

THE ASSOCIATION BETWEEN AGRICULTURAL ORGANOPHOSPHATE PESTICIDE EXPOSURE AND AUTISM SPECTRUM DISORDERS IN THE CHARGE STUDY

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Background and Aims: Prenatal organophosphate (OP) exposure has been associated with an increased risk of cognitive and behavioural abnormalities in children. In California, two studies have reported an association between organophosphate exposure and autism spectrum disorders (ASDs).

Aim 1: Evaluate the association between ASD and organophosphate pesticide application within township sections 500m of the birth residence of CHARGE study participants.

Aim2: Evaluate the relationship between timing of exposure and the odds of having a child with an ASD.

Methods: The study population includes participants from the Childhood Autism Risks from Genes and Environment (CHARGE) study, a population-based case-control study. Using pesticide use report data from the California Department of Pesticide Regulation, agriculturally applied organophosphate exposure was summed in the 500m radius of each residence. Non-zero quartiles of exposure were calculated for residences where at least one trimester of pregnancy occurred during the application year. Multivariate logistic regression models were constructed to assess the relationship between living within the two highest quartiles of exposure and ASD.

Results: Children with ASDs were more likely to live in close proximity to the two highest non-zero quartiles of OP pesticide application. 7.9% of cases were in the 3rd and 4th quartiles of exposure compared to 1.54% of non-cases. In logistic regression modelling, the unadjusted odds ratio (OR) was 1.28 (95% confidence interval (CI) 0.81-2.04). After adjustment for potential confounders (regional center, gender, age of the mother, education level of the mother), the OR was approximately the same aOR=1.34 (95%CI 0.79-2.25).

Conclusions: These results suggest families of ASD children may live in closer proximity to agriculturally applied organophosphates, but a larger sample size will be analyzed prior to deriving meaningful results with regard to timing of exposure. Because only two of twelve years of CHARGE study participants (2000 and 2001) have been analyzed, these results should be considered strictly preliminary.