

## Epidemiology

### General Review- Glyphosate and cancer

- Mink, P. J., J. S. Mandel, B. K. Scurman, and J. I. Lundin. 2012. Epidemiologic studies of glyphosate and cancer: a review. *Regul Toxicol Pharmacol* 63:440-452.  
(ALSO on NON-cancer: Mink, P.J., J. S. Mandel, J. I. Lundin and B. K. Scurman. 2011. Epidemiologic studies of glyphosate and non-cancer health outcomes: a review. *Regul Toxicol Pharmacol* 61:172-184.)

### Current study driving IARC (Shinasi)

- Schinasi, L. and M. E. Leon. 2014. Non-Hodgkin lymphoma and occupational exposure to agricultural pesticide chemical groups and active ingredients: a systematic review and meta-analysis. *Int J Environ Res Public Health* 11:4449-4527.

### Direct Commentary on Shinasi Study

- Delzel / Exponent analysis of Shinasi et al meta-analysis (unpublished)

### NCI Ag Health studies on glyphosate and hematologic malignancy- with associated analyses/comments

#### Multiple myeloma

- De Roos, A. J., A. Blair, J. A. Rusiecki, J. A. Hoppin, M. Svec, M. Dosemeci, D. P. Sandler, and M. C. Alavanja. 2005. Cancer incidence among glyphosate-exposed pesticide applicators in the Agricultural Health Study. *Environ Health Perspect* 113:49-54.
  - Farmer, D. R., T. L. Lash, and J. F. Acquavella. 2005. Glyphosate results revisited. *Environmental Health Perspectives* 113(6):A365-367.
  - De Roos, A. J., M. A. Svec, A. Blair, J. A. Rusiecki, M. Dosemeci, M. C. Alavanja, J. A. Hoppin, and D. P. Sandler. 2005a. Glyphosate Results Revisited: De Roos et al. Respond. *Environ Health Perspect* 113:49-54.
  - Sorahan, T. 2015. Multiple myeloma and glyphosate use: A re-analysis of US Agricultural Health Study (AHS) Data. *Int. J. Environ. Res. Public Health* 12:1548-1559.
- Brown, L. M., L. F. Burmeister, G. D. Everett, and A. Blair. 1993. Pesticide exposures and multiple myeloma in Iowa men. *Cancer Causes Control* 4:153-156.
- Pahwa, P., C. P. Karunanayake, J. A. Dosman, J. J. Spinelli, H. H. McDuffie, and J. R. McLaughlin. 2012. Multiple myeloma and exposure to pesticides: a Canadian case-control study. *J Agromedicine* 17:40-50.

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Related: MGUS is a precursor to MM and was NOT associated with glyphosate exposure

- Landgren, O., R. A. Kyle, J. A. Hoppin, L. E. Beane Freeman, J. R. Cerhan, J. A. Katzmann, S. V. Rajkumar, and M. C. Alavanja. 2009. Pesticide exposure and risk of monoclonal gammopathy of undetermined significance in the Agricultural Health Study. *Blood* 113:6386-6391.

Overall review of AHS 2010

- Weichenthal, S., C. Moase, and P. Chan. 2010. A review of pesticide exposure and cancer incidence in the Agricultural Health Study Cohort. *Environmental Health Perspectives* 118 (8): 1117-1125.

Misc. studies on methods/reliability in the AHS

- Blair, A., R. Tarone, D. Sandler, C. F. Lynch, A. Rowland, W. Wintersteen, W. C. Steen, C. Samanic, M. Dosemeci, and M. C. Alavanja. 2002. Reliability of reporting on life-style and agricultural factors by a sample of participants in the Agricultural Health Study from Iowa. *Epidemiology* 13:94-99.
- Blair, A. and S. H. Zahm. 1990. Methodologic issues in exposure assessment for case-control studies of cancer and herbicides. *Am J Ind Med* 18:285-293.
- Freeman, L. B. 2009. Evaluation of Agricultural Exposures: The Agricultural Health Study and the Agricultural Cohort Consortium. President's Cancer Panel - October 21, 2008. *Reviews on Environmental Health* 24 (4):311-318.
- Lash, T. L. 2007. Bias analysis applied to Agricultural Health Study publications to estimate non-random sources of uncertainty. *Journal of Occupational Medicine and Toxicology* 2(15): 1-9.
- Mandel, J. S., B. H. Alexander, B. A. Baker, J. F. Acquavella, P. Chapman, and R. Honeycutt. 2005. Biomonitoring for farm families in the Farm Family Exposure Study. *Scand J Work Environ Health* 31 Suppl 1: 98-104.

