A detailed assessment of glyphosate use and the risks of non-Hodgkin lymphoma overall and by major histological sub-types: findings from the North American Pooled Project

MANISHA PAHWA, CANCER CARE ONTARIO, CANADA
BEANE FREEMAN L. 2, SPINELLI J. 3,4, BLAIR A. 2, HOAR ZAHM S. 2, CANTOR K. 2, PAHWA P. 5,6, DOSMAN J. 5, MCLAUGHLIN J. 1,7,8, WEISENBURGER D. 9, DEMERS P. 1,7,10, HARRIS S. 1

1 Occupational Cancer Research Centre, Cancer Care Ontario, Toronto, Canada
2 Division of Cancer Epidemiology and Genetics, U.S. National Cancer Institute, Bethesda, U.S.A.
3 British Columbia Cancer Research Centre, Vancouver, Canada
4 School of Population and Public Health, University of British Columbia, Vancouver, Canada
5 Canadian Centre for Health and Safety in Agriculture, University of Saskatchewan, Saskatoon, Canada
6 Department of Community Health and Epidemiology, University of Saskatchewan, Saskatoon, Canada
7 Dalla Lana School of Public Health, University of Toronto, Toronto, Canada
8 Public Health Ontario, Toronto, Canada
9 Department of Pathology, City of Hope Medical Center, Duarte, U.S.A
10 Prevention and Cancer Control, Cancer Care Ontario, Toronto, Canada

Purpose: Glyphosate is the most frequently used herbicide worldwide. The International Agency for Research on Cancer recently classified glyphosate as a probable carcinogen for non-Hodgkin lymphoma (NHL), but the epidemiological studies considered were limited by small sample sizes and a lack of exposure-response data for NHL sub-types. We evaluated potential associations between glyphosate use and NHL risk using detailed information from the North American Pooled Project (NAPP).

Methods: Data from NHL cases (N=1690) and population-based controls (N=5131), recruited from Canada and the Midwest U.S. during the 1980s-1990s for 4 different studies, were recently pooled for the NAPP. Self-reported glyphosate use information was used to assess possible associations with NHL overall and by histological sub-type (follicular lymphoma [FL], diffuse large B-cell lymphoma [DLBCL], small lymphocytic lymphoma [SLL], and other). Odds ratios (OR) and 95% confidence intervals (CI) were estimated with multiple logistic regression models adjusted for demographic and NHL risk factors.

Results: Unadjusted for other pesticides, subjects who ever used glyphosate (N=133) had a significantly elevated NHL risk (OR=1.43, 95% CI: 1.11, 1.83). Glyphosate use for >3.5 years increased SLL risk (OR=1.98, 95% CI: 0.89, 4.39). Handling glyphosate for >2 days/year was associated with significantly higher odds of NHL (OR=2.42, 95% CI: 1.48, 3.96) and DLBCL (OR=2.83, 95% CI: 1.48, 5.41). There were suggestive risk increases (p-value ≤0.02) for NHL, FL, and SLL with greater years*days/year of glyphosate use. Except for SLL, risks attenuated when adjusted for other pesticides.

Conclusions: This analysis suggested that glyphosate use was associated with increased NHL risk. Risk differences by histological sub-type were not consistent across glyphosate use metrics and may have been chance findings. Nevertheless, the NAPP’s large sample size yielded more precise results than previously possible.

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The role of oral hygiene in head and neck cancer: Results from International Head and Neck Cancer Epidemiology (INHANCE) Consortium

DANA HASHIM, ICAHN SCHOOL OF MEDICINE AT MOUNT SAINI, UNITED STATES
SARTORI S. 1, BRENNAN P. 2, CURADO M. 3, WÜNSCH-FILHO V. 3, OLSHAM A. 4, ZEVALLOS J. 4, WINN D. 5, FRANCESCHI S. 2, CASTELLSAGUÉ X. 6, LISSOWSKA J. 7, RUDNAI P. 8, MATSUO K. 9, MORGENSTERN H. 10, BOFFETTA P. 1

1 Department of Preventive Medicine and Department of Translational Epidemiology, Icahn School of Medicine at Mount Sinai, New York, NY USA
2 Genetic Epidemiology Group, International Agency for Research on Cancer, Lyon, France
3 Epidemiology- CIPE/ACCAMARGO and Faculdade de Saúde Pública, Universidade de São Paulo, Sao Paulo, Brazil
4 Department of Pediatric Dentistry and Department of Epidemiology, University of North Carolina School of Public Health, Chapel Hill, NC, USA
5 Division of Cancer Control and Population Sciences, National Cancer Institute, Bethesda, MD
6 Catalan Institute of Oncology (ICO)-IDIBELL, L’Hospitalet de Llobregat, Catalonia, Spain; CIBER de Epidemiología y Salud Pública (CIBERESP), Spain
7 The M. Skasadowska-Curie Memorial Cancer Center and Institute of Oncology, Dept. of Cancer Epidemiology and Prevention, Warsaw, Poland