Occupational Lung Cancer: The Invisible Issue in Canadian Workplaces

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Background of Lung Cancer

Lung Cancer is a deadly version of cancer where abnormal cells accumulate in the lungs to form tumours which can cause detrimental health issues ("Lung Cancer," 2023). Within the body, cells commonly grow, divide, and die in a regular manner. After DNA alteration, cells begin multiplying with the damaged DNA code, causing tumours (Mayo Clinic Staff, 2024). Occupational lung cancer is a form of lung cancer caused by prolonged exposure to hazardous materials in the workplace. These hazardous compounds are known as carcinogens, which are substances that have the potential to cause cancer by damaging the DNA in cells. According to the Occupational Disease Surveillance System (ODSS), 15% of lung cancer diagnoses in Canada each year are linked to exposures in the workplace ("Ontario Cancer Facts," 2020). In the Canadian context, the hazards that cause occupational lung cancer include second-hand smoke, radon exposure, asbestos, silica dust, radioactive ores such as uranium, etc. These harmful hazards are found in various sectors including manufacturing, mining, transportation, firefighting, etc. ("Ontario Cancer Facts," 2020). The risk of obtaining occupational lung cancer is determined by the probability of workers being exposed to harmful hazards. According to the British Journal of Cancer, the primary risk factors for occupational lung cancer in Canada include exposure to asbestos, crystalline silica, and polycyclic aromatic hydrocarbons (PAH) (Wild et al., 2012). Data from ODSS displays the elevated risks in specific occupations. The table below shows hazard ratios that compare lung cancer likelihood across various job industries.

Table 1

Lung Cancer Risk by Occupation Group (ODSS Data Adaptation, 1983–2016, n=2.1 million)

Occupation group	**Hazard Ratio**	**95% Lower Confidence Limit**	**95% Upper Confidence Limit**
Mining and quarrying, including oil and gas field	1.46	1.33	1.60
Transport equipment operating	1.39	1.34	1.44
Processing (mineral, metal, chemical)	1.17	1.11	1.24
Fishing, hunting, trapping and related	1.16	0.64	2.10

("Ontario Cancer Facts," 2020)

Table 1 shows that workers in mining, quarrying, and oil/gas fields are 46% more likely to develop lung cancer than workers in other industries ("Ontario Cancer Facts," 2020). This is due

to extended exposure to radioactive toxins such as radon often seen in these surroundings. Similarly, jobs requiring the operation of transportation equipment and the processing of minerals, metals, and chemicals are linked with increased risks. This implies that exposure to transport and processing materials play a role in the development of occupational lung cancer.

The trend in the data shows that exposure to hazardous substances is the key contributor to developing occupational lung cancer. In occupational lung cancer, the primary mechanism through which harmful substances enter the lungs is inhalation (Shankar et al., 2019). These carcinogens become embedded in lung tissues, causing damage and inflammation.

Short and Long-Term Health Consequences for Workers

Occupational lung cancer has serious short and long-term health consequences for workers, commonly leading to chronic sickness, disability and decreased quality of life (Anttila et al., 2022, p. 543). Short-term consequences include anxiety, depression, and fatigue primarily during the early treatment stages (Anttila et al., 2022, p. 543). Long-term health consequences include hearing loss, neuropathy, paralysis, breathing problems, muscle pain, organ failure, etc. (Anttila et al., 2022, p. 543) (Yang, 2009). By acknowledging the long-term effects, workplaces can implement better support systems, reduce exposure, and increase life expectancy.

Prevention Methods

Canada has set up several workplace regulations and preventive measures to limit the risk of occupational lung cancer, however, the enforcement of regulations can vary depending on the job type. It is important to establish strict occupational lung cancer prevention strategies and regulations to help minimize exposure to harmful carcinogens. Firstly, strengthening occupational exposure limits across Canada's regulation system will help protect workers across all industries ("OCRC Report," 2019). Secondly, creating data sheets to track workplace hazards and exposure to occupational carcinogens can greatly reduce lung cancer cases. These sheets provide better safety plans by helping discover patterns and dangers linked to specific hazards. This proactive tracking can lead to more targeted preventative strategies, which will help reduce future incidences of occupational lung cancer ("OCRC Report," 2019). Lastly, occupational lung cancer can be prevented by eliminating the use of carcinogenic substances or finding safer alternatives to reduce harmful exposure in the workplace ("OCRC Report," 2019).

