



Occupational cancer risks among male and female workers: enhancing knowledge translation and prevention

World Cancer Day 2025 Webinar

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The Occupational Cancer Research Centre (OCRC)

- The OCRC's mission is to enhance understanding of health effects of hazardous occupational exposures and use this knowledge to support improvements in occupational disease prevention and compensation
 - Increase occupational cancer research capacity in Ontario
 - Initially focused only on cancer, but more recently broadened to occupational disease

Development of the Occupational Disease Surveillance System (ODSS)



- At its conception, no other system in Canada included both work and health information to examine the risks of occupational diseases among workers
- Purpose is to identify at-risk workers and occupational risk factors to inform prevention activities

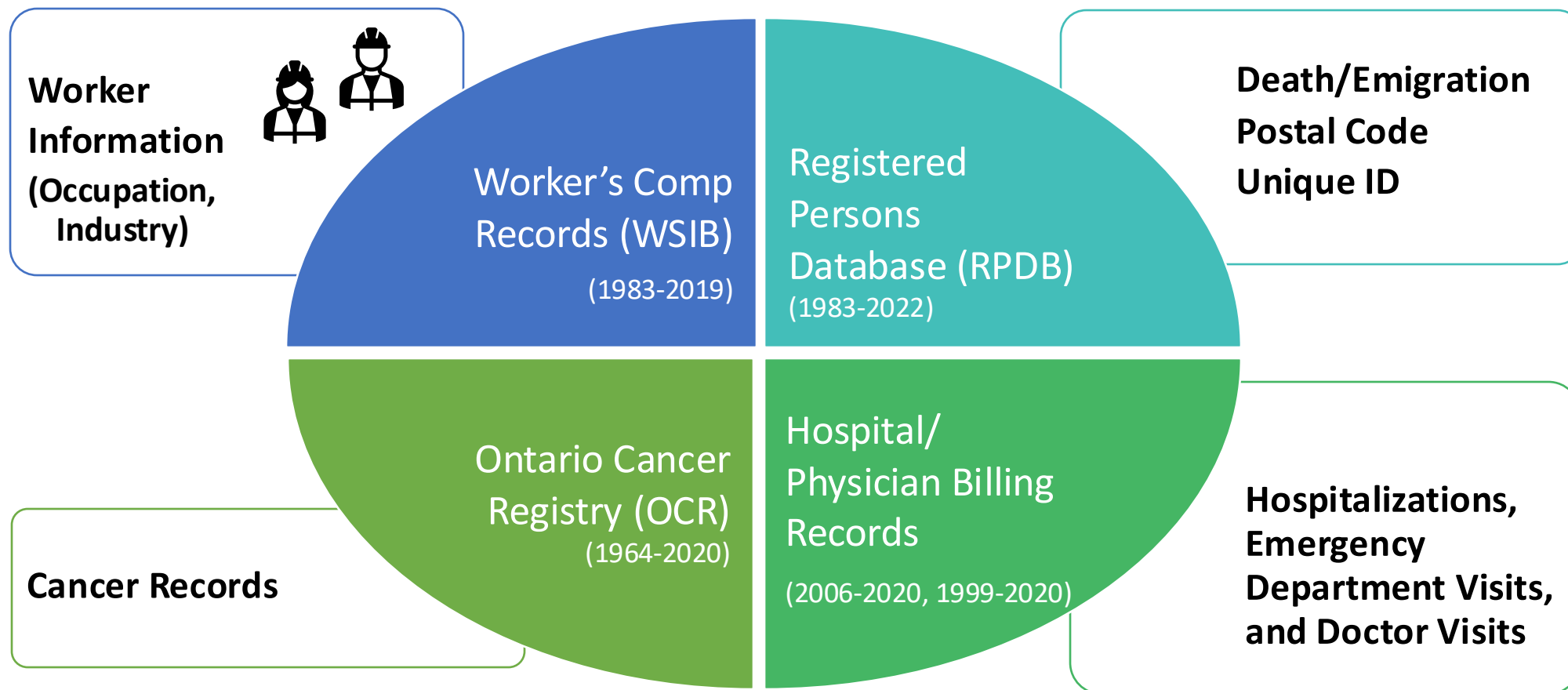


Public Health
Agency of Canada

Agence de la santé
publique du Canada

Occupational Disease Surveillance System

Total cohort of 2.37 million workers



Examples of cancers monitored in the Occupational Disease Surveillance System (ODSS)



