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Potential Impact of the Affordable Care Act's Preventive Services Provision on Breast Cancer Stage: A Preliminary Assessment

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Abstract

Introduction—The Affordable Care Act's (ACA) preventive services provision (PSP) removes copayments for preventive services such as cancer screening. We examined: 1) whether a shift in breast cancer stage occurred, and 2) the impact of the provision on racial/ethnic disparities in stage. **Materials and Methods:** Data from the National Cancer Data Base were used. The pre- and post-PSP periods were identified as 2007–2009 and 2011–2013, respectively. Proportion differences (PDs) and 95% confidence Intervals (CIs) were calculated. **Results:** All three racial/ethnic groups experienced a statistically significant shift toward Stage I breast cancer. Pre-PSP, black:white disparity in Stage I cancer was -9.5 (95% CI: $-8.9, -10.4$) and the Latina:white disparity was -5.2 (95% CI: $-4.0, -6.1$). Post-PSP, the disparities improved slightly. **Discussion:** Preliminary data suggest that the ACA's PSP may have a meaningful impact on cancer stage overall and by race/ethnicity. However, more time may be needed to see reductions in disparities.

METHODS—A sensitivity analysis was also carried out to examine if changes in the pre- and post-PSP periods could be accounted for by secular trends such as the observed decline in the rate of late stage breast cancer.¹ Therefore, the overall and racial/ethnic-specific proportions in stage I cancer were examined for 2004–2006 and compared to those of the pre- and post-PSP periods.

RESULTS—*Sensitivity Analysis.* The sensitivity analysis revealed that between 2004–2006 and the pre-PSP period (2007–2009), the proportion of stage I breast cancers had statistically significantly increased by 1.4 and 1.5 percentage points for white and black women, respectively, but did not change for Latina women (PD= -0.5 ; 95% CI: $-1.0 - 2.1$). However, the shift toward stage I breast cancers that occurred between the pre- and post-PSP periods was considerably larger (Figure 1). It increased by 3.2, 4.0, and 4.1 percentage points for white, black, and Latina women respectively. Supplementary data can be found in the online version of this paper.

DISCUSSION—In addition, we carried out a sensitivity analysis to better understand how secular trends might account for the changes we observed between the pre- and post-PSP periods.

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Keywords

Breast cancer; disparities; cancer stage; insurance; Affordable Care Act

INTRODUCTION

Breast cancer is the most common cancer among women in the United States (US) with an estimated 252,710 cases to be diagnosed in 2017.¹ Breast cancers that are diagnosed at an early stage require less invasive treatment and have a very favorable prognosis.^{1,2} Although most breast cancers in the US are diagnosed at an early stage, non-Latina black and Latina women are less likely than their non-Latina white counterparts to present at an early stage which may contribute to observed disparities in prognosis.³

Despite recent controversies, mammography remains the primary tool for detecting breast cancer at earlier stages.⁴ The US Preventive Services Task Force (USPSTF) recommends biennial use for women aged 50–74 years of age.⁵ Compared to white women, Latina women are less likely to receive mammograms overall and black women are less likely to receive them at recommended intervals.^{6,7} Out of pocket payments for preventive services have been identified as a potential barrier to receiving a screening mammogram.^{8,9} Recently, a key provision under the Patient Protection and Affordable Care Act's (ACA) preventive services provision (PSP) has removed this cost barrier.

In order to increase the use of preventive care, the ACA eliminated cost-sharing (e.g. copayment, co-insurance) for preventive services that are strongly recommended by the USPSTF.¹⁰ Beginning in January 1, 2011, Medicare and private health plans could no longer impose cost-sharing for these preventive services. Screening mammograms are among the 45 services covered under this provision. The elimination of cost-sharing may increase the use of screening mammography which could lead to a shift in the proportion of earlier stage breast cancer. Furthermore, the elimination of cost-sharing may help ameliorate racial/ethnic disparities in breast cancer stage because minority women are disproportionately represented among those targeted by such provisions.¹¹

The present analysis had two objectives. First, we examined whether a shift in breast cancer stage occurred following the implementation of ACA's PSP. Second, we assessed the impact of this provision on racial/ethnic disparities in breast cancer stage.

METHODS

This retrospective study includes patients diagnosed with breast cancer and included in the National Cancer Data Base (NCDB). Sponsored by the Commission on Cancer of the American College of Surgeons and the American Cancer Society, the NCDB is a nationwide hospital-based cancer database that captures approximately 70% of all newly diagnosed cancers in the US from approximately 1,500 hospitals accredited by the Commission on Cancer. Patients were included if they were: non-Latina white (white), non-Latina black (black), or Latina; diagnosed with stage I–IV cancer; ages 50 to 74; and Medicare- or privately-insured women. The pre- and post- periods of the preventive services provision

were identified as 2007–2009 (pre-PSP) and 2011–2013 (post-PSP), respectively. The year 2010 was treated as a washout/phase-in period and was excluded. A pre-post design was used to: 1) examine a shift in the distribution of cancer stage overall and by race/ethnicity; and 2) assess the impact on racial/ethnic disparities in stage.

