

## Early exposure to tobacco smoke may lead to early emphysema later

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Chronic exposure to tobacco smoke in childhood may contribute to early emphysema later in life, according to new research. Environmental tobacco smoke (ETS) is known to be associated with a variety of serious health problems, but it had not previously been associated with the development of emphysema over the life course. The data will be presented on Tuesday, May 19, at the 105th International Conference of the American Thoracic Society in San Diego.

"Emphysematous 'holes' in the lung that begin as small areas of damage or impaired development may expand according to a fractal trajectory after an earlier insult," said Gina Lovasi, M.P.H., Ph.D., of Columbia University. "We hypothesized that environmental [tobacco smoke](#) in [childhood](#) may be one such early insult, associated with signs of early [emphysema](#) detectable on computed tomography (CT) scan in adulthood and perhaps lower [lung function](#) detectable by spirometry."

Emphysema is an anatomically defined condition that overlaps substantially with [chronic obstructive pulmonary disease](#), the fourth leading cause of death worldwide. Although smoking leads to emphysema in the upper lobes of the lungs, people who have never smoked may also have tissue destruction patterns that indicate emphysema. However, emphysema in people who have never smoked is more likely to appear as diffuse damage throughout the lungs.

To determine whether chronic exposure to ETS in childhood could lead to the development of early emphysema later in life, Dr. Lovasi and

colleagues analyzed data from a diverse sample of 3,964 relatively healthy adults recruited as part of the Multi-Ethnic Study of Artherosclerosis (MESA) study, focusing on 1,781 adults who had never smoked. The MESA-lung study assessed childhood exposure to ETS by asking each participant "In your childhood, did you live with a regular cigarette smoker who smoked in your home?"

The MESA-lung study was also the first large study of healthy adults to collect CT images that show most of the lungs, allowing for the classification of some areas of the lungs as having indications of early emphysema: large contiguous areas of air-like density ("holes", in contrast to lung tissue, which is more dense than air) or the total percentage of lung volume with air-like density.

After adjusting for a number of potentially confounding variables, including childhood asthma and living with a smoker as an adult, the researchers found that non-smokers who reported childhood exposure to ETS were more likely to have CT patterns that looked like early emphysema: large holes were relatively more common, and more of the lung volume appeared to have low, air-like density. The association was not detectable among current or former smokers, perhaps due to the relatively strong influence of one's own smoking history. They did not find an association for childhood ETS exposure and lung function as measured by spirometry.

"The take-home message from our analysis is that exposure to tobacco smoke during childhood may be associated with detectable differences in lung structure, and perhaps early emphysema, later in life among people who do not themselves smoke," Dr Lovasi said. "These findings might also help researchers to understand how lung damage develops. However, the observed associations are small and the implications of the novel CT-based measures for long-term health this research needs to be replicated."

Source: American Thoracic Society ([news](#) : [web](#))

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