Bladder

Breast

Colorectal

Kidney

Laryngeal

Leukemia

Liver

Lung

Mesothelioma

Non-Hodgkin Lymphoma

Prostate

Salivary Gland

Sinonasal

Stomach

Thyroid

Testicular

Ovarian

Uterine

Statistical Analysis

- We use cox proportional hazards models to estimate hazard ratios and 95% confidence intervals by occupation compared with all other workers in the ODSS
 - Coded using the Canadian Classification Dictionary of Occupation (CCDO 1971)
 - Examined at 3 levels: division, major, and minor groups
- All models adjusted for age at start of follow-up and birth year; some models indirectly adjusted for smoking

Leukemia



Sales Occupations in Commodities

Females: 1.17



Mechanics and Repairers except Electrical

Females: 1.20
Males: 1.10



Motor Transport Operating

Females: 1.21
Males: 1.14



Protective Services

Males: 1.17



Metal Machining

Females: 1.17
Males: 1.23

Interpretation: Hazard Ratio (HR) > 1.0 means the risk of cancer is elevated among workers in the specific occupation compared to the rest of workers in the ODSS

	Acute Myeloid	Chronic Myeloid	Acute Lymphocytic	Chronic Lymphocytic
Motor transport operating	↑	↑		↑

Non-Hodgkin's Lymphoma



Elementary & Secondary School Teaching

Females: 1.18



Protective Services

Females: 1.01

Males: 1.19



Mineral Ore Treating

Males: 1.92



Nursing Therapy

Females: 1.09

Males: 1.22



Mining and Quarrying

Males: 1.22



Motor Transport Operating

Females: 1.29

Males: 1.12

Interpretation: Hazard Ratio (HR) > 1.0 means the risk of cancer is elevated among workers in the specific occupation compared to the rest of workers in the ODSS

Melanoma



University Teaching

Females: 1.87



Architects & Engineers

Females: 1.97
Males: 1.62



Other Farming, Horticultural and Animal Husbandry

Males: 1.08



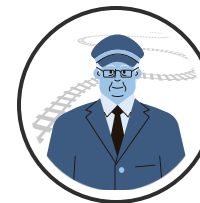
Elementary & Secondary School Teaching

Males: 1.74



Nursing Therapy

Females: 1.37
Males: 1.39



Railway Transport Operating

Males: 1.83



Other Teaching

Females: 1.29
Males: 2.10



Protective Services

Males: 1.94



Motor Transport Operating

Males: 1.28

Interpretation: Hazard Ratio (HR) > 1.0 means the risk of cancer is elevated among workers in the specific occupation compared to the rest of workers in the ODSS

Lung Cancer



Food & Beverage Preparation Services

Females: 1.19



Metal Processing

Females: 1.22

Males: 1.26



Excavating, Grading & Paving

Females: 2.25

Males: 1.36



Printing & Related

Females: 1.51



Metal Machining

Females: 1.56



Other Construction Trades

Females: 1.54

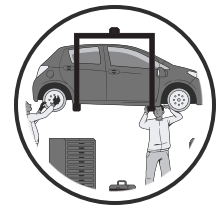
Males: 1.11



Chemicals, Petroleum, Rubber, & Plastic Material Processing

Females: 1.35

Males: 1.01



Mechanics & Repairers, Except Electrical

Females: 1.39

Males: 1.02



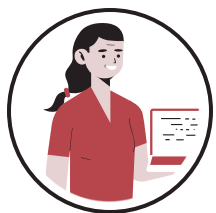
Motor Transport Operating

Females: 1.69

Males: 1.42

Interpretation: Hazard Ratio (HR) > 1.0 means the risk of cancer is elevated among workers in the specific occupation compared to the rest of workers in the ODSS

Female Reproductive Cancers



Managerial, Administrative

Uterine: 1.39

Ovarian: 1.22



Other Teaching

Uterine: 1.70



Metal Machining

Ovarian: 2.24



Elementary & Secondary School Teaching

Uterine: 1.35

Ovarian: 1.09



Wood Machining

Uterine: 1.60

Ovarian: 1.72

Interpretation: Hazard Ratio (HR) > 1.0 means the risk of cancer is elevated among workers in the specific occupation compared to the rest of workers in the ODSS



