Smoking around your young son could raise the risk of asthma for your future grandchildren

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Children are more likely to develop asthma if their father was exposed to secondhand smoke when he was a child, according to a study published today in the *European Respiratory Journal*.

The study also shows that children's risk of asthma is even higher if their father was exposed to secondhand smoke and went on to become a smoker.

The researchers say their findings highlight how smoking can damage health not only for smokers and their children, but also their grandchildren.

The research was led by Mr. Jiacheng Liu and Dr. Dinh Bui from the University of Melbourne, Australia. It was based on data from the Tasmanian Longitudinal Health Study (TAHS), led by Professor Shyamali Dharmage. TAHS began in 1968 and is one of the world's largest and longest ongoing respiratory studies.

For this study, researchers looked at 1,689 children who grew up in Tasmania, and their fathers and their paternal grandparents. They compared data on whether the children had developed asthma by the age of seven years with data on whether the fathers grew up with parents who smoked when they were under the age of 15. They also included data on whether the fathers were current or former smokers.

Liu said, "We found that the risk of non-allergic asthma in children increases by 59% if their fathers were exposed to secondhand smoke in childhood, compared to children whose fathers were not exposed. The risk was even higher, at 72%, if the fathers were exposed to secondhand smoke and went on to smoke themselves."

Dr. Bui said, "Our findings show how the damage caused by smoking can have an impact not only on smokers, but also their children and grandchildren. For men who were exposed to secondhand smoke as children, our study suggests that they can still lower the risk they pass on to their own children, if they avoid smoking."

Professor Dharmage said, "We can't be certain of how this damage is passed on through generations, but we think it may be to do with epigenetic changes. This is where factors in our environment, such as tobacco smoke, interact with our genes to modify their expression. These changes can be inherited but may be partially reversible for each generation.

"It's possible that tobacco smoke is creating epigenetic changes in the cells that will go on to produce sperm when boys grow up. These changes can then be passed on to their children."

The researchers will now investigate if the

increased risk of asthma persists into adult life and whether fathers who were exposed to secondhand smoke as children pass on any increase in allergies or other lung diseases to their children.

Professor Jonathan Grigg is Chair of the European Respiratory Society's Tobacco Control Committee and was not involved in the research. He says, "Asthma is a common, long-term lung condition that affects children and adults and usually requires ongoing treatment. We already know that smoking and being exposed to secondhand smoke can increase asthma risk. This study adds to growing evidence that the damage caused by tobacco smoke can be passed on to children and even to grandchildren. We need to protect children from this damage with measures to discourage smoking and support to help smokers quit."

More information: Pre-pubertal smoke exposure of fathers and increased risk of offspring asthma: a possible transgenerational effect, *European Respiratory Journal* (2022). DOI: 10.1183/13993003.00257-2022

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