

Trends in Exposure to 2,4-D

and

Glyphosate-Based Herbicides and Associations with Birth Outcomes in a Midwest Birth Cohort

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Presenter Disclosures

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Results of Two Studies

- 2,4-D Exposure Study.
- Nested case control study of associations between herbicide exposure and preterm birth.

What is 2,4-D?

- Phenoxy herbicide contained in more than 600 products with agricultural and non-agricultural applications.
- Water soluble and non-persistent environmentally and biologically.
- In the Agricultural Health Study (1993-1997), farmers were highly exposed preand post- application (72% and 100%).²
- Spouses and children also had high rates of exposure (41% and 62%).⁸
- Exposure found to be common in nonagricultural contexts.⁹



Changes in Herbicide Use Since 1996



Impact on Use of 2,4-D

Percent Acres Treated with 2,4-D





Pounds Applied of 2,4-D

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2,4-D Exposure Study

- 6 NHANES Cycles:
 - 2001-2002
 - 2003-2004
 - 2007-2008
 - 2009-2010
 - 2011-2012
 - 2013-2014
- 14,395 participants with 2,4-D biomarker data
- Exposure: Average pounds of 2,4-D applied
- Outcome categories based on the highest LOD across all cycles:
 - Low Exposure: below the LOD in any cycle
 - High Exposure: above the LOD in all cycles





OR	CI
2.27	1.71, 3.01

Results

https://doi.org/10.1186/s12940-021-00815-x



nuMoM2b Nested Case Control Study





What Exposures?

Herbicide Products:

- Glyphosate
- Glufosinate

Environmental Degradates:

- Aminomethylphosphonic Acid (AMPA)
- 3-(methylphosphinico)propionic acid (3-MPPA)



Limitations

- Single biomarker measurement
- Single exposure window
- Relatively small sample size

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Research Context

- PEES Indiana
- PROTECT Puerto Rico
- TIDES Multicenter (CA, MN, WA)
- nuMoM2b Multicenter (OH, IN, IL)

Conclusions

- Herbicide use is up and expected to continue to rise.
- Herbicide exposure appears to be increasing.
- Mounting evidence of reproductive impacts.

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