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Other studies relevant to Shinasi meta-analysis on lymphoma

- Cantor, K. P., A. Blair, G. Everett, R. Gibson, L. F. Burmeister, L. M. Brown, L. Schuman, and F. R. Dick. 1992. Pesticides and other agricultural risk factors for non-Hodgkin's lymphoma among men in Iowa and Minnesota. *Cancer Res* 52:2447-2455.
  - Cantor, K. P., A. Blair, L. M. Brown, L. F. Burmeister, and G. Everett. 1993. Correspondence re: K. P. Cantor et al., pesticides and other agricultural risk factors for non-Hodgkin's lymphoma among men in Iowa and Minnesota. *Cancer Res* 53:2421.
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- Eriksson, M., L. Hardell, M. Carlberg, and M. Akerman. 2008. Pesticide exposure as risk factor for non-Hodgkin lymphoma including histopathological subgroup analysis. *Int J Cancer* 123:1657-1663.

- Hardell, L. and M. Eriksson. 1999. A case-control study of non-Hodgkin lymphoma and exposure to pesticides. *Cancer* 85:1353-1360.
  - Acquavella J, D. Farmer, and M. R. Cullen 1999. A case-control study of non-Hodgkin lymphoma and exposure to pesticides. *Cancer* 86:729-31.
- Hardell, L., M. Eriksson, and M. Nordstrom. 2002. Exposure to pesticides as risk factor for non-Hodgkin's lymphoma and hairy cell leukemia: pooled analysis of two Swedish case-control studies. *Leuk Lymphoma* 43:1043-1049.
- Kachuri, L., P. A. Demers, A. Blair, J. J. Spinelli, M. Pahwa, J. R. McLaughlin, P. Pahwa, J. A. Dosman, and S. A. Harris. 2013. Multiple pesticide exposures and the risk of multiple myeloma in Canadian men. *Int J Cancer* 133:1846-1858.
- Karunanayake, C. P., J. J. Spinelli, J. R. McLaughlin, J. A. Dosman, P. Pahwa, and H. H. McDuffie. 2012. Hodgkin lymphoma and pesticides exposure in men: a Canadian case-control study. *J Agromedicine* 17:30-39.
- Kaufman, D. W., T. E. Anderson, and S. Issaragrisil. 2009. Risk factors for leukemia in Thailand. *Ann Hematol* 88:1079-1088.
- Lee, W. J., K. P. Cantor, J. A. Berzofsky, S. H. Zahm, and A. Blair. 2004a. Non-Hodgkin's lymphoma among asthmatics exposed to pesticides. *Int J Cancer* 111:298-302.
- McDuffie, H. H., P. Pahwa, J. R. McLaughlin, J. J. Spinelli, S. Fincham, J. A. Dosman, D. Robson, L. F. Skinnider, and N. W. Choi. 2001. Non-Hodgkin's lymphoma and specific pesticide exposures in men: cross-Canada study of pesticides and health. *Cancer Epidemiol Biomarkers Prev* 10:1155-1163.
- Nordstrom, M., L. Hardell, A. Magnuson, H. Hagberg, and A. Rask-Andersen. 1998. Occupational exposures, animal exposure and smoking as risk factors for hairy cell leukaemia evaluated in a case-control study. *Br J Cancer* 77:2048-2052.
- Orsi, L., L. Delabre, A. Monnereau, P. Delval, C. Berthou, P. Fenaux, G. Marit, P. Soubeyran, F. Hugué, N. Milpied, M. Laporrier, D. Hemon, X. Troussard, and J. Clavel. 2009. Occupational exposure to pesticides and lymphoid neoplasms among men: results of a French case-control study. *Occup Environ Med* 66:291-298.

