

Women who survive breast or thyroid cancer are more likely to develop the other type later

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Women who survived breast or thyroid cancer faced an elevated risk of developing the other cancer as a secondary malignancy, according to a study published in *Cancer Epidemiology, Biomarkers & Prevention*, a journal of the American Association for Cancer Research.

The incidence of differentiated thyroid cancer, which includes papillary and follicular cancers, has increased nearly threefold in the United States over the past three decades, and [breast cancer](#) is the most commonly diagnosed malignancy in [women](#). Advances in detection and treatment have resulted in many women surviving their initial illness, said the study's lead author, Raymon H. Grogan, MD, assistant professor of surgery and director of the Endocrine Surgery Research Program at the University of Chicago Medicine and Biological Sciences.

"We now have large numbers of women who have survived one of the cancers. We saw evidence in the clinic that women who survived one seemed vulnerable to later developing the other," Grogan said.

Grogan and fellow researchers set out to analyze studies of both kinds of cancer over several decades through a review of PubMed and Scopus databases. The researchers queried the databases to find studies in which women who had survived either breast or thyroid cancer developed the other type later. They then calculated odds ratios based on the numbers of observed and expected secondary malignancies.

The results showed that women who had survived breast cancer were

1.55 times more likely to develop thyroid cancer than a woman who hasn't had breast cancer, and women who had survived thyroid cancer were 1.18 times more likely to develop breast cancer than a woman who hasn't had thyroid cancer.

Grogan's study also included a literature review that evaluated several theories about the connection between breast cancer and thyroid cancer.

Key findings:

- Surveillance bias. Grogan explained that a woman who has survived breast cancer will have very close clinical followup with her physicians in the years after her illness, which could increase the likelihood of detecting thyroid cancer even if it was in an early stage. Similarly, the study suggested, women with a history of thyroid cancer are more likely to be compliant with screening tests such as mammograms, thus increasing rates of breast cancer detection.
- Shared hormonal factors. Both breast and thyroid cancer cancers have hormonal risk factors, so researchers considered whether the co-occurrence of the cancers could also result from hormonal factors. There is evidence in the literature that exposure to estrogens and to thyroid-stimulating hormones may play a role in the development of breast or thyroid cancer as a secondary malignancy, Grogan said, adding that further research would be necessary to confirm the link.
- Treatment effect. Most early-stage breast cancers are treated with surgery, followed by radiation therapy. Previous studies have suggested that exposure to radiation affects the risk of certain cancers, including lung, esophageal, and blood cancers, and sarcomas. Grogan said that radiation exposure is also a well-known risk factor for the development of thyroid cancer, but that radiation exposure of the thyroid during chest radiation can be largely ameliorated with proper shielding of the thyroid. Grogan

said previous research did find that radioactive iodine (RAI), used in the treatment of thyroid cancer, plays a very small role in the development of other cancers later on, including breast cancer, but the exact risk of developing breast cancer after RAI therapy is still not clear.

- **Genetics.** Another theory is that a germline mutation could be responsible for the connection between breast and thyroid cancers. One known genetic link is Cowden syndrome, which has been proven to increase the risk of a patient developing both cancers; however, it alone cannot explain the elevated risks found in the current study. Grogan said that further research is necessary to identify other potential genetic factors.

Grogan said that by being aware of the risk a woman faces of developing breast or thyroid cancer after surviving the other form of the disease, clinicians should be diligent about recommending screening measures.

"The connection between [breast](#) cancer and [thyroid cancer](#) is another risk factor that a doctor and a patient should be aware of," he said.

According to Grogan, a limitation of the study is that the time between initial illness and secondary malignancy could not be determined due to heterogeneity in the studies. Without this information it is hard to determine how much of the risk of developing the second cancer is associated with surveillance bias. However, the significant increase in risk is bidirectional, so the researchers believe that surveillance bias alone cannot explain the link entirely.

More information: S. M. Nielsen et al. The Breast-Thyroid Cancer Link: A Systematic Review and Meta-analysis, *Cancer Epidemiology Biomarkers & Prevention* (2016). [DOI: 10.1158/1055-9965.EPI-15-0833](https://doi.org/10.1158/1055-9965.EPI-15-0833)

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