Knowledge Translation at OCRC

Sharing evidence to drive change

Ontario Occupational Disease Statistics

- Interactive data tool developed in partnership with CCOHS
- Explore ODSS data by sector or exposure



Construction



Food & Beverage



Healthcare



Metal Manufacturing



Mining



Plastic Products



Protective Services

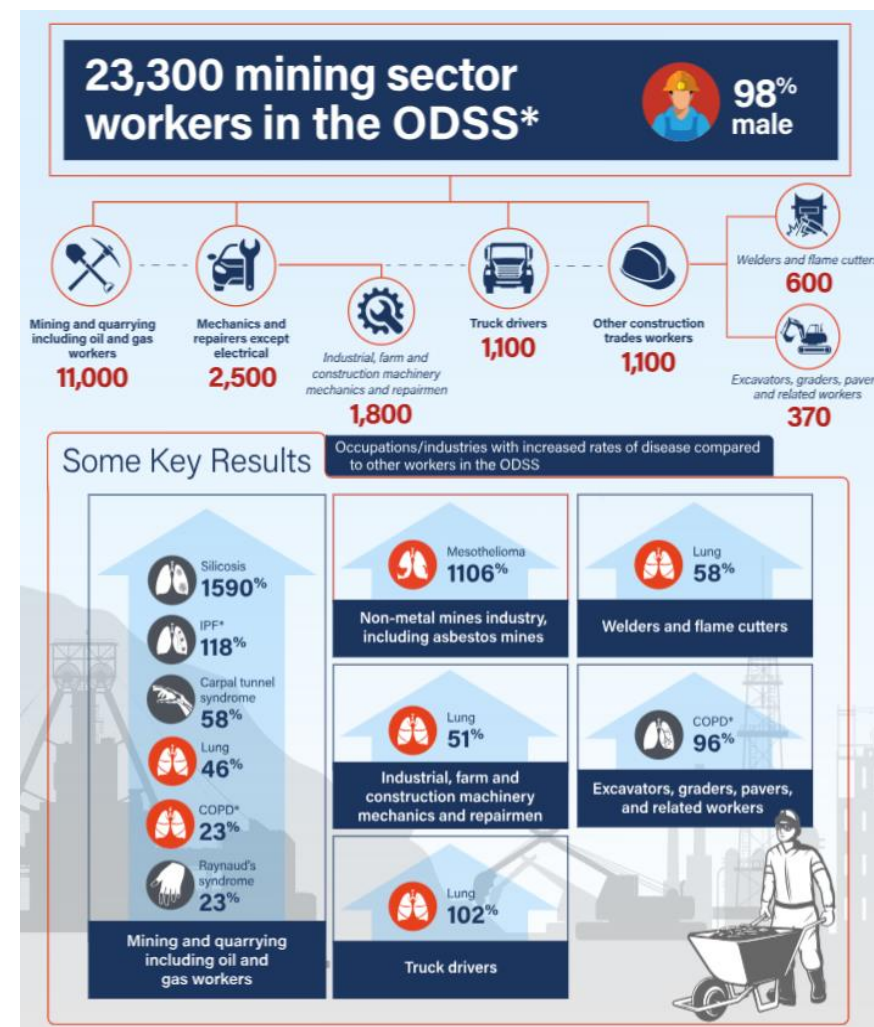


Rubber Products



Transportation

occdiseasestats.ca



OCRC Infographics

RISK OF LEUKEMIA AMONG ONTARIO WORKERS

Key Insights

- Females and males employed in **motor transportation operating** and **metal product fabricating** had a higher risk of leukemia compared to other workers. This is consistent with known cancer-causing agents in these environments.
- Higher risks were also observed among female workers in **sales**, as well as male workers in **mining, metal machining, protective services, and mechanical repairing**.
- Differences in leukemia risk between female and male workers may be due to variations in work-related exposures, such as benzene, formaldehyde, and ionizing radiation, and non-occupational factors.



