

# Secondhand tobacco exposure in utero linked to decreased lung function in children

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Exposure to second hand smoke in utero and in early childhood linked to decreased lung function. Credit: ATS

Environmental tobacco smoke exposure in utero and during early childhood—especially secondhand smoke—is associated with decreased childhood lung function, according to research presented at the ATS 2021 International Conference.

Hanna Knihtilä, MD, Ph.D., research fellow, Channing Division of Network Medicine, Brigham and Women's Hospital and Harvard Medical School, and colleagues sought to clarify the effects of [tobacco](#) smoke exposure during [pregnancy](#) and childhood on children's [lung](#) function at age six years.

The authors found that cumulative tobacco smoke exposure reflected by increased blood cotinine levels during pregnancy and childhood is associated with decreased lung function at six years of age. This decrease is evident even with minimal smoking exposures.

"Most of the exposure, especially during

pregnancy, was secondhand," said Dr. Knihtilä. "This suggests that even small amounts of exposure from secondhand sources can have detrimental effects on children's lung function."

The researchers included 476 [mother-child pairs](#) in the study, which was done with participants in the Vitamin D Antenatal Asthma Reduction Trial (VDAART). They recruited non-smoking women at 10-18 gestational weeks.

The scientists gave study participants questionnaires on active smoking and household smoking during pregnancy and at one, three and six years after delivery. They measured blood cotinine levels at 10-18 and 32-38 gestational weeks, and at ages 1, 3 and 6 years, and calculated cumulative tobacco smoke exposure based on the cotinine levels. They also measured the children's lung function at age six using spirometry and impulse oscillometry, a relatively new technology that uses sound waves to measure lung function.

Sixty-five mothers (14 percent) reported active smoking and 103 (22 percent) reported other household smoking on at least one occasion during the study. Mothers' active smoking and household smoking were associated with increased cotinine levels in the mothers during pregnancy and in their children.

The authors stated, "Both gestational and childhood cumulative tobacco smoke exposure, reflected by increased blood cotinine levels during pregnancy and early life were associated with decreased lung function at age six years, but the strongest effects were observed with cumulative smoke exposure from pregnancy to childhood together."

"The study is unique because, with a relatively

large sample, we have comprehensive follow-up data with detailed questionnaires about tobacco [smoking](#) in the household, and an objective blood marker of tobacco smoke exposure (cotinine), at five different timepoints from pregnancy to age six years," said Dr. Knihtilä. "With this multiple timepoint follow-up data, we were able to show that the effect of tobacco smoke exposure on lung function seems to be dependent on the dose and duration of exposure from pregnancy to childhood."

Cotinine is the predominant metabolite of nicotine and is used as a biomarker of tobacco smoke exposure.

"We hope that our study serves as objective data for [health care providers](#) and families to advocate for minimizing tobacco smoke exposure from pregnancy to [childhood](#) to improve lung health among children," concluded Dr. Knihtilä.

**More information:**

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