Published in final edited form as:

JAMA Intern Med. 2013 February 11; 173(3): 227–228. doi:10.1001/jamainternmed.2013.2127.

Costs, Evidence, and Value in the Medicare Program:

The Challenges of Technology Innovation in Breast Cancer Prevention and Control

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Women who are now 65 years old can expect to live another 20 years, and those aged 75 years will live, on average, for another 13 years based on US life tables. The Medicare program, enacted in 1965, currently provides care to approximately 30 million US women 65 years or older (hereinafter referred to as “older”), and that number is projected to double by 2030 owing to the “graying of America.” Total Medicare spending was \$523 billion in 2010 with breast cancer screening accounting for about \$1 billion of that total.

The provocative article by Gross et al¹ published in this issue examines whether investments in new and more expensive breast cancer screening technologies, such as digital mammography, provide a good return on investment in the care of the growing older US female population. Evidence on the efficacy of digital mammography comes from the American College of Radiology Imaging Network Digital Mammographic Imaging Screening Trial; published in 2005, the trial involved more than 40 000 women of all ages. Digital screening rapidly disseminated into practice in the United States after these results were published. This occurred despite the primary trial finding that there was no overall difference between digital and plain-film mammography in detecting breast cancer, although it was superior for premenopausal or perimenopausal women younger than 50 years with dense breasts. Notably, among women 65 or older, whose breasts have a higher proportion of fat than dense mammary tissue, there was actually a strong trend for digital mammography to perform worse than plain film mammography.² Yet Medicare has covered this service under its annual breast cancer screening benefit and continues to do so, despite limitations in evidence of benefit for older women and lack of cost-effectiveness.³

The study by Gross et al focused on the period early in the adoption of digital screening (2006–2007), when costs related to false-positive readings may be highest because of the learning curve in reading the images.⁴ They found that regions that “spend more” on

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Conflict of Interest Disclosures: None reported.

Disclaimer: The views expressed in this commentary represent those of the authors and not the NIH.

screening have higher early cancer rates, but no change in advanced cancer rates or treatment costs, after considering comorbidity of the beneficiaries in the area and regional payment variations. They concluded that costs are driven up by use of the newer technologies like digital mammography and computer-aided detection, but that outcomes may not be any better, especially for beneficiaries 75 years or older, who accounted for \$410 million of spending on screening in each year studied. Moreover, they and others suggest that some of the cancers being detected among older women in high-cost regions may actually be instances of overdiagnosis—cancers that might never have surfaced or progressed within the woman's life span.

Although the evidence from this study is compelling, it does not fully address the question of whether investment in more expensive digital technology improves breast cancer outcomes for older women. They used incidence of early- vs late-stage disease as their primary measure of effect. Even if detection at early stages was associated with decreased breast cancer treatment costs (and they were not), investments in screening might not realize their full return if mortality is unaffected. Even all-cause and breast cancer-specific mortality are still considered flawed outcome measures owing to observational, lead, and length biases.⁵

Clinical trials specific to older populations could begin to address the limitations inherent in all good observational research, including that of Gross et al. Like many trials, the original breast cancer screening trials did not include sufficient numbers of women older than 74 years for definitive analyses about the impact on breast cancer mortality. Thus, the US Preventive Services Task Force⁶ recently concluded that “the current evidence is insufficient to assess the additional benefits and harms of screening mammography in [average risk] women 75 years or older” who have been regularly screened from ages 50 to 74 years. Beyond the lack of direct evidence, this conclusion was also driven by the steeper average rate of rise of competing mortality after age 74 years. But, millions of women 75 years or older are not average in terms of health status, life expectancy, or risk of dying of breast cancer vs another disease. It should be noted that the research by Gross et al focused on Medicare claims data predating the 2009 Task Force recommendation for screening cessation after age 74 years. The claims do not include information about risk factors or screening histories of women predating their entry into the Medicare program, underscoring the need for expanded population-based screening registries and trials. But, until we invest in conducting a definitive randomized trial in older women, we will continue to grapple with the conundrums inherent in interpreting observational results like those of Gross et al.

