Breast cancer risk in relation to occupations with exposure to carcinogens and endocrine disruptors: a Canadian case–control study

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Abstract

Background: Endocrine disrupting chemicals and carcinogens, some of which may not yet have been classified as such, are present in many occupational environments and could increase breast cancer risk. Prior research has identified associations with breast cancer and work in agricultural and industrial settings. The purpose of this study was to further characterize possible links between breast cancer risk and occupation, particularly in farming and manufacturing, as well as to examine the impacts of early agricultural exposures, and exposure effects that are specific to the endocrine receptor status of tumours.

Methods: 1005 breast cancer cases referred by a regional cancer center and 1146 randomly-selected community controls provided detailed data including occupational and reproductive histories. All reported jobs were industry- and occupation-coded for the construction of cumulative exposure metrics representing likely exposure to carcinogens and endocrine disruptors. In a frequency-matched case–control design, exposure effects were estimated using conditional logistic regression.

Results: Across all sectors, women in jobs with potentially high exposures to carcinogens and endocrine disruptors had elevated breast cancer risk (OR = 1.42; 95% CI, 1.18-1.73, for 10 years exposure duration). Specific sectors with elevated breast cancer risk included mining (OR = 1.86; 95% CI, 1.32-2.61) and manufacturing (OR = 1.98; 95% CI, 1.39-2.82).
FUNDERS

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PARTNERS

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- University of Windsor
- Windsor Regional Cancer Centre
- Occupational Health Clinics for Ontario Workers
- Hospice of Windsor
Essex & Kent Counties

- Manufacturing
- Agriculture
STATE OF THE EVIDENCE:
THE CONNECTION BETWEEN BREAST CANCER AND THE ENVIRONMENT
by Janet Gray, Ph.D.

FROM SCIENCE TO ACTION
by Janet Nudelman, M.A., and Connie Engel, Ph.D.
Gaps in Breast Cancer Research

- Occupation/Environment
- Endocrine Disrupting Chemicals
- Mixtures
- Cumulative effects
- Periods of vulnerability
Occupational Histories of Cancer Patients in a Canadian Cancer Treatment Center and the Generated Hypothesis

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Occupational exposures increase cancer risk in the Windsor Regional Cancer Centre in Windsor, Ontario, Canada, the first Canadian cancer treatment center to collect occupational histories of its patients, which were recorded on a computer-based questionnaire. Breast cancer represented the largest respondent group. The lifetime occupational histories of 299 women with newly diagnosed breast cancers were compared with those of 232 healthy controls. Odds ratios (ORs) were calculated using logistic regression, adjusting for age, social class, and education.

The OR for women ≤ 55 years of age who had ever farmed, compared with women of the same age with other cancers, was 9.05 (95% CI: 2.68-29.8). The risk for those who had farmed before the age of 18 was 15.5 (95% CI: 5.0-49.5). Women who had worked in agriculture had twice the risk of women who worked in the forest or trees (OR = 2.80, 95% CI: 1.64-4.76).

**ABSTRACT:** A local collaborative process was launched in Windsor, Ontario, Canada to explore the role of occupation as a risk factor for cancer. An initial hypothesis-generating study found an increased risk for breast cancer among women aged 55 years or younger who had ever worked in farming. On the basis of this result, a 2-year case-control study was undertaken to evaluate the lifetime occupational histories of women with breast cancer. The results indicate that women with breast cancer were nearly three times more likely to have worked in agriculture when compared to the controls (OR = 2.80, 95% CI: 1.6-4.8). The risk for those who...
Current Study

- 1,006 cases
- 1,146 controls
Questionnaire

Non-Occupational Factors

- Reproductive factors
- Income
- Smoking
- Family history
- Etc.

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Questionnaire

Occupational Factors

- All jobs
- Industry
- Occupation
- Exposure
- Vulnerability factors
Exposure Assessment

- Low
- Moderate
- High
Non-Occupational Findings

- High postmenopausal BMI
- Less education and income
- Number of pregnancies
- Duration of child-bearing years
- Smoking
Occupational Findings

- High Exposed Any Job: 1.42
- Farming: 1.36
- Bars/Gambling: 2.28
- Metal Industries: 1.73
- Food Canning: 2.35
- Auto Plastics: 2.68
... Premenopausal

- Auto Plastics: 4.76
- Food Canning: 5.7
Hormone Receptor

**ER+/PR+**
- farming (1.32)
- metals (2.03)
- bars/gambling (3.87)
- auto plastics (3.63)

**ER+ /PR-**
- food canning (4.01)

**ER-**
- farming (1.71)
- food canning (3.19)
Farming Exposures (1.36)

- Pesticides
- Fungicides
- Fertilizers
- Diesel exhaust
- Other agricultural chemicals?
Bars/Gambling Exposures (2.28)

- Second-hand tobacco smoke
- Night work
- Other?
Metal Work Exposures (1.73)

- Metals
- Solvents
- Metalworking fluids
- Smoke/exhaust/PAHs
- Other chemicals
Food Canning Exposures (2.35)

- Plastic can linings
- Pesticides
- Other?
Automotive Plastics Exposures (2.68)

- Plastic resins
- Additives
- Flame retardants
- Solvents/glues/paints
- Other chemicals
“Chemical Exposures of Women Workers in the Plastics Industry With Particular Reference to Breast Cancer and Reproductive Hazards,” DeMatteo, et al., 2012

http://baywood.metapress.com/link.asp?id=k01404273056
What Are The Implications?

- Occupational exposures
- Regulatory change
- Workplace compensation
- More research
- PREVENTIVE ACTION
http://www.nnewwh.org/overview.php?section=4