

Study shows a significant ongoing decline in sperm counts of Western men

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Dr. Hagai Levine, the study's lead author and Head of the Environmental Health Track at the Hebrew University-Hadassah Braun School of Public Health and Community Medicine, in the Hebrew University's Faculty of Medicine. Credit: Hebrew University

In the first systematic review and meta-analysis of trends in sperm count, researchers from the Hebrew University-Hadassah Braun School of Public Health and Community Medicine and the Icahn School of Medicine at Mount Sinai report a significant decline in sperm concentration and total sperm count among men from Western countries. The study [under embargo until July 25 at 1 pm EDT] is published today in *Human Reproduction Update*, the leading journal in the fields of Reproductive Biology and Obstetrics & Gynecology.

By screening 7,500 studies and conducting a meta-regression analysis on 185 studies between 1973 and 2011, the researchers found a 52.4 percent decline in [sperm concentration](#), and a 59.3 percent decline in total sperm [count](#), among men from North America, Europe, Australia and New Zealand who were not selected based on their fertility status. In contrast, no significant decline

was seen in South America, Asia and Africa, where far fewer studies have been conducted.

The study also indicates the rate of decline among Western men is not decreasing: the slope was steep and significant even when analysis was restricted to studies with sample collection between 1996 and 2011.

The research was led by Dr. Hagai Levine, Head of the Environmental Health Track at the Hebrew University-Hadassah Braun School of Public Health and Community Medicine, Jerusalem, with Dr. Shanna H Swan, Professor in the Department of Environmental Medicine and Public Health at the Icahn School of Medicine at Mount Sinai, New York, and an international team of researchers from Brazil, Denmark, Israel, Spain and the United States.

While declines in sperm count have been reported since 1992, the question has remained controversial because of limitations in past studies. However, the current study uses a broader scope and rigorous meta-regression methods, conservatively addresses the reliability of study estimates, and controls for factors that might help explain the decline such as age, abstinence time, and selection of the study population.

"Given the importance of sperm counts for male fertility and human health, this study is an urgent wake-up call for researchers and health authorities around the world to investigate the causes of the sharp ongoing drop in sperm count, with the goal of prevention," said Dr. Hagai Levine, the lead author and Head of the Environmental Health Track at the Hebrew University-Hadassah Braun School of Public Health and Community Medicine, in the Hebrew University of Jerusalem's Faculty of Medicine.

The findings have important [public health](#) implications. First, these data demonstrate that the

proportion of men with sperm counts below the threshold for subfertility or infertility is increasing. Moreover, given the findings from recent studies that reduced sperm count is related to increased morbidity and mortality, the ongoing decline points to serious risks to male fertility and health.

"Decreasing sperm count has been of great concern since it was first reported twenty-five years ago. This definitive study shows, for the first time, that this decline is strong and continuing. The fact that the [decline](#) is seen in Western countries strongly suggests that chemicals in commerce are playing a causal role in this trend," Dr. Shanna H Swan, a professor in the Department of Environmental Medicine and Public Health at the Icahn School of Medicine at Mount Sinai, New York.

While the current study did not examine causes of the observed declines, [sperm](#) count has previously been plausibly associated with environmental and lifestyle influences, including prenatal chemical exposure, adult pesticide exposure, smoking, stress and obesity. Therefore, [sperm count](#) may sensitively reflect the impact of the modern environment on male health across the lifespan and serve as a "canary in the coal mine" signaling broader risks to male [health](#).

More information: Hagai Levine et al, Temporal trends in sperm count: a systematic review and meta-regression analysis, *Human Reproduction Update* (2017). [DOI: 10.1093/humupd/dmx022](https://doi.org/10.1093/humupd/dmx022)

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