Studies on lymphoma including / relevant to glyphosate literature

- De Roos, A. J., S. H. Zahm, K. P. Cantor, D. D. Weisenburger, F. F. Holmes, L. F. Burmeister, and A. Blair. 2003. Integrative assessment of multiple pesticides as risk factors for non-Hodgkin's lymphoma among men. *Occup Environ Med* 60:E11.
- Hohenadel, K., S. A. Harris, J. R. McLaughlin, J. J. Spinelli, P. Pahwa, J. A. Dosman, P. A. Demers, and A. Blair. 2011. Exposure to multiple pesticides and risk of non-Hodgkin lymphoma in men from six Canadian provinces. *Int J Environ Res Public Health* 8:2320-2330.
- Pearce, N. and D. McLean. 2005. Agricultural exposures and non-Hodgkin's lymphoma. *Scand J Work Environ Health* 31 Suppl 1:18-25; discussion 15-17.
- Alexander, D. D., P. J. Mink, H. O. Adami, E. T. Chang, P. Cole, J. S. Mandel, and D. Trichopoulos. 2007. The non-Hodgkin lymphomas: a review of the epidemiologic literature. *Int J Cancer* 120 Suppl 12:1-39.
  
- Brown, L. M., A. Blair, R. Gibson, G. D. Everett, K. P. Cantor, L. M. Schuman, L. F. Burmeister, S. F. Van Lier, and F. Dick. 1990. Pesticide exposures and other agricultural risk factors for leukemia among men in Iowa and Minnesota. *Cancer Res* 50:6585-6591.
  
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- Armitage, J.O. 1997. The changing classification of non-Hodgkin's lymphomas. *CA Cancer J Clin* 47:323-325.

Papers on methodologic limitations related specifically to glyphosate

- Acquavella, J., J. R. Cowell, M. R. Cullen, D. R. Farmer, and H. Pastides. 2001. Implications of glyphosate toxicology and human biomonitoring data for epidemiological research. *Journal of Agromedicine* 7(4): 7-27.
- Acquavella, J., J. Doe, J. Tomenson, G. Chester, J. Cowell and L. Bloemen. 2003. Epidemiologic studies of occupational pesticide exposure and cancer; regulatory risk assessments and biologic plausibility. *Ann Epidemiol* 13:1-7.
- Acquavella, J. F., C. Gustin, B. H. Alexander and J. S. Mandel. 2005. Implications for epidemiologic research on variation by pesticide in studies of farmers and their families. *Scand J Work Environ Health* 31 Suppl 1:105-109.
- Acquavella, J., B. H. Alexander, J. S. Mandel, C. J. Burns and C. Gustin. 2006. Exposure misclassification in studies of agricultural pesticides. Insights from biomonitoring. *Epidemiology* 17:69-74.

General papers on methods and methodological limitations

- Bowling, A. 2005. Mode of questionnaire administration can have serious effects on data quality. *J Public Health (Oxf)* 27:281-291.

- Griffith, L. E., D. J. Cook, G. H. Guyatt, and C. A. Charles. 1999. Comparison of open and closed questionnaire formats in obtaining demographic information from Canadian general internists. *J Clin Epidemiol* 52:997-1005.
- Higgins, J. P. T. and S. Green, editors. 2011. Cochrane Handbook for Systematic Reviews of Interventions, Version 5.1.0. [updated March 2011]. Available at: [www.cochrane-handbook.org](http://www.cochrane-handbook.org). The Cochrane Collaboration.
- Hill, A. B. 1965. The Environment and Disease: Association or Causation? *Proc R Soc Med* 58:295-300.
- Jurek, A. M., S. Greenland, and G. Maldonado. 2008. How far from non-differential does exposure or disease misclassification have to be to bias measures of association away from the null? *Int J Epidemiol* 37:382-385.
- Jurek, A. M., S. Greenland, G. Maldonado, and T. R. Church. 2005. Proper interpretation of non-differential misclassification effects: expectations vs observations. *Int J Epidemiol* 34:680-687.

### Exposure

(Human exposure)

- Acquavella J.F., B. H. Alexander, J. S. Mandel, C. Gustin, B. Baker, P. Chapman, and M. Bleeke. 2004. Glyphosate biomonitoring for farmers and their families: Results from the Farm Family Exposure Study. *Environmental Health Perspectives* 112(3): 321-326. .
- Niemann L. C. Sieke, R. Pfeil, and R. Solecki. 2015. A critical review of glyphosate findings in human urine samples and comparison with the exposure of operators and consumers. *Journal of Consumer Protection and Food Safety*. Published online: [ [HYPERLINK "http://link.springer.com/article/10.1007/s00003-014-0927-3/fulltext.html"](http://link.springer.com/article/10.1007/s00003-014-0927-3/fulltext.html) ]
- Lavy T, Cowell J, Steinmetz JR, Massey JH. 1992. Conifer seedling nursery exposure to glyphosate. *Arch Environ Contam Toxicol* 22:6-13.