Logistic regression models of stage I cancer versus all other stages, with model-based standardization (predictive margins), were used to report proportions (P) and estimate differences (PDs) with bias-corrected bootstrapped 95% confidence Intervals (CIs). First, we used the models to obtain estimates of the proportion differences in stage I cancer pre-versus post-PSP, overall and stratified by race/ethnicity. Second, in order to assess the impact of PSP on disparities in stage, models were used to obtain estimates of racial/ethnic differences in the proportion of stage I cancer, stratified by PSP period. Models were adjusted for age, ZIP code-level economic indicators (i.e. median household income, percent with high school education), and insurance type.

A sensitivity analysis was also carried out to examine if changes in the pre- and post-PSP periods could be accounted for by secular trends such as the observed decline in the rate of late stage breast cancer.¹² Therefore, the overall and racial/ethnic-specific proportions in stage I cancer were examined for 2004–2006 and compared to those of the pre- and post-PSP periods.

RESULTS

Study Population

The study included 470,465 patients of whom 85% were white, 10% were black, and 4% were Latina (Table 1). Both pre- and post-PSP, most women were diagnosed before age 65 and with stage I cancer, had private health insurance, and lived in areas with a median household income of \$48,000 or greater and a high school completion rate of at least 19%. Overall, both pre- and post-PSP, minority women were more likely than white women to be diagnosed at a younger age and later stage ($p < 0.0001$). In addition, they were more likely to live in zip codes with lower income and educational attainment ($p < 0.0001$).

Overall Shift in Breast Cancer Stage

Between the pre- and post-PSP periods, a shift in the breast cancer stage distribution occurred (Table 1). Specifically, the overall proportion of stage I cancers increased from 54.4% to 58.0% while the proportion of stage II and stage III cancers decreased. After adjusting for age, income, education, and insurance type, the proportion difference (PD) in stage I cancers was slightly attenuated but remained statistically significant (PD= 3.2; 95% CI: 3.0, 3.5).

Shift in Breast Cancer Stage by Race/Ethnicity

Table 1 illustrates that all three racial/ethnic groups experienced a significant shift toward stage I cancers ($p < 0.0001$). The improvement in stage at diagnosis was only slightly attenuated after adjusting for age, income, education, and insurance type and remained statistically significant. Specifically, the adjusted pre-/post-PSP proportion difference (PD)

in stage I breast cancer was 3.2 (95% CI: 2.9, 3.5) among white women, 4.0 (95% CI: 3.0, 4.8) among black women and 4.1 (95% CI: 2.6, 5.5) among Latina women (Figure 1).

Impact on Racial/Ethnic Disparities in Stage

Pre-PSP, the adjusted proportion of stage I cancer was 55.7%, 46.1% and 50.6% for white, black, and Latina women respectively, which translated into a statistically significant black:white disparity (PD) of -9.5 and a Latina:white disparity of -5.2 (Table 2). Post-PSP, the racial/ethnic disparity was slightly reduced but remained statistically significant (black:white PD= -8.6; Latina:white PD= -4.3)

Sensitivity Analysis

The sensitivity analysis revealed that between 2004–2006 and the pre-PSP period (2007–2009), the proportion of stage I breast cancers had statistically significantly increased by 1.4 and 1.5 percentage points for white and black women, respectively, but did not change for Latina women (PD=-0.5; 95% CI: -1.0 – 2.1). However, the shift toward stage I breast cancers that occurred between the pre- and post-PSP periods was considerably larger (Figure 1). It increased by 3.2, 4.0, and 4.1 percentage points for white, black, and Latina women respectively. Supplementary data can be found in the online version of this paper.

DISCUSSION

This early assessment of the ACA's preventive services provision suggests that it may have a positive impact on breast cancer stage at diagnosis for women age 50–74, who are targeted by the USPSTF mammography screening guidelines. First, breast cancer patients overall experienced a higher proportion of stage I diagnoses during the post-PSP period as compared to the pre-PSP period. Second, compared to white women, black and Latina women experienced a slightly larger shift toward stage I diagnoses. Third, the racial/ethnic disparity in stage was minimally attenuated.

While the shift in stage I cancers was modest, it translates into a potentially significant public health impact. Given that approximately one-quarter of a million women in the US are diagnosed with breast cancer yearly, a small shift toward stage I diagnoses would improve the prognosis for thousands of women. Additionally, it would reduce the need for invasive treatments such as chemotherapy for a substantial number of women.

