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Pesticide use and risk of non-Hodgkin lymphoid malignancies in agricultural cohorts from France, Norway and the USA: a pooled analysis from the AGRICOH consortium

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Abstract

Background: Pesticides are commonly used in agriculture, and previous studies endorsed the need to further investigate the possible association between their use and risk of lymphoid malignancies in agricultural workers.

Methods: We investigated the relationship of ever use of 14 selected pesticide chemical groups and 33 individual active chemical ingredients with non-Hodgkin lymphoid malignancies (NHL) overall or major subtypes, in a pooled analysis of three large agricultural worker cohorts. Pesticide use was derived from self-reported history of crops cultivated combined with crop-exposure matrices (France and Norway) or self-reported lifetime use of active ingredients (USA). Cox regression models were used to estimate cohort-specific hazard ratios (HRs) and 95% confidence intervals (CIs), which were combined using random effects meta-analysis to calculate meta-HRs.

Results: During follow-up, 2430 NHL cases were diagnosed in 316 270 farmers accruing 3 574 815 person-years under risk. Most meta-HRs suggested no association. Moderately elevated meta-HRs were seen for: NHL and ever use of terbufos (meta-HR = 1.18, 95% CI: 1.00-1.39); chronic lymphocytic leukaemia/small lymphocytic lymphoma and deltamethrin (1.48, 1.06-2.07); and diffuse large B-cell lymphoma and glyphosate (1.36, 1.00-1.85); as well as inverse associations of NHL with the broader groups of organochlorine insecticides (0.86, 0.74-0.99) and phenoxy herbicides (0.81, 0.67-0.98), but not with active ingredients within these groups, after adjusting for exposure to other pesticides.

Conclusions: Associations of pesticides with NHL appear to be subtype- and chemical-specific. Non-differential exposure misclassification was an important limitation, showing the need for refinement of exposure estimates and exposure-response analyses.

Keywords: AGRICOH; NHL; Pesticides; cohort; farmers; meta-analysis.

Figures

Figure 1. Cohort-specific exclusions and resulting study...

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