

# Risk for leukemia after treatment for early-stage breast cancer higher than reported

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The risk of developing leukemia after radiation therapy or chemotherapy for early stage breast cancer remains very small, but it is twice as high as previously reported, according to results of a new study led by researchers at the Johns Hopkins Kimmel Cancer Center.

The study team reviewed data on 20,063 [breast cancer](#) patients treated at eight U.S. cancer centers between 1998 and 2007 whose cancer recurrence and secondary cancer rates were recorded in a database kept by the National Comprehensive Cancer Network. In that group, 50 patients had developed some form of leukemia within 10 years after radiation therapy, [chemotherapy](#) or a combination of the two. That translates to roughly a cumulative risk of 0.5 percent.

Data from earlier randomized clinical trials, which typically include just a few hundred patients, found that about 0.25 percent of [breast cancer patients](#) develop leukemia as a late effect of chemotherapy, says Judith Karp, M.D., professor emerita of oncology at the Johns Hopkins University School of Medicine, who retired in 2013 as director of the Kimmel Cancer Center's Leukemia Program.

"The frequency of bone marrow cancers such as leukemia is small, there's no question about it," Karp says. "However, the cumulative risk over a decade is now shown to be twice as high as we thought it was, and that risk doesn't seem to slow down five years after treatment."

Results of their so-called look-back, or retrospective, study were

published online Dec. 22 in the *Journal of Clinical Oncology*.

"Most medical oncologists have come to think that the risk is early and short-lived," says Karp. "So this was a little bit of a wake-up call that we are not seeing any plateau of that risk, and it is higher."

Antonio Wolff, M.D., a professor of oncology at the Johns Hopkins University School of Medicine, says the study could help early-stage breast cancer patients and their physicians think more carefully about the use of chemotherapy for "just-in-case" reasons, especially when patients have a low risk of cancer recurrence.

"Our study provides useful information for physicians and patients to consider a potential downside of preventive or adjuvant chemotherapy in patients with very low risk of [breast cancer recurrence](#)," says Wolff. "It could be a false and dangerous security blanket to some patients by exposing them to a small risk of serious late effects with little or no real benefit from the treatment."

In recent years, oncologists have learned that postsurgical chemotherapy for breast cancer mostly benefits a small and select group of patients. The National Comprehensive Cancer Network clinical guidelines no longer recommend it for all patients with stage 1 breast cancers, the term for invasive breast cancers no larger than 2 centimeters that have not spread to nearby lymph nodes.

Wolff says that each patient's treatment plan for early-stage cancer could differ depending on a variety of factors, including the size of the tumors; whether the cancer has spread to the lymph nodes; and whether the tumor tests positive for certain breast cancer-related hormone and growth receptors, such as estrogen receptors (ER) and human epidermal growth factor receptor 2 (HER2).

The study team, led by Johns Hopkins researchers, also included a hypothetical case to put the risks of early-stage breast cancer and chemotherapy treatment in perspective. She was a 60-year-old woman in average health, diagnosed with stage 1 breast cancer that was rapidly growing and ER-positive, and who is calculated to have a 12.3 percent risk of dying of breast cancer after 10 years. She could improve her 10-year survival rate by 1.8 percent with four cycles of chemotherapy, but she would also increase her risk of leukemia over that same time by 0.5 percent.

"The good news is that the majority of patients with stage 1 breast cancer will survive their breast cancer diagnosis," he adds, "and of all the solid tumors, breast cancer is among the most curable of them."

Wolff says it isn't yet clear whether the increased risk of leukemia after postsurgical chemotherapy applies to [patients](#) with other kinds of solid tumors, especially since the drug regimens used in breast cancer differ from those used for other cancers.

**More information:** *Journal of Clinical Oncology*,  
[jco.ascopubs.org/content/early ... 013.54.6119.abstract](http://jco.ascopubs.org/content/early ... 013.54.6119.abstract)

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