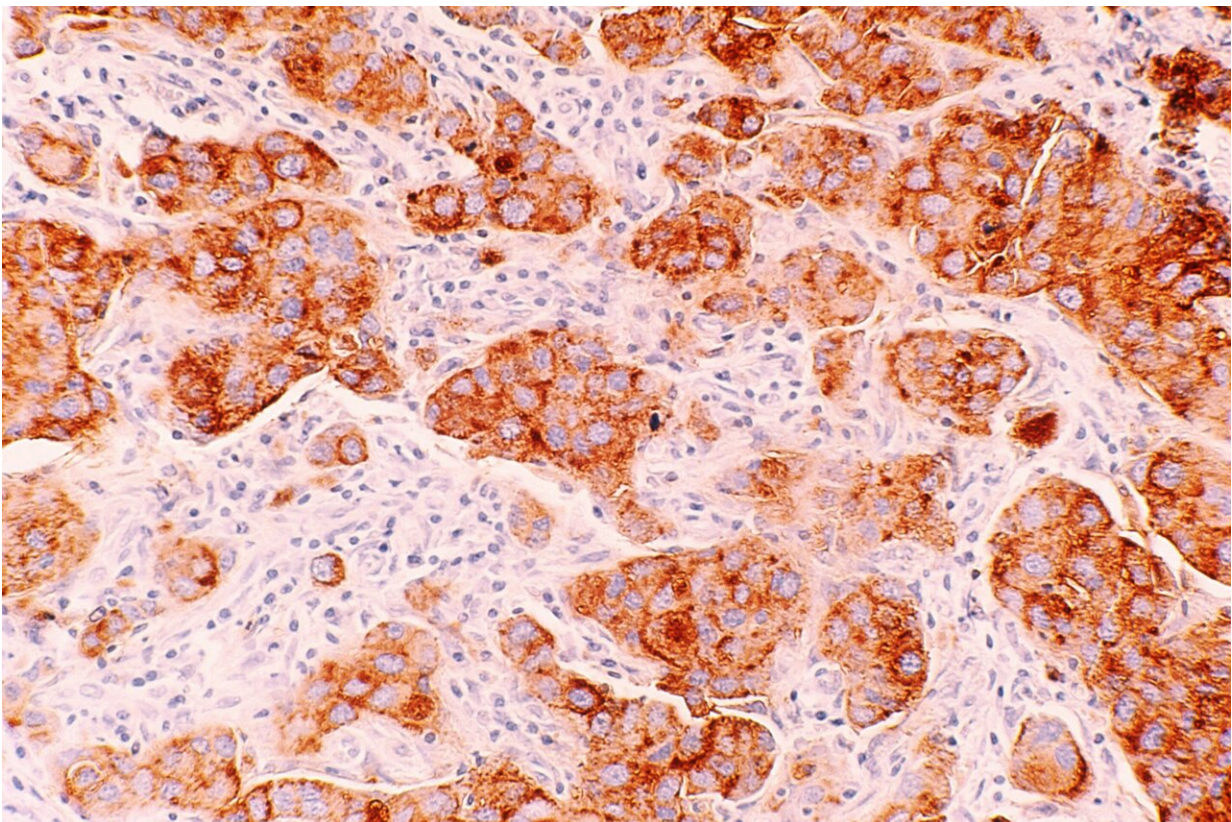


Low income linked to high recurrence risk, poorer survival in women with ER-positive breast cancer

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Patients with early-stage estrogen receptor-positive breast cancer who live in low-income neighborhoods are likelier to have more aggressive

tumors and significantly lower overall survival (OS) than those in higher-income neighborhoods, according to research led by Roswell Park Comprehensive Cancer Center. The study, "Association of neighborhood-level household income with 21-gene recurrence score and survival among patients with estrogen receptor-positive breast cancer," appears today in *JAMA Network Open*.

Anurag Singh, MD, Director of Radiation Research and Co-Leader of the Cancer Stress Biology Program at Roswell Park, served as principal investigator of the study; Sung Jun Ma, MD, Department of Radiation Medicine, was first author. The research team included collaborators from the State University of New York at Buffalo (UB), the Jacobs School of Medicine and Biomedical Sciences at UB, and the Department of Radiation Oncology at the University of Florida.

Utilizing the National Cancer Database, the research team analyzed data connected to women who were diagnosed with early-stage ER-positive breast [cancer](#) between 2006-2018. All were treated with surgery and adjuvant endocrine therapy, either with or without chemotherapy. Their health was tracked until 2021, with a median follow-up of 66.2 months. Overall survival was defined as the duration between diagnosis and either the last follow-up or death from any cause.

Of the 119,478 women included in the study, 82,198 (68.8%) lived in neighborhoods (defined by ZIP code) above the median U.S. household income of \$50,353; the remaining 37,280 (31.2%) fell below that threshold.

With that information in hand, the research team focused on patients' 21-gene recurrence score (RS), which is based on the expression of 21 cancer-related genes detected in pre-treatment tumor specimens. The RS, which ranges from 0-100, is used routinely in clinical care to predict the risk of distant metastasis—the tumor's spread from its original

location to other parts of the body. A score of 26 or higher indicated greater risk of recurrence and poorer overall survival, whether or not lymph nodes showed evidence of cancer. Data analysis revealed a statistically significant relationship between low household income and high RS.

The authors believe this to be the largest study using a nationwide oncology database to make that connection. "We have known that income level increases the incidence of poor-prognosis triple-negative breast cancer," notes Dr. Singh, "but this is the first data to show that income level impacts survival even in breast cancer with a better prognosis."

The study data also captured the percentage of adults living in the neighborhood who did not graduate from high school, with a median of 10.9% defined as a low education level. The research team found no association between low education levels and high RS—only between low income and high RS. In fact, the study included non-Hispanic white women with higher education levels who also had private health insurance. The data showed that if those women lived in low-income areas, they still tended to have higher RS and worse OS, while those with higher income tended to have lower RS.

The authors speculate that higher RS and lower overall survival may mean that women in low-income households are less likely to undergo cancer screening, resulting in delayed diagnosis and worsening of tumor biology. They also note that "financial distress has been shown to result in increased psychological and [emotional distress](#), poor quality of life, and depression," adding that such distress could weaken the p53 tumor protein, which is responsible for preventing the development of tumors, and contributing to "more aggressive tumor biology with distant metastasis."

The authors conclude that further research is needed to better understand the relationship between socioeconomic status and intrinsic [tumor](#) biology among breast cancer patients, and how financial distress affects the pathways that promote the formation of tumors.

The National Cancer Database contains data on more than 34 million cancer cases treated at 1500 facilities accredited by the Commission on Cancer. It represents 80% of newly diagnosed [breast cancer](#) cases in the U.S.

More information: Sung Jun Ma et al, Association of Neighborhood-Level Household Income With 21-Gene Recurrence Score and Survival Among Patients With Estrogen Receptor–Positive Breast Cancer, *JAMA Network Open* (2023). [DOI: 10.1001/jamanetworkopen.2023.0179](https://doi.org/10.1001/jamanetworkopen.2023.0179)

Provided by Roswell Park Comprehensive Cancer Center

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