

Smoking fathers increase asthma-risk in future offspring

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Smoking harms nearly every organ in the body and causes many diseases. Credit: CDC/Debra Cartagena

A Norwegian study shows that asthma is three times more common in those who had a father who smoked in adolescence than offspring who didn't.

It is well known that a mother's environment plays a key role in child

health. However, recent research, including more than 24,000 offspring, suggests that this may also be true for fathers.

"Offspring with a father who smoked only prior to conception had over three times more early-onset [asthma](#) than those whose father had never smoked," says Professor Cecilie Svanes at the Centre for International Health, Department of Global Public Health and Primary Care, University of Bergen (UiB).

Early debut increases risk

The study shows that both a father's early smoking debut and a father's longer smoking duration before conception increased non-allergic early-onset asthma in offspring. This is equally true with mutual adjustment, and adjusting for the number of cigarettes smoked and years since quitting smoking.

"The greatest increased risk for their children having asthma was found for fathers having their smoking debut before age 15. Interestingly, time of quitting before conception was not independently associated with offspring asthma," Svanes says.

Smoking fathers may influence gene control in children

Concerning mother's smoking, the research found more offspring asthma if the mother smoked around pregnancy, consistent with previous studies. However, no effect of maternal smoking only prior to conception was identified. The difference from father's smoking suggests effects through male sperm cells.

"Smoking is known to cause genetic and epigenetic damage to

spermatozoa, which are transmissible to offspring and have the potential to induce developmental abnormalities," explains Svanes.

It is previously known that nutritional, hormonal and psychological environment provided by the mother permanently alters organ structure, cellular response and gene expression in her offspring. Father's lifestyle and age appear, however, to be reflected in molecules that control gene function.

"There is growing evidence from animal studies for so called epigenetic programming, a mechanism whereby the father's environment before conception could impact on the health of future generations," Svanes says.

Welding increases risk

Svanes and her team also investigated whether parental exposure to welding influenced [asthma risk](#) in offspring, with a particular focus on exposures in [fathers](#) prior to conception.

The study shows that paternal welding increased offspring asthma risk even if the welding stopped prior to [conception](#). Smoking and welding independently increased offspring asthma risk, and mutual adjustment did not alter the estimates of either.

"For [smoking](#) and welding starting after puberty, exposure duration appeared to be the most important determinant for the asthma risk in offspring," says Cecilie Svanes.

More information: Cecilie Svanes et al. Father's environment before conception and asthma risk in his children: a multi-generation analysis of the Respiratory Health In Northern Europe study, *International Journal of Epidemiology* (2016). [DOI: 10.1093/ije/dyw151](https://doi.org/10.1093/ije/dyw151)

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