



# Associations between Maternal Periconceptional Exposure to Secondhand Smoke and Major Birth Defects

*The relationship between exposure to secondhand smoke (SHS) during pregnancy and birth defects needs further research and examination. SHS remains an important public health concern, especially in groups where exposure appears to be higher. This study used data from the multisite case-control National Birth Defects Prevention Study (NBDPS) to determine whether mothers with any SHS exposure during pregnancy gave birth to more infants with birth defects compared to mothers with no SHS exposure during pregnancy.*

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Link to abstract:  
<https://www.ncbi.nlm.nih.gov/pubmed/27443814>

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This study used data from the National Birth Defects Prevention Study (NBDPS), the largest case-control study to date of birth defects in the United States, to examine the association between maternal periconceptional exposure to secondhand smoke (SHS) and a spectrum of major birth defects for delivery years 1997 through 2009. The analysis was restricted to birth defects with  $\geq 100$  cases, singleton births, non-smokers, and mothers without pregestational type-1 or 2 diabetes (which has been associated with a range of birth defects). Following the inclusion/exclusion criteria, 44 birth defect groups were identified—leaving a total of 18,762 cases and 7,747 controls. Maternal exposure to SHS was examined for the period one month prior to conception through the first trimester for all birth defects; with the exception being craniosynostosis—where associations in the second and third trimesters were also examined. Additionally, source of SHS exposure (whether household or workplace/school—occurring concurrently or independently) were also examined. Multivariate logistic regression models were used to estimate both crude and adjusted odds ratios and 95% confidence intervals (cORs/aORs, 95% C.I.s). The odds ratios were adjusted for a variety of maternal and infant factors including: maternal age, education, race/ethnicity, BMI, periconceptional alcohol and folic acid intake, previous live births, maternal nativity, pregnancy intention, household income/number of people supported by the income, study center, and time to interview.

## Main findings from this research

- ◇ The prevalence range of SHS was wider for cases (12.9-27.8%) than for controls (14.5-15.8%)
- ◇ Modest positive associations were noted between SHS and the following defect groups: neural tube defects (anencephaly: (aOR, 1.66; 95% C.I., 1.22-2.25); spina bifida: (aOR, 1.49; 95% C.I., 1.20-1.86)), orofacial clefts (cleft lip without cleft palate: (aOR, 1.41; 95% C.I., 1.10-1.81); cleft lip with or without cleft palate (aOR, 1.24; 95% C.I., 1.05-1.46); and cleft palate alone (aOR, 1.31; 95% C.I., 1.06-1.63)), bilateral renal agenesis (aOR, 1.99; 95% C.I., 1.05-3.75), amniotic band syndrome-limb body wall complex (aOR, 1.66; 95% C.I., 1.10-2.51), and atrial septal defects, secundum (aOR, 1.37; 95% C.I., 1.09-1.72)
- ◇ No significant inverse associations observed across any of the case groups

## Conclusion and discussion

A modest positive association between exposure to any SHS and 8 birth defects, 1 CHD and 7 non-CHDs, was observed. The results are consistent with previous studies which have found SHS to be moderately associated with a few birth defects—particularly NTDs and orofacial clefts. Despite the moderate size of the risk estimates, the pervasiveness of SHS worldwide, particularly in lower-resource countries and segments of the population, may translate into many cases of potentially preventable birth defects.