(Food residues)

- EFSA European Food Safety Authority, 2014. The 2012 European Union Report on pesticide residues in food. *EFSA Journal* 2014;12(12):3942. [ [HYPERLINK "http://www.efsa.europa.eu/en/efsajournal/doc/3942.pdf"](http://www.efsa.europa.eu/en/efsajournal/doc/3942.pdf) ].
- Fact Sheet - Residual Traces of Pesticide Residues including Glyphosate Residues in Food on the European Market Extracted from the 2012 European Union Report on pesticide residues in food (2014).

(Degradation in drinking water)

- Jönsson J., R. Camm, and T.Hall. (2013) Removal and degradation of glyphosate in water treatment: a review. *Journal of Water Supply: Research and Technology—AQUA*, 62 (7): 395-408.

- Speth T.F. (1994) Glyphosate removal from drinking water. *Journal of Environmental Engineering* 119: 1139-1157.

### Toxicology Studies

Review of all animal carcinogenesis studies

- Greim, H., D. Saltmiras, V. Mostert, and C. Strupp. 2015. Evaluation of carcinogenic potential of the herbicide glyphosate, drawing on tumor incidence data from fourteen chronic/carcinogenicity rodent studies. *Crit. Rev. Toxicol.*, in press.

Gentox- formulations and glyphosate itself

- Kier, L. D. 2015. Review of genotoxicity biomonitoring studies of glyphosate-based formulations. *Crit. Rev. Toxicol.*, in press.
- Kier, L. D. and D. J. Kirkland. 2013. Review of genotoxicity studies of glyphosate and glyphosate-based formulations. *Crit Rev Toxicol* 43:283-315.
- Heydens, W. F., C. E. Healy, K. J. Hotz, L. D. Kier, M. A. Martens, A. G. E. Wilson and D. R. Farmer. 2008. Genotoxic potential of glyphosate formulations: mode-of-action investigations. *J. Agric. Food Chem.* 56:1517-1523.

Original (2000) animal toxicology review

- Williams, G. M , R. Kroes and I. C. Munro. 2000. *Regulatory Toxicology and Pharmacology.* 31: 117-165.

Surfactant effects literature

- Levine, S. L., Z. Han, J. Liu, D. R. Farmer and V. Papadopoulos. 2007. Disrupting mitochondrial function with surfactants inhibits MA-10 Leydig cell steroidogenesis. *Cell Biol Toxicol* 23:385-400.

### KEY CURRENT REGULATORY DOCUMENT: BfR Assessment for EU (Currently under review)

- Germany Federal Institute for Risk Assessment (BfR) - Update on glyphosate review. 2015.
    - [ HYPERLINK "<http://www.bfr.bund.de/cm/343/eu-wirkstoffpruefung-zu-glyphosat-stand-der-dinge-und-ausblick.pdf>" ]
  - Germany Federal Institute for Risk Assessment (BfR) Assessment Report Glyphosate Annex B 6.5.3 Published data on carcinogenicity reviewed by the BfR:
  - Germany Federal Institute for Risk Assessment (BfR) Assessment Report Glyphosate Annex B 6.4 Published data on Genotoxicity.
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Assorted Background Regulatory and Government Documents- REFERENCE - NOT ESSENTIAL FOR REVIEW

