-related PAH exposure resulted in approximately **\$183 million in costs for newly diagnosed lung, non-melanoma skin, and suspected bladder cancer cases** in 2011.

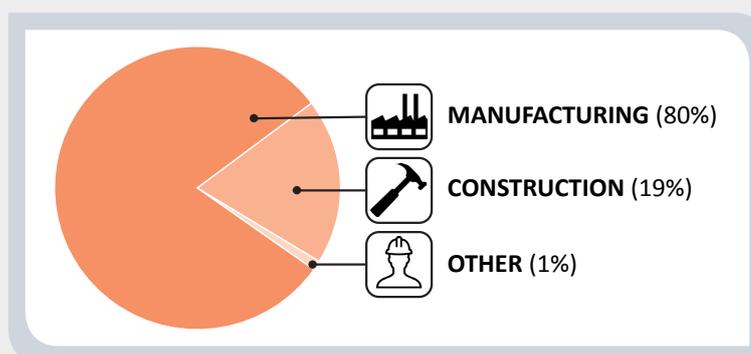
This includes approximately:

- 65% in health-related quality of life losses
- 7% in direct costs including health care, out of pocket expenses, family care giving, and workers’ compensation administration
- 28% in indirect costs including output and productivity losses

\$183 million
Estimated yearly cost of lung cancer, non-melanoma skin cancer, and suspected bladder cancer due to workplace PAH exposure

WHAT WORKERS ARE MOST AFFECTED?

Most PAH-related cancers occur among workers in **manufacturing** and **construction** (see pie chart on right). This includes attributable lung, skin, and suspected bladder cancers.



CAREX CANADA ASSESSMENT OF OCCUPATIONAL EXPOSURE TO PAHS

Inhalation and dermal contact are the most important routes of occupational exposure to PAHs. Approximately 350,000 Canadians are exposed to PAHs at work.

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

- **Food services and drinking places** (102,000 people exposed)
- **Repair and maintenance services** (44,000 exposed)
- **Gasoline stations** (42,000 exposed)

Occupations with the largest number of exposed workers include:

- **Chefs and cooks** (123,000 exposed)
- **Mechanics** (116,000 exposed)
- **Occupations in protective services** (27,000 exposed)

PAHs occur as part of complex mixtures, making it challenging to assess occupational exposure levels.

HOW CAN EXPOSURE BE REDUCED?

Strategies for reducing exposure to PAHs include implementing local exhaust ventilation systems, ensuring that workers are enclosed and separated from contaminated air, and employing wet cleaning methods to reduce contamination on surfaces or equipment. For more details, visit the [OCRC exposure controls webpage](#).

ABOUT THE BURDEN OF OCCUPATIONAL CANCER STUDY

The Burden of Occupational Cancer Study quantified the number of cancers that are caused by exposure to carcinogens in the workplace in order to identify priority areas for prevention. It was a collaboration between researchers at OCRC, CAREX Canada, the Institute for Work & Health (who led the economic analyses), 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.

This fact sheet was produced by CAREX Canada in partnership with OCRC. The Burden of Occupational Cancer Study is led by OCRC and is supported by the Canadian Cancer Society. CAREX Canada is hosted at Simon Fraser University and supported by the Canadian Partnership Against Cancer. Acknowledgments for header photos: Chris RubberDragon, Wyliepoon.