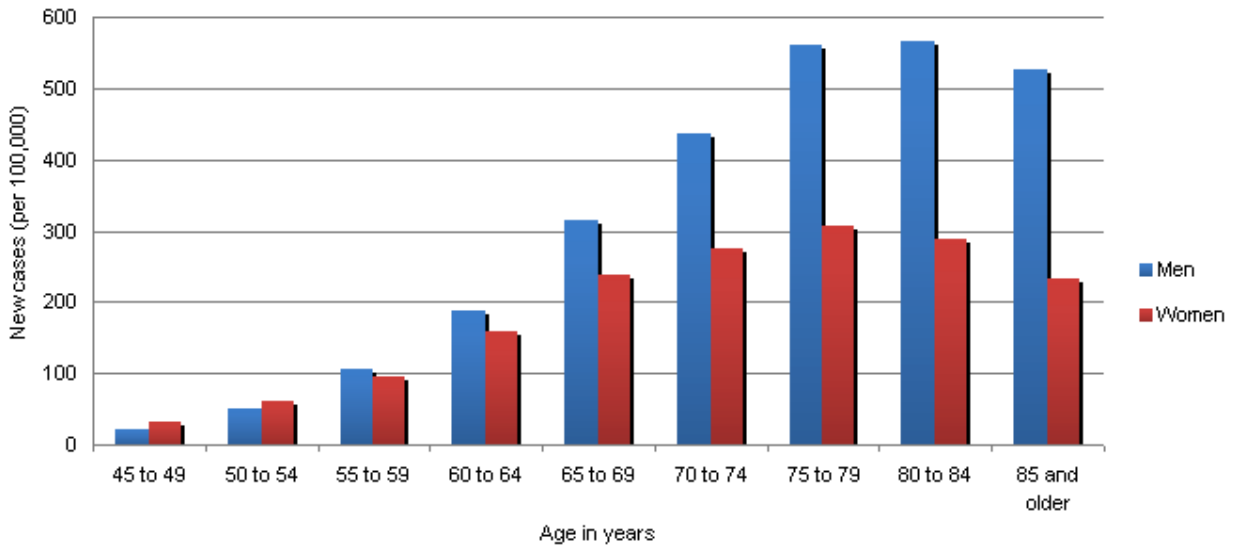
Relevance/Significance to Canadian Health

In Canada, occupational lung cancer is a significant public health concern that affects many workers. In Canada, there are roughly 10,000 workers who are diagnosed with lung cancer annually ("New Canadian Cancer Society," 2024). Treating lung cancer, along with lost work time and the emotional impact on families, creates a large social and economic burden. Canada's long wait times in hospitals and clinics can discourage people with lung cancer from seeking early treatment. This can lead to serious long-term health issues as damaged cells continue to build up in the body. Furthermore, Canadian workers may face a variety of financial challenges, including loss of income due to time off work and costly medical treatments. These financial obligations can add enormous stress to employees and their families, especially when dealing with chronic illnesses. There are notable differences in occupational lung cancer rates between

men and women in Canada. In men, 25% of lung cancer cases are linked to workplace exposure, whereas only 5% of lung cancer cases in women are job-related ("Canadian Cancer Statistics," 2020).

Figure 1

Lung Cancer Rates by Age and Sex, Canada (2007) (Reprint)



Note. **Figure 1** shows lung cancer rates by age and sex in Canada in 2007, displaying the number of new cases per 100,000 people.

("Chart 3," 2018)

Figure 1 displays the difference between lung cancer rates in age and sex. Men are visibly more likely to obtain lung cancer and occupational lung cancer in Canada. One reason this difference occurs is because men in Canada are more likely to work in industries with high exposure to carcinogens compared to women. This increases their risk of workplace-related lung cancer. As an individual gets older, they are more prone to occupational lung cancer ("Risk factors for lung cancer," 2020). As people age, their immune system becomes weaker, making it harder for the body to repair damaged cells. This explains the increase in new cases as age increases.

Conclusion

In conclusion, occupational lung cancer presents a serious threat to workers in Canada. Prevention strategies like stricter regulations and tracking systems are key, given the high risks associated with hazardous exposures in sectors such as mining and construction. Addressing these risks early through workplace protections, alternative materials, and better support systems can help reduce the burden of the disease. By improving prevention and awareness, Canada can protect its workforce and alleviate the long-term impacts of occupational lung cancer.

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