



# DOES PREGNANCY SMOKING AFFECT CHILDHOOD AND YOUNG ADULT CANCER INCIDENCE IN THE OFFSPRING?

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## Background

Smoking causes several cancers typically arising in adulthood. Some are also rare occurrences in childhood, though cancer in childhood is much less common and the cancers typical at young ages are very different from those of adulthood. It is plausible that foetal exposure to tobacco-derived carcinogens is a cause of some childhood cancers, but this is difficult to establish and to differentiate from possible effects of exposure to environmental tobacco smoke in childhood. A review in 1999 suggested an estimate for the increased risk of all childhood cancer amongst offspring of women smoking in pregnancy of 10% (RR 1.1 95% CI 1.03-1.19). More evidence is needed.

## Methods

We have used information prospectively assembled in the Oxford Record Linkage Study, which combines information collected antenatally and at delivery, and on subsequent hospital admissions, with cancer registrations and deaths for mothers and offspring who continue to reside in the study area. Among more than 320,000 delivery records which form the cohort base we identified 548 babies born between 1965 and 1989 with a subsequent diagnosis of malignant neoplasm or benign brain tumour in childhood or young adulthood (under 35 years of age) by 1999. 406 of these were diagnosed in children (under 15 years of age). We analysed data for these cases and up to 6 unaffected controls per case selected from within the cohort to allow for migration and loss to follow-up. We believe that >80% of children with cancer were included, but completeness of inclusion of cases to older ages is less certain. The nested case-control approach should allow unbiased estimates of risk for exposures for which information is equally available for cases and controls. Missing information clearly allows scope for misclassification of exposure but for many variables of interest, few data were missing. This was not so for smoking in pregnancy unfortunately, for which data were equally missing for 48% of cases and controls. Contemporary national surveys suggest smoking prevalence was higher than we can report for the cohort, so we cannot assume that all for whom data were not available were non-smokers.

## Results

We examined a number of factors that may be interrelated for childhood cancer risk. Results for those diagnosed with tumours at older ages are mentioned only where they are of note, and we present results for those diagnosed under 15 years of age.

We found no evidence of increased risk of childhood cancer (all types combined) when examined in relation to reported smoking in pregnancy. Where smoking data were available we believe them valid, based on the relationships between smoking status and mean birthweight per group (see table).

We found strong significant independent effects of increasing mother's age and decreasing parity on childhood cancer risk. There was no evidence of an effect of antenatal diagnostic irradiation but only 3% of cases and controls were exposed. There was a non-significant trend of increased risk of childhood cancer with increasing birthweight but mean birthweights (grams) for cases and controls were near identical (cases 3297, controls 3289). Young adult (but not childhood) cancer cases were significantly more likely to have their own mother diagnosed with cancer.

Maternal smoking in pregnancy and childhood cancer\*

	Cases	Controls	OR (95%CI)	Mean birthweight in grams (controls only)
<b>Non-smoker</b>	159	834	1.00	3374
<b>Smoking N/K</b>	196	1098	0.94 (0.75-1.18)	3269
<b>Smoker</b>	51	335	0.80 (0.57-1.12)	3139

\* not importantly different, when including young adult cases as well

## Conclusion

We have made several interesting findings, consistent with some previous work. Our data were collected prospectively, and case numbers are reasonably large, but our smoking data are so incomplete that our study does not add much new information about risks associated with this exposure.

Since the review in 1999, nothing conclusive about smoking and childhood cancer has emerged, though there have been recent corroborated suggestions of increased risks of one rare tumour (hepatoblastoma). Clearly risk may vary by subtype of childhood cancer and we will explore the relationships with smoking in our data in more detail.