Select occupations with a higher risk of leukemia in comparison to other occupations



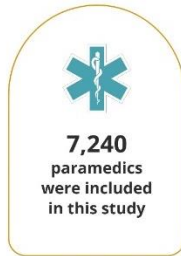
i This fact sheet summarizes the risk of leukemia among workers in the Occupational Disease Surveillance System (ODSS) based on diagnoses identified in the Ontario Cancer Registry (OCR) from 1983 to 2019. Workers in each occupation group are compared to all other workers in the ODSS. This study also explored risks among the four major types of leukemia, including acute myeloid leukemia (AML), chronic myeloid leukemia (CML), acute lymphoblastic leukemia (ALL), and chronic lymphocytic leukemia (CLL). These findings, and additional details related to this study, can be found in our recent publication.

[View the publication: mdpi.com/1660-4601/21/8/981](https://doi.org/10.1660/1660-4601/21/8/981)

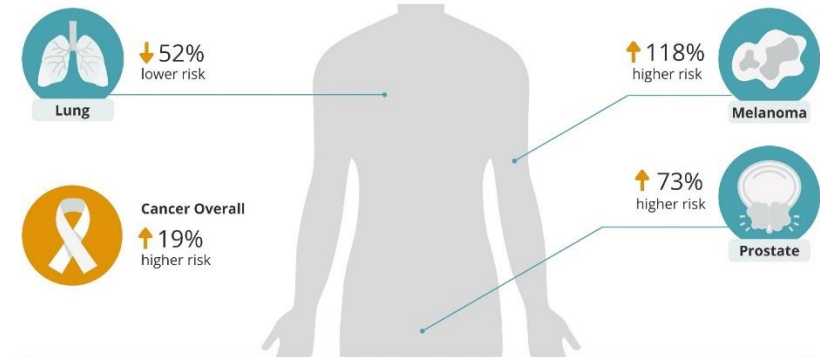
Risk of Cancer Among Ontario Paramedics

Key Insights

- This is the first study to investigate cancer risks among Ontario paramedics. The study found that paramedics had a higher overall risk of cancer compared to other workers.
- Paramedics had a higher risk of melanoma and prostate cancer compared to other workers, as well as a lower risk of lung cancer.
- The cancer risks among paramedics were similar to those of firefighters and police.



Select Cancer Risks Among Ontario Paramedics:



Paramedics may share some common exposures with firefighters and police:



This fact sheet summarizes the cancer risks among Ontario paramedics identified in the Occupational Disease Surveillance System (ODSS) using Workplace Insurance & Safety Board (WSIB) claims data from 1996 to 2019, and cancer diagnoses recorded in the Ontario Cancer Registry (OCR) from 1996 to 2020. Paramedics are compared to all other workers in the ODSS. More information about the ODSS can be found at odsp-ocrc.ca.

[View the publication: https://www.tandfonline.com/doi/full/10.1080/10903127.2023.2283079](https://www.tandfonline.com/doi/full/10.1080/10903127.2023.2283079)

Fact Sheets on Top Disease Risks

- Collaboration with Workplace Safety North
- Top occupational disease risks in:
 - Mining
 - Forestry
 - Pulp & paper



Top Occupational Disease Risks in Mining Industry

Silicosis is top risk



Based on the number of cases among workers in a specific industry group compared to other workers in the Occupational Disease Surveillance System. Sectors include: metal mines, non-metal mines, quarries and sandpits, services incidental to mining.*



1. Silicosis and idiopathic pulmonary fibrosis (lung disease caused by breathing in tiny bits of silica and other very fine dust)



7. Chronic obstructive pulmonary disease (COPD)



2. Carpal tunnel syndrome (numbness and weakness in the hands)



8. Colorectal cancer



3. Laryngeal cancer



9. Oral cancer



4. Lung cancer



10. Raynaud's syndrome (decreased blood flow to hands or feet, often due to vibrating equipment or exposure to cold)




5. Leukemia and non-Hodgkin's lymphoma



11. Acute myocardial infarction (heart attack)



6. Pancreatic cancer

 **Noise-induced hearing loss** (top disease based on approved WSIB claims, but not included in ODSS data)

Ontario's Asbestos Workers Registry (AWR)

- Employers are required to report workers' hours of Type II and Type III work with asbestos-containing materials
- Workers are notified when they reach 2,000 reported hours (~1 year)

Study Aims:

- Evaluate the risk of asbestos-related cancer & respiratory disease among workers in the AWR
- **Assess the utility of the AWR for occupational disease surveillance**

Study led by:
Victoria Arrandale, University of Toronto
Nathan DeBono, OCRC
Paul Demers, OCRC

