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Cancer risks in a population-based study of 70,570 agricultural workers: results from the Canadian census health and Environment cohort (CanCHEC)

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Abstract

Background: Agricultural workers may be exposed to potential carcinogens including pesticides, sensitizing agents and solar radiation. Previous studies indicate increased risks of hematopoietic cancers and decreased risks at other sites, possibly due to differences in lifestyle or risk behaviours. We present findings from CanCHEC (Canadian Census Health and Environment Cohort), the largest national population-based cohort of agricultural workers.

Methods: Statistics Canada created the cohort using deterministic and probabilistic linkage of the 1991 Canadian Long Form Census to National Cancer Registry records for 1992-2010. Self-reported occupations were coded using the Standard Occupational Classification (1991) system. Analyses were restricted to employed persons aged 25-74 years at baseline (N = 2,051,315), with follow-up until December 31, 2010. Hazard ratios (HR) and 95% confidence intervals (CI) were modeled using Cox proportional hazards for all workers in agricultural occupations (n = 70,570; 70.8% male), stratified by sex, and adjusted for age at cohort entry, province of residence, and highest level of education.

Results: A total of 9515 incident cancer cases (7295 in males) occurred in agricultural workers. Among men, increased risks were observed for non-Hodgkin lymphoma (HR = 1.10, 95% CI = 1.00-1.21), prostate (HR = 1.11, 95% CI = 1.06-1.16), melanoma (HR = 1.15, 95% CI = 1.02-1.31), and lip cancer (HR = 2.14, 95% CI = 1.70-2.70). Decreased risks in males were observed for lung, larynx, and liver cancers. Among female agricultural workers there was an increased risk of pancreatic cancer (HR = 1.36, 95% CI = 1.07-1.72). Increased risks of melanoma (HR = 1.79, 95% CI = 1.17-2.73), leukemia (HR = 2.01, 95% CI = 1.24-3.25) and multiple myeloma (HR = 2.25, 95% CI = 1.16-4.37) were observed in a subset of female crop farmers.

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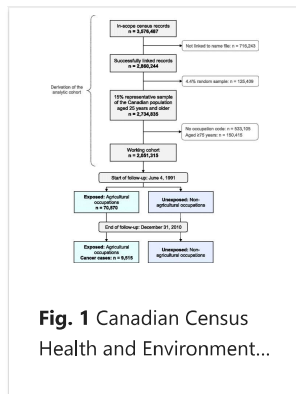
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Conclusions: Exposure to pesticides may have contributed to increased risks of hematopoietic cancers, while increased risks of lip cancer and melanoma may be attributed to sun exposure. The array of decreased risks suggests reduced smoking and alcohol consumption in this occupational group compared to the general population.

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