- US EPA. 1993. Reregistration Eligibility Decision (RED): Glyphosate. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Washington, DC.
- US EPA. 2013 Federal Register Final Rule Glyphosate; Pesticide Tolerances. 78 (84): 25396-25401. The following documents provide the assessments behind this final rule:
  - US EPA. 2012. Human Health Risk Assessment (EPA-HQ-OPP-2012-0132-0010). Glyphosate. Section 3 Registration Concerning the Application of Glyphosate to Carrots, Sweet Potato, Teff, and Oilseeds (Crop Group (CG) 20) and to Update the CG Definitions for Bulb Vegetable (CG 3-07), Fruiting Vegetable (CG 8-10), Citrus Fruit (CG 10-10), Pome Fruit (CG 11-10), and Berry (CG 13-07).
  - US EPA. 2012. Drinking Water Assessment (EPA-HQ-OPP-2012-0132-0013) for Label Amendments (Roundup WeatherMAX® EPA Reg. No. 524-537 and Roundup Ultra® EPA Reg. No. 524-475) for Glyphosate Use on Oilseed Crops, Root and Tuber Crops, Pome Fruit Crops, Citrus Fruit Crops, Fruiting Vegetable Crops, Berry and Small Fruit Crops, Bulb Vegetables Crops.
  - US EPA. 2012. Dietary Exposure and Risk Assessment (EPA-HQ-OPP-2012-0132-0011) in Support of the Requested Application of Glyphosate to Carrots, Sweet Potatoes, and Oilseeds (Crop Group (CG) 20) and to Update the CG Definitions for Bulb Vegetable (CGT 3-07), Fruiting Vegetable (CG 8-10), Citrus Fruit (CG 10-10), Pome Fruit (CG 11-10), and Berry (CG 13-07).
- Canada Pest Management Regulatory Agency. 1991. Pre-Harvest use of glyphosate herbicide [Preharvest application of glyphosate (Roundup) herbicide]. Discussion Document D91-01. 98 pp. Pesticide Information Division, Plant Industry Directorate, Agriculture Canada.
- JMPR (WHO/FAO). 1986. Pesticides residues in food. Report of the Joint Meeting of the FAO Panel of Experts on Pesticide Residues in Food and the Environment and the WHO Expert Group on Pesticide Residues. Part II-Toxicology, Glyphosate: 63-76. Rome, Italy, 29 September – 8 October.
- JMPR (WHO/FAO). 2004. Pesticide Residues in Food. Report of the Joint Meeting of the FAO Panel of Experts on Pesticide Residues in Food and the Environment and the WHO Core Assessment Group. Part II-Toxicology, Glyphosate: 96-169. Rome, Italy 20-29 September 2004.
- JMPR (WHO/FAO) . 2004. Pesticide Residues in Food. Report of the Joint Meeting of the FAO Panel of Experts on Pesticide Residues in Food and the Environment and the WHO Core Assessment Group on Pesticide Residues. FAO Plant Production and Protection Paper 178, Glyphosate Dietary Risk Assessment: 98-103. Rome, Italy 20-29 September 2004.
- World Health Organization (WHO). 1994. Glyphosate. International Programme on Chemical Safety, Environmental Health Criteria No. 159. World Health Organization, Geneva.
- World Health Organization (WHO). 2005. Glyphosate and AMPA in Drinking-water. Background document for development of WHO *Guidelines for Drinking-water Quality*.
- European Commission. (2002) Report for the Active Substance Glyphosate, Directive 6511/VI/99, January 21.

- Australian Pesticides and Veterinary Medicines Authority (APVMA).2013. A review of the Earth Open Source (EOS) report.
- EFSA European Food Safety Authority Final review of the Séralini et al. 2012a publication on a 2-year rodent feeding study with glyphosate formulations and GM maize NK603 published online 19 September 2012 in Food and chemical Toxicology. EFSA Journal 2012 10(11):2986. [ HYPERLINK "<http://www.efsa.europa.eu/en/search/doc/2986.pdf>" ]
- ANSES National Agency for Food, Environmental and Occupational Health Safety. 2014. SCIENTIFIC AND TECHNICAL SUPPORT MEMORANDUM on the analysis of the differences between 'Republished study: long-term toxicity of a Roundup herbicide and a Roundup-tolerant genetically modified maize' by Séralini et al. (2014) and the original publication of said study in 2012.
- Germany Federal Institute for Risk Assessment (BfR) opinion on Seralini et al. 2012 "Feeding study in rats with genetically modified NK603 maize and with a glyphosate containing formulation (Roundup) published by Séralini et al. (2012)" [ HYPERLINK "<http://www.bfr.bund.de/cm/349/feeding-study-in-rats-with-genetically-modified-nk603-maize-and-with-a-glyphosate-containing-formulation-roundup-published-bei-seralini-et-al-2012.pdf>" ]
- Food Standards Australia New Zealand FSANZ. 2013. Response to Seralini paper.