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## Secondhand Smoke Risk Penetrates Womb

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### MedPage Today Action Points

- Explain that nonsmoking women who breathe secondhand tobacco smoke during pregnancy increase their risk of stillbirth and a range of birth defects, according to a meta-analysis of 19 studies.
- Note that spontaneous abortion -- defined as miscarriage of the pregnancy before 20 weeks' gestation -- wasn't significantly more common with secondhand smoke exposure in utero.

### Review

Nonsmoking women who breathe secondhand tobacco smoke during pregnancy increase their risk of stillbirth, major birth defects, and other harms to their babies, according to a meta-analysis.

The analysis of 19 observational studies found a 23% increased risk of stillbirth with tobacco smoke exposure during pregnancy (odds ratio 1.23, 95% confidence interval 1.09 to 1.38) in four of the studies, reported Jo Leonardi-Bee, PhD, MSc, of the University of Nottingham, England, and colleagues.

And seven of the studies found that pregnant women exposed to second hand smoke were also 13% more likely give birth to a child with congenital malformations (OR 1.13, 95% CI 1.01 to 1.26), Leonardi-Bee and co-authors wrote in the April issue of *Pediatrics*.

"Because the timing and mechanism of this effect is not clear, it is important to prevent secondhand smoke exposure in women before and during pregnancy," the group urged in their paper.

Previous data have shown that smoking during pregnancy boosts the risk of birth defects by 10% to 34% and stillbirth risk by 20% to 34%, so a modest impact of environmental exposure involving lower levels of the same tobacco smoke toxins wasn't surprising, the group noted.

A prior meta-analysis by Leonardi-Bee's group found that maternal exposure to secondhand smoke decreased infant birth weights by 33 g (1.16 oz) and increased the risk of having a low birthweight baby (defined as <2,500 g or <5.5 lb), so the team expanded their investigation to look for other hazards to the neonate.

They pooled the results of 19 observational studies of nonsmoking pregnant women, 10 of which came from North America, one from South America, three from Asia, and five from Europe.

Among the studies, case-control design was most commonly used (eight studies), followed by cross-sectional design (seven), and cohort (four). Only two studies used objective measures of smoke exposure with serum and plasma cotinine levels, whereas the rest used self-reported exposure.

The group claimed that theirs was the first systematic review and meta-analysis of all world evidence available to quantify the effects of maternal secondhand smoke exposure during pregnancy on a range of adverse fetal outcomes.

Spontaneous abortion -- defined as miscarriage of the pregnancy before 20 weeks' gestation -- wasn't significantly more common with secondhand smoke exposure in utero (OR 1.17, 95% CI 0.88 to 1.54).

Death of the baby after 20 weeks' gestation to within the first 28 days after birth also showed no significant impact of secondhand smoke (OR 1.07, 95% CI 0.48 to 2.38) but was only evaluated in two studies.

With regard to individual congenital malformations, again, relatively few studies reported on outcomes but with elevated point estimates for some risks, despite small numbers and statistical non-significance. These included:

- Conotruncal heart defects (OR 1.30, 95% CI 0.85 to 2.10)
- Clubfoot and other similar deformities of the feet (OR 1.80, 95% CI 0.97 to 3.30)
- Cryptorchidism (OR 1.55, 95% CI 0.95 to 2.54)
- Neural tube defects (OR 1.20, 95% CI 0.83 to 1.73)
- Anencephaly (OR 2.10, 95% CI 0.90 to 4.90)
- Spina bifida (OR 1.90, 95% CI 0.70 to 9.40)
- Orofacial clefts (OR 1.09, 95% CI 0.93 to 1.27)
- Craniosynostosis (OR 1.30, 95% CI 0.89 to 1.90)

Leonardi-Bee's group suggested that their results should be generalizable, but cautioned about the likelihood of residual confounding, since they were limited by reliance on confounding factors adjusted for in the original studies. "Therefore, we were unable to completely adjust for the effects of socioeconomic status or ethnicity, which could have been potential confounders," they wrote.

Publication bias was also a possibility, the researchers added.

Moreover it wasn't clear whether exposure to tobacco smoke toxins via the mother was the culprit, since active smoking by the father could damage genes in his sperm and impact the child as well, Leonardi-Bee's team noted.

"These results highlight the importance of smoking prevention and cessation to focus on the father in addition to the mother during the preconception period and during pregnancy," they concluded in the paper.

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Cancer Research UK, Economic and Social Research Council, Medical Research Council, and the Department of Health, under the auspices of the U.K. Clinical Research collaboration, and by a grant from the Cancer Research UK project.

The researchers reported having no conflicts of interest to disclose.

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Leonardi-Bee J, et al "Secondhand smoke and adverse fetal outcomes in nonsmoking pregnant women: A meta-analysis" *Pediatrics* 2011; DOI: 10.1542/peds.2010-3041.

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