

Paternal grandfather's high access to food may indicate higher mortality risk in grandsons

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Potato harvesting in Kristinebergsparken, Stockholm, early 1900's. Credit: Svenska Dagbladet, unknown photographer/Stockholmskällan

A paternal grandfather's access to food during his childhood is associated with mortality risk, especially cancer mortality, in his grandson, shows a large three-generational study from Stockholm University. The reason might be epigenetic – that environmental exposures in one generation may influence health outcomes in following generations.

If a paternal grandfather had good [access](#) to [food](#) and experienced unusually high yields as a young boy, his grandson – but not granddaughter – has a higher [mortality risk](#), the study shows. Especially high was the risk of [cancer mortality](#). The researchers traced approximately 9,000 grandparents and examined the mortality of their grandchildren, more than 11,000 individuals. "Paternal grandfather's access to food predicts all-cause and cancer mortality in grandsons" is published in the journal *Nature Communications*.

"The results are very clear when it comes to the correlation between a grandfather's access to food and his grandson's mortality. A previous Swedish smaller study, the Overkalix study, showed the same result. However, we have been unable to determine other correlations over the generations," says Denny Vågerö, one of the authors of the paper and professor at the Department of Public Health Sciences, Stockholm University.

Previous research has suggested that the pre-pubertal, slow growth period (ages 9-12) is particularly vulnerable to nutritional effects. Denny Vågerö and colleagues' new study confirms this is true when it comes to men. However, there is no difference in mortality risk between grandsons whose paternal grandfather had low or average access to food.

Accounting for [social factors](#), such as education, family size and income, the correlation between access to food and mortality in grandsons was enhanced.

The researchers do not claim to explain the causal relationship but believe that epigenetics might be the key.

"Introduction of chemical pesticides was limited in the end of the 1800's and it's not likely that it would have led to new, large-scale mutations. Therefore, the most reasonable explanation would be that boys', but not girls', germ line cells are open for epigenetic change such as nutritional effects, during pre-puberty. If that is the case, these changes might be passed on to following generations, something that is also shown in animal experiments. However, more research is needed, both in epidemiology and [molecular biology](#)," says Denny Vågerö.

The study, "Paternal grandfather's access to food predicts all-cause and cancer mortality in grandsons," expands on Uppsala Birth Cohort Multigeneration Study. Grandparents (9,039) have been traced and regional data on the yields of harvests have been used to determine the grandparents' access to food during their childhood, 1874-1910. These results were followed up by data on [mortality](#) from 1961-2015 for their grandchildren (11,561).

The study has been published in *Nature Communications* on December 6, 2018.

More information: Denny Vågerö et al. Paternal grandfather's access to food predicts all-cause and cancer mortality in grandsons, *Nature Communications* (2018). [DOI: 10.1038/s41467-018-07617-9](https://doi.org/10.1038/s41467-018-07617-9)

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