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# Adjuvant Chemotherapy Use and Health Care Costs After Introduction of Genomic Testing in Breast Cancer

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## Abstract

Genomic testing in patients with early-stage breast cancer is associated with decreased use of chemotherapy and lower costs in younger patients, and slightly increased use of chemotherapy and higher costs in older patients. Genomic testing in actual practice may “rule out” chemotherapy in younger women, and “rule in” chemotherapy in older women.

## Keywords

personalized medicine and genomics, medical decision making

## Disciplines

Analytical, Diagnostic and Therapeutic Techniques and Equipment | Health Services Research

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## KEY FINDINGS:

Genomic testing in patients with early-stage breast cancer is associated with decreased use of chemotherapy and lower costs in younger patients, and slightly increased use of chemotherapy and higher costs in older patients. Genomic testing in actual practice may “rule out” chemotherapy in younger women, and “rule in” chemotherapy in older women.

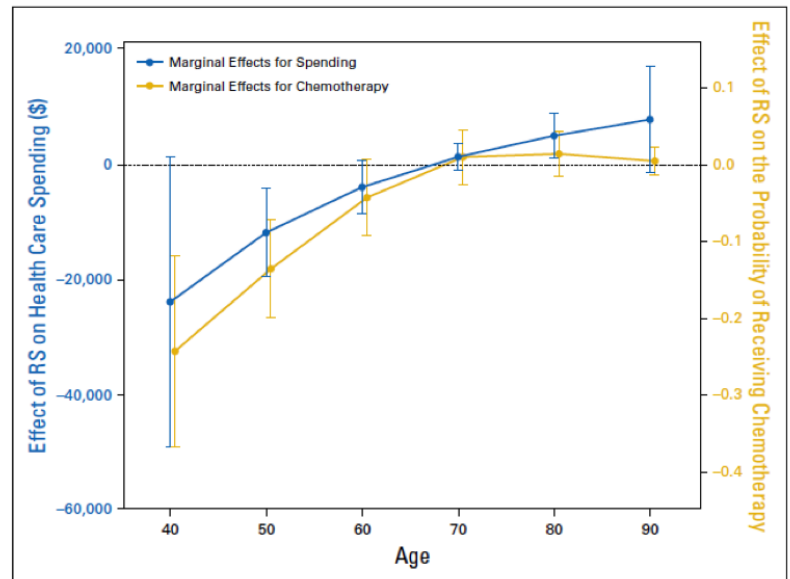
## THE QUESTION

The promise of personalized genomic testing is that it can reduce unnecessary care and costs by predicting which patients are most likely to benefit from a treatment. After surgery, women with early-stage breast cancer face the decision of whether to undergo expensive and potentially toxic chemotherapy to prevent recurrence, although most will not have a recurrence. The 21-gene recurrence score test (RS) was developed in 2004 to predict this risk, and its use in clinical medicine is increasing. In this study of actual treatment patterns, LDI Senior Fellows Andrew Epstein and Peter Groeneveld and colleagues investigate how genomic testing of women with early-stage breast cancer affects subsequent chemotherapy use and medical spending in the year after diagnosis.

## THE FINDINGS

The study found that RS testing influenced treatment decisions and medical expenses differently for younger and older patients. Among women younger than 55, RS testing was associated with a nearly 20 percentage point decrease in use of chemotherapy (from 60.8% to 41.5%) and \$15,000 less in medical spending in the 12 months after diagnosis (from \$96,667 to \$81,334).

Among women older than 75, however, RS testing increased chemotherapy use by almost 6 percentage points (from 8.7% to 14.4%) and increased medical spending by more than \$3,000 (from \$29,720 to \$33,209). The authors found that the rate of RS testing decreased with age after 55.



Source: Journal of Clinical Oncology, Dec 20, 2015

### Incremental effect of RS receipt on probability of receiving chemotherapy and on total spending

The gold lines represent the difference in probability (0 to 1 scale) of chemotherapy use among RS recipients. The blue lines represent the change in total health care costs (2010 \$US) among RS recipients. The vertical lines indicate 95% CIs for the point estimates.

## THE IMPLICATIONS

These findings have important policy implications for genomic testing. In real-world practice settings, RS testing was associated with substantial reductions in the use of chemotherapy and medical spending in younger women, implying that RS testing reduced unnecessary treatment—a critical goal of personalized medicine. Among elderly women, however, RS testing may provide impetus to use chemotherapy among patients with comorbidities.

Hence, RS testing may be commonly used among younger patients to “rule out” patients for chemotherapy, but, conversely, it may be used among older patients to “rule in” the use of chemotherapy patients who otherwise would not be candidates for chemotherapy due to their frailty or comorbid conditions. At a population level, the impact of RS testing is much greater for younger women.

## THE STUDY

The authors used the Pennsylvania Cancer Registry to assemble a cohort of 7,287 women who were diagnosed with early-stage breast cancer between 2007 and 2010 and had initial surgical treatment. Unlike most studies of cancer treatment, the authors studied patients who were covered both under Medicare (74%) and private insurance (26%). Compared to patients who did not receive RS testing, patients with RS testing were younger and more likely to have private insurance, have fewer comorbidities, and have stage I breast cancer. The registry data were combined with administrative claims data from traditional Medicare and Independence Blue Cross covering 12 months before and after diagnosis to identify patient comorbidities, treatments and expenditures. The authors used propensity score-

weighted regression models to find out whether and how RS testing influenced chemotherapy use and medical spending after diagnosis.

Epstein AJ, Wong YN, Mitra N, et al. [Adjuvant Chemotherapy Use and Health Care Costs After Introduction of Genomic Testing in Breast Cancer](#). JCO Dec 20, 2015;4259-4267; DOI:10.1200/JCO.2015.61.9023.

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and an appreciation for institutional context, and focuses on better understanding the sources of variation in medical care and their implications for the performance of the delivery system. His research has been published in leading medical, health services research, and economics journals, including JAMA, BMJ, Health Services Research, Medical Care, the Journal of Health Economics, and the Rand Journal of Economics.



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