Improving the AWR as a tool for prevention

Research finding:

- Increased rates of asbestos-related disease seen among workers with as little as 500 cumulative work hours

Opportunity for prevention:

- Consider lowering the 2000-hour threshold for notification

Radon in Ontario Workplaces

- Measured radon levels in small-medium sized Ontario workplaces and public buildings
- Over 450 workplaces in 10 cities across Ontario participated

Onaping Falls Community Centre basement closed due to radon

Radon levels in the west side of the basement at the Onaping Community Centre read at 263 becquerels per cubic metre, which exceeds the maximum Canadian guideline of 200

Sudbury.com Staff
Jul 22, 2023 11:00 AM

Radon issue getting resolved at Onaping Falls Community Centre

The city has an estimated completion date for radon mitigation at the Onaping Falls Community Centre of Jan. 31, which is just in time for the Onaping Falls Winter Carnival



[Tyler Clarke](#)
Jan 3, 2025 5:00 PM



www.occupationalcancer.ca/resources/radon-resources/

PROTECTING THE WORKPLACE FROM RADON

Exposure to radon can cause lung cancer.

All buildings are susceptible to radon.

The only way to know if radon is a problem is to test.

The infographic features a large green 'S' shape on the left containing a question mark icon and a ribbon icon. To the right, there are three circular icons: a radiation symbol, a magnifying glass, and a globe. Below these are three sections: 'What is radon?' with a text box, 'Why is radon a concern?' with a text box, and 'Where is radon found?' with a bulleted list. At the bottom, there is a section 'How to test for radon:' with a text box and a bulleted list. An illustration of a house with radon gas entering from the ground is shown on the left side of the infographic.

What is radon?
Radon is a gas that is...

- radioactive
- invisible
- odorless

Why is radon a concern?
Radon is the leading cause of lung cancer for non-smokers, and exposure to radon greatly increases the risk of lung cancer for smokers.

Where is radon found?

- Naturally found in rocks and soil
- Basement and ground floors are at most risk of radon gas buildup

How to test for radon:
Health Canada recommends placing radon monitors for 90+ days. Radon testing can be done by:

- hiring a certified radon testing professional, or
- buying a do-it-yourself radon test kit at select hardware stores.

The infographic features a large exclamation mark icon on the left. To the right, there is a text box with the Canadian guideline for indoor radon levels. Below this, there is a text box about the OCRC study and a button to view the project summary. At the bottom, there is a section 'Additional measures workplaces can take:' with a bulleted list. The OCRC logo is at the bottom left.

Reduce radon if levels test above 200 Bq/m³

The Canadian guideline for indoor radon levels is **200 Bq/m³**

The OCRC tested Ontario workplaces for radon. For more information about the study and for radon reduction resources, [visit our project summary page:](#)

[VIEW PROJECT SUMMARY](#)

Additional measures workplaces can take:

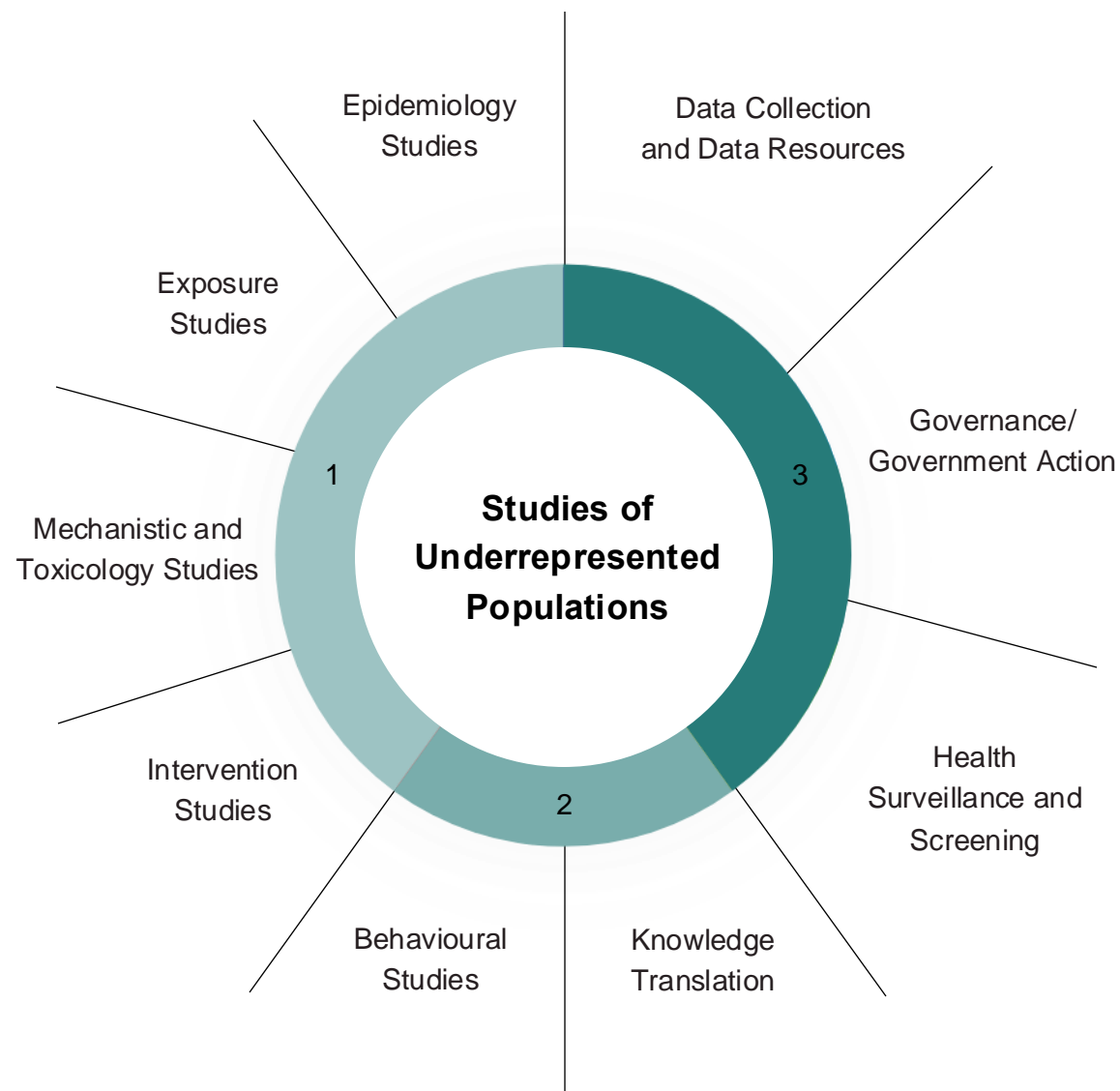
- Increase air circulation (open windows, if able)
- Seal cracks in basements
- Install sump pump covers

Visit the project summary page at <https://www.occupationalcancer.ca/project/radon-in-ontario-workplaces/>. This project was funded by the Ministry of Labour, Immigration, Training and Skills Development (MLTSD). The views expressed in this publication are those of the OCRC and do not necessarily reflect those of the Province.

Firefighter cancer research priorities workshop report

- Workshop of ~70 industry, research, and government stakeholders
- Identified 10 key gaps
- Four Canadian priorities
 - Underrepresented populations
 - Exposure interventions
 - Mechanistic studies on cancer risk
 - Studies measuring exposure and improved exposure assessment for epidemiology studies

www.occupationalcancer.ca/ffcrpw/



OCRC research related to firefighting

- Diesel engine exhaust exposures and controls in Ontario fire halls
- Validation of respirator fit testing for emergency workers during simulated life support tasks
- Assessing new methods for measuring occupational exposure to flame retardants and PFAS*
- Exposure to PFAS and cancer prevalence by occupation and industry

2023-2024 Annual Report

- Highlights progress and accomplishments
 - Research programs
 - Projects
 - KTE initiatives & products
- Theme: Expanding our Scope
- Available at:

www.occupationalcancer.ca/resources/ocrc-annual-report-2023-2024/



Resources

- OCRC Website:
 - www.occupationalcancer.ca
- ODSS:
 - ODSS webpage: www.occupationalcancer.ca/odss/
 - Occupational Disease Statistics: occdiseasestats.ca
 - Opioids and Work: opioidsandwork.ca
- Firefighting:
 - www.occupationalcancer.ca/resources/ff-resources/
 - www.occupationalcancer.ca/area_of_focus/high-risk-groups/firefighters/

Thank you



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