

TOP TAKEAWAYS

Systematic review finds limited or suggestive evidence of no association between talc and two types of reproductive cancers



To date, most reviews on talc exposure and risk for female reproductive cancers have found limited, yet inconsistent evidence of a link between the two. In an independent systematic review of studies on the potential health hazards of talc, accepted for publication in *Frontiers in Toxicology*, on June 8, 2023, Stantec, a Boston-based research firm, has determined that it is likely that there is no association between talc exposure and female reproductive cancers at human relevant levels.

The objective of this work was to apply rigorous systematic review methods to critically evaluate and synthesize the scientific evidence addressing any possible relationship(s) between talc exposure and reproductive cancers, specifically ovarian, endometrial, and cervical cancers. The review included studies on personal use of talc-containing products (primarily talcum powders and cosmetics), integrating three types of studies: epidemiological, toxicological, and mechanistic studies that identify potential underlying modes of action (MOA).

The team of scientists, which included a highly qualified group of toxicologists and epidemiologists, found suggestive evidence of no association between talc and ovarian or endometrial cancers at human relevant exposure levels. The researchers used a hybrid methodology based on the United States Environmental Protection Agency's Integrated Risk Information System (IRIS) Program and the National Academies of Science criteria.

WHY IT MATTERS

This is one of the most comprehensive systematic reviews to date of existing research on talc—a compound used in cosmetic powders and many other products—and the first publication that we are aware of that applies formal methods and integrated multiple lines of evidence. The results raise questions on the validity of pending lawsuits claiming that talc exposure, mostly through the use of talcum powder and cosmetics, causes female reproductive cancers.

"We carefully evaluated the methodological quality of individual studies, and perhaps most importantly, considered how bias associated with specific quality domains—namely exposure characterization—likely affected study results."

"Our analysis demonstrates that it is critical that researchers evaluate not only a study's overall quality, but also whether a specific methodological feature may influence the study results more strongly than others before informing causal decision-making."

- Heather Lynch, M.P.H.

Methods

- Strictly followed PRISMA guidelines and incorporated aspects from the Institute of Medicine (as of 2015 the National Academy of Medicine) and several EPA frameworks for systematic reviews.
- Evaluated and integrated the epidemiological, animal, and mechanistic literature on talc and female reproductive cancers.
- Detailed data abstraction and study quality evaluation, adapting the Toxic Substances Control Act (TSCA) framework.
- The literature search and selection process identified 40 primary studies, with most information available for ovarian cancers.

Key Findings

OVARIAN CANCER

- Animal-** A single animal study with perineal talc application was judged to be of high quality and reported no evidence that talc causes ovarian or other reproductive tumors in rodents after perineal exposure. Experimental studies in rodents and monkeys found that talc does not move from the external genital area or vagina to the ovaries.
- Mechanistic-** Studies that explored mode of action were relatively small in number and had limitations based on the methods used. However, current mechanistic evidence does not support any mode of action whereby talc can cause cancer in the female reproductive tract at human relevant exposure levels.
- Epidemiological-** High-quality epidemiological studies addressing genital use of talc and ovarian cancer were small in number, however, the better-quality studies tended to be negative, providing insufficient evidence to conclude with any confidence that there is a causal connection.

ENDOMETRIAL AND CERVICAL CANCERS

- Animal-** No endometrial or cervical tumors were observed in a single sub-chronic animal study of perineal talc application.
- Mechanistic-** Current mechanistic evidence does not support any mode of action whereby talc can cause cancer in the female reproductive tract at human relevant exposure levels. Mechanistic studies in animals indicate there may be some movement of talc from the external genital area to the cervix, but not into the uterus or beyond. No information was available regarding inflammatory or immune modes of action in endometrial or cervical cells or tissues.
- Epidemiological-** The studies on endometrial cancer and especially cervical cancer were sparse, but the results mimic those of ovarian cancer reported above. The five studies evaluated were all rated as medium quality and did not show an association between genital talc use and endometrial or cervical cancer.

CONCLUSIONS

THE AUTHORS' CONCLUSIONS REGARDING THE HAZARD FOR EACH CANCER TYPE ARE BASED ON THE IOM CLASSIFICATION SYSTEM AND DESCRIBED BELOW.

OVARIAN AND ENDOMETRIAL CANCERS

Integrating all lines of evidence, the authors conclude that there is suggestive evidence of no association between genital talc use and ovarian or endometrial cancers at human relevant exposure levels. The endometrial cancer finding is based on a small but largely null body of literature.

CERVICAL CANCER

The authors conclude that there is insufficient evidence to determine whether a causal association exists between genital talc application and cervical cancer.

"This research brings further clarity to the ongoing debate about the effects of talc exposure. The findings of this comprehensive review should ensure that future considerations of talc in the courtroom or medicine cabinet will be based on validated science, and produce better regulatory and judicial decisions that foster innovation, benefit consumers and protect public health."

– Jacob Traverse, President & CEO, Center for Truth in Science

This systematic review was funded by the [Center for Truth in Science](https://www.truthinscience.org), an independent non-profit organization dedicated to exploring the intersection of science, justice and the economy.

The research plan and summary were described by Margaret Murray, Ph.D., research director of Center for Truth in Science, and performed by a highly qualified group of toxicologists and epidemiologists from April to September, 2021.

To view the full independent systematic review, visit:
<https://www.frontiersin.org/articles/10.3389/ftox.2023.1157761/full>

IOM CATEGORIZATIONS FOR EVALUATING STRENGTH OF EVIDENCE

Sufficient Evidence of No Association

Several adequate studies, covering the full range of levels of exposure that human beings are known to encounter, are mutually consistent in not showing a positive association between exposure and the outcome. However, the possibility of a very small elevation in risk at the levels of exposure studied can never be excluded.

Sufficient Evidence of an Association

Evidence is sufficient to conclude that there is a positive association. That is, a positive association has been observed between an exposure and the outcome in studies in which chance, bias, and confounding could be ruled out with reasonable confidence.

Limited or Suggestive Evidence of an Association

The evidence suggests an association between an exposure and the outcome, but a firm conclusion is limited because chance, bias, and confounding could not be ruled out with confidence.

Inadequate or Insufficient Evidence to Determine Whether an Association Exists

Available studies are of insufficient quality, consistency, or statistical power to permit a conclusion regarding the presence or absence of an association. For example, these studies may fail to control for confounding factors, have inadequate exposure assessment, or fail to address latency.

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** The authors conclude that there is limited/suggestive evidence of no association between genital talc use and reproductive tract cancers at human relevant exposure levels.*