

Causal Association in Developing Breast Cancer Among Female Firefighters

A Rapid Systematic Review

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About this report

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About the Evidence-Based Practice Group

The Evidence-Based Practice Group was established to address the many medical and policy issues that WorkSafeBC officers deal with on a regular basis. Members apply established techniques of critical appraisal and evidence-based review of topics solicited from both WorkSafeBC staff and other interested parties such as surgeons, medical specialists, and rehabilitation providers.

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Objectives

- To determine whether there is any evidence to support the (causal) association in the development of breast cancer among female firefighters.

Methods

- A comprehensive and systematic literature search was conducted on March 11, 2024.
- The search was done on commercial medical literature databases as well as on non-commercial occupational health database. The commercial medical literature databases, BIOSIS Previews (1969 to 2008), Embase (1974 to 2024 Week 10), Medline and Epub Ahead of Print, Medline In-Process, In-Data-Review & Other Non-Indexed Citations, Medline Daily and Medline (1946 to March 08, 2024), Joanna Briggs Institute Evidence-Based Practice Database (Current to March 06, 2024), Cochrane Clinical Answers (February 2024), that are available through Ovid platform. While the non-commercial database we searched was NIOSHTIC-2 (<https://www2a.cdc.gov/nioshtic-2/default.asp>). NIOSHTIC-2 is a searchable bibliographic database of occupational safety and health publications, documents, grant reports, and other communication products supported in whole or in part by the US NIOSH.
- Combination of keywords were employed in this search. These keywords included:
 1. ((female **OR** woman **OR** women) **AND** ((fire fighter*) **OR** firefighter* **OR** fire-fighter*))
 2. (breast cancer) **OR** (breast neoplasm) **OR** (breast carcinoma)
 3. #1 **AND** #2
- No limitation, such as on the date or language of publication was implemented in any of these searches.
- Manual search, on the references of the articles that were retrieved in full, was also conducted.

Results

- Search results:
 - Fifteen⁽¹⁻¹⁵⁾ published studies were identified from Ovid platform search while the search on NIOSHTIC-2 database did not identify any study.
 - Upon examination on the titles and abstracts of these 15⁽¹⁻¹⁵⁾ studies, five^(6,7,10,13,14) studies were thought to be relevant and were retrieved in full for further appraisal. Of these five^(6,7,10,13,14) studies that were retrieved in full, only the study by Sritharan et al⁽¹³⁾ reporting on the cancer risk among firefighters and police in Ontario provided relevant information to the objective of this systematic review. This paper by Sritharan et al⁽¹³⁾ is summarized below and the other four^(6,7,10,14) studies will not be discussed further.
 - No further relevant study was identified from manual searches.
- In their study, Sritharan et al⁽¹³⁾ employed administrative databases, including Occupational Disease Surveillance System (ODSS) (to identify workers employed as firefighters or police in Ontario), workers' compensation (WSIB) claims data (to identify workers with identified lost-time claims) and the Ontario Cancer Registry database (1983–2020) (to identify those with cancers). Overall, the authors identified 13,642 firefighters and 22,595 police in the cohort. With regard to female breast cancer data, by employing Cox proportional hazard regression models (adjusted for age at start of follow-up, birth year and sex), the authors found that compared to all other workers in the ODSS cohort (1983-2020), the hazard ratio (HR) of female breast cancer among firefighters was 0.97 (95% CI: 0.46-2.03) with 7 cases

identified in the cohort (the corresponding number among police was HR:1.26 (95% CI:1.01-1.57) with a number of identified female breast cancer cases = 80). A different Cox regression model, constructed by excluding non-firefighters or police workers, adjusted for age at the start of follow-up, birth year and sex, showed that compared to police, female firefighters had HR=0.78 (95% CI:0.36-1.71) of having diagnosed with breast cancer compared to police. It should be noted that this study employed administrative databases of which, although case ascertainment may be completely reported, information on potential confounders (on the risk factors of breast cancer, such as number of parity, contraceptive used, smoking history, etc.) may be lacking (as it may be shown by the Cox regression models presented). Hence, the potential role of confounders in affecting the observed outcomes, may not be investigated properly. Further, numerous statistical tests were reported in this study.

Summary

- At present, there is some evidence, although statistically not significant, that being a female firefighters may have a protective effect of diagnosed with breast cancer compared to police or non-firefighters. However, this result needs to be interpreted with high caution due to potential effect of confounding and chance.

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Appendix 1

WorkSafeBC — Evidence-Based Practice Group levels of evidence (adapted from 1-6)

1	Experimental, randomized controlled trial (RCT), systematic review RCTs with or without meta-analysis.
2	Evidence from controlled trials without randomization (quasi-experimental studies) or systematic reviews of observational studies.
3	Evidence from cohort or case-control analytic studies, preferably from more than 1 centre or research group.
4	Evidence from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled experiments.
5	Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees based on scientific evidence.

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