Adding further to this complexity are critical ethical and economic questions about how to best value outcomes (from either trials or observational studies), personalize coverage in public health programs, and ensure equity. We have few metrics to measure the value of care in a “one-size fits all” payment system. The Medicare program was not originally designed to consider in its coverage decisions factors like modern technology or the marked heterogeneity in health and life expectancy seen in the present cohorts of older Americans. There is also a tension between an insurer's economic perspective and individuals' preferences for specific health outcomes. Undergoing screening for the potential of avoiding death from breast cancer might have important value to many older women and their

families. This may be especially true for women 75 years or older who are healthier than the average for their ages. Even for those of average health, extending the number of healthy, independent years owing to avoidance of the complications of more advanced cancer may have an important value, even if there is no extension of life.

One logical consequence of the demographic and fiscal imperatives the United States and other countries are facing would be to examine how Medicare can be maintained but allow for more “personalized,” evidence-based coverage to increase program efficiency, lower costs and integrate different values. For instance, Gross et al did not look at costs and outcomes by strata based on comorbidity-specific life expectancy. Also, since they used claims data, they were not able to consider family history, screening use before age 65 years and/or past hormone therapy use. These factors could be studied using simulation models to project which potential alternative policies could best personalize coverage, considering individual and societal preferences to maximize benefits and minimize costs related to overdiagnosis and overtreatment of breast cancer and other cancers. What is harder to capture in any evidence synthesis is the moral imperative to provide equitable access to care.⁷

Although we have discussed the value of health interventions covered by the Medicare program in the context of breast cancer screening and treatment, these considerations apply equally to other common cancers affecting older Americans for whom screening technology and novel therapies exist, and to most all other chronic conditions for which advanced technology is part of medical care, from proton-beam radiation to genomic testing. For all of these conditions, interventions, and decisions about Medicare coverage, the real question raised by the research of Gross et al that must be answered is how we put a value on the life of any person or group.⁸

Acknowledgments

Funding/Support: The authors are supported by funding from the National Cancer Institute at the National Institutes of Health (NIH) (grant No. U01CA088283 and U01CA152958 to Dr Mandelblatt and Ms van Ravesteyn; grant No. KO5CA96940 to Dr Mandelblatt; grant No. P01CA154292 to Drs Mandelblatt and Tosteson and Ms van Ravesteyn, grant No. RC2CA148577 to Drs Mandelblatt and Tosteson, and grant No. U54CA163307 to Dr Tosteson).

References

1. Gross CP, Long JB, Ross JS, et al. The cost of breast cancer screening in the Medicare population [published online January 7, 2013]. *JAMA Intern Med.* 2013; 173(3):220–226. [PubMed: 23303200]
2. Pisano ED, Hendrick RE, Yaffe MJ, et al. DMIST Investigators Group. Diagnostic accuracy of digital versus film mammography: exploratory analysis of selected population subgroups in DMIST. *Radiology.* 2008; 246(2):376–383. [PubMed: 18227537]
3. Tosteson AN, Stout NK, Fryback DG, et al. DMIST Investigators. Cost-effectiveness of digital mammography breast cancer screening. *Ann Intern Med.* 2008; 148(1):1–10. [PubMed: 18166758]
4. Henderson LM, Hubbard RA, Onega TL, et al. Assessing health care use and cost consequences of a new screening modality: The case of digital mammography [published online August 23, 2012]. *Med Care.* 2012

5. Mandelblatt JS, Silliman R. Hanging in the balance: making decisions about the benefits and harms of breast cancer screening among the oldest old without a safety net of scientific evidence. *J Clin Oncol.* 2009; 27(4):487–490. [PubMed: 19075258]
6. US Preventive Services Task Force. Screening for breast cancer: US Preventive Services Task Force recommendation statement. *Ann Intern Med.* 2009; 151:716–26. W-236. <http://www.uspreventiveservicestaskforce.org/uspstf/uspbrca.htm>. Accessed October 1, 2012. [PubMed: 19920272]
7. Goldie SJ, Daniels N. Model-based analyses to compare health and economic outcomes of cancer control: inclusion of disparities. *J Natl Cancer Inst.* 2011; 103(18):1373–1386. [PubMed: 21900120]
8. Sulmasy DP. Cancer care, money, and the value of life: whose justice? which rationality? *J Clin Oncol.* 2007; 25(2):217–222. [PubMed: 17210943]