

Study finds 'thirdhand smoke' poses danger to unborn babies' lungs

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Stepping outside to smoke a cigarette may not be enough to protect the lungs and life of a pregnant woman's unborn child, according to a new study in the *American Journal of Physiology*.

The study, by researchers at the Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center (LA BioMed), found prenatal exposure to toxic components of a newly recognized category of tobacco smoke-known as "thirdhand smoke"-can have as serious or an even more negative impact on an infants' [lung development](#) as postnatal or childhood exposure to smoke. Thirdhand smoke is the newly formed toxins from tobacco smoke that remain on furniture, in cars, on clothing and on other surfaces-long after smokers have finished their cigarettes.

"Thirdhand smoke is a stealth toxin because it lingers on the surfaces in the homes, hotel rooms, casinos and cars used by smokers where children, the elderly and other vulnerable people may be exposed to the toxicants without realizing the dangers," said Virender Rehan, MD, a principal investigator at LA BioMed and corresponding author of the study. "Pregnant women should avoid homes and other places where thirdhand smoke is likely to be found to protect their unborn children against the potential damage these toxins can cause to the developing infants' lungs.

Dr. Rehan, a National Institutes of Health-funded investigator who has been researching the effects of smoking on lung development for more than a decade, said this is the first study to show the exposure to the

constituents of thirdhand smoke is as damaging and, in some cases, more damaging than secondhand smoke or firsthand smoke.

"We looked at the mechanisms that drive normal lung development and found those mechanisms were clearly disrupted by thirdhand smoke," he said. "Based on this, we can conclude that prenatal disruption of lung development can lead to asthma and other respiratory ailments that can last a lifetime."

Thirdhand smoke is aged secondhand smoke, and it attaches to the surfaces in homes and other surroundings. It is composed of smaller, ultrafine particles with a greater molecular weight that pose a greater asthma hazard than firsthand or [secondhand smoke](#). Although concerns about the dangers from thirdhand smoke have been raised recently, this new study is the first to provide biological data to support these concerns.

Dr. Rehan said touching surfaces contaminated with thirdhand smoke, as well as ingesting dust containing the superfine particles of thirdhand smoke, are the most likely major pathways for exposure to these toxins.

"Children and pregnant mothers in busy households are especially susceptible to thirdhand smoke exposure because they could touch or breathe in the toxic substances from contaminated surfaces," he said. "Among infants, it has been found that the rate of ingesting dust is more than twice that of adults, making babies especially vulnerable to the effects of thirdhand smoke."

He also noted that nicotine levels are six times lower among infants living in homes with strict no-smoking policies.

"The dangers of thirdhand smoke span the globe because smoking is more prevalent in many other countries than it is in the United States,"

he said. "While further study is needed, the alarming data clearly highlight the potential risks and long-term consequences of thirdhand smoke exposure."

While previous studies had documented the danger of nicotine in thirdhand smoke, this new study measured the effect of two other toxins in thirdhand smoke-1-(N-methyl-N-nitrosamino)-1-(3-pyridinyl)-4-butanal (NNA) and 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK). The researchers found prenatal exposure to thirdhand [tobacco smoke](#) components plays a much greater role in altered lung function in offspring than postnatal or childhood exposures.

More information: The study was published online and is scheduled for publication in an upcoming special edition of the American Journal of Physiology on the effects of smoking.

Provided by Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center

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