Minority women experienced only a slightly larger improvement in stage at diagnosis than white women and so a reduction in the racial/ethnic disparity in stage was minimal. These findings suggest the need to explore persistent post-ACA factors (e.g., navigating a new complex healthcare environment) that disproportionately impact minority women.¹³

These results should be interpreted in the context of the study's strengths and limitations. In terms of limitations, the NCDB cohort represents a patient population that receives cancer care at CoC-accredited hospitals. Accredited hospitals are larger, more frequently located in urban areas, and tend to have more cancer-related services.¹⁴ Therefore, these findings may not extend to breast cancer cases that are diagnosed in hospitals without CoC-accreditation. However, 70% of cancer cases are diagnosed in CoC-accredited hospitals, therefore the

value of the overall findings remains meaningful. There was no actual assessment of mammography use and its impact on stage at diagnosis. Instead, we inferred that the removal of cost-sharing for preventive services may increase mammography screening which may improve stage at diagnosis.¹⁵ In terms of strengths, this study includes a large number of cases which provided substantial power to detect a small but meaningful shift in breast cancer stage. In addition, we carried out a sensitivity analysis to better understand how secular trends might account for the changes we observed between the pre- and post-PSP periods.

Efforts aimed at evaluating the impact of the ACA on cancer outcomes and disparities should be supported as they will help inform future policy recommendations.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

1. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2017. *CA: a cancer journal for clinicians*. 2017; 67(1):7–30. [PubMed: 28055103]
2. Gradishar WJ, Anderson BO, Balassanian R, et al. Invasive breast cancer version 1.2016, NCCN clinical practice guidelines in oncology. *Journal of the National Comprehensive Cancer Network*. 2016; 14(3):324–354. [PubMed: 26957618]
3. Ooi SL, Martinez ME, Li CI. Disparities in breast cancer characteristics and outcomes by race/ethnicity. *Breast cancer research and treatment*. 2011; 127(3):729–738. [PubMed: 21076864]
4. Swain M, Jeudy M, Pearlman MD. Controversies in Screening Mammography. *Clinical obstetrics and gynecology*. 2016; 59(2):351–361. [PubMed: 27101240]
5. Siu AL. on behalf of the USPSTF. Screening for breast cancer: U.s. preventive services task force recommendation statement. *Annals of internal medicine*. 2016; 164(4):279–296. [PubMed: 26757170]
6. Smith-Bindman R, Miglioretti DL, Lurie N, et al. Does utilization of screening mammography explain racial and ethnic differences in breast cancer? *Annals of internal medicine*. 2006; 144(8):541–553. [PubMed: 16618951]
7. Miranda PY, Tarraf W, Gonzalez P, Johnson-Jennings M, Gonzalez HM. Breast cancer screening trends in the United States and ethnicity. *Cancer Epidemiol Biomarkers Prev*. 2012; 21(2):351–357. [PubMed: 22147364]
8. Trivedi AN, Rakowski W, Ayanian JZ. Effect of cost sharing on screening mammography in Medicare health plans. *N Engl J Med*. 2008; 358(4):375–383. [PubMed: 18216358]
9. Ayanian JZ, Landon BE, Zaslavsky AM, Newhouse JP. Racial and ethnic differences in use of mammography between Medicare Advantage and traditional Medicare. *J Natl Cancer Inst*. 2013; 105(24):1891–1896. [PubMed: 24316600]
10. Koh HK, Sebelius KG. Promoting prevention through the Affordable Care Act. *N Engl J Med*. 2010; 363(14):1296–1299. [PubMed: 20879876]

11. Abdus S, Mistry KB, Selden TM. Racial and Ethnic Disparities in Services and the Patient Protection and Affordable Care Act. *American journal of public health*. 2015; 105(Suppl 5):S668–675. [PubMed: 26447920]
12. Helvie MA, Chang JT, Hendrick RE, Banerjee M. Reduction in late-stage breast cancer incidence in the mammography era: Implications for overdiagnosis of invasive cancer. *Cancer*. 2014; 120(17):2649–2656. [PubMed: 24840597]
13. Moy B, Chabner BA. Patient navigator programs, cancer disparities, and the patient protection and affordable care act. *The oncologist*. 2011; 16(7):926–929. [PubMed: 21804070]
14. Bilimoria KY, Bentrem DJ, Stewart AK, Winchester DP, Ko CY. Comparison of commission on cancer-approved and -nonapproved hospitals in the United States: implications for studies that use the National Cancer Data Base. *J Clin Oncol*. 2009; 27(25):4177–4181. [PubMed: 19636004]
15. Cooper GS, Kou TD, Dor A, Koroukian SM, Schluchter MD. Cancer preventive services, socioeconomic status, and the Affordable Care Act. *Cancer*. 2017

Figure 1. Adjusted^a proportion of stage I breast cancer, pre- and post- preventive services provision (PSP), by race/ethnicity

Table 1

Characteristics of the study population before and after the implementation of the preventive services provision (PSP) of the Affordable Care Act.

	All Pre-PSP (n=211,028), %	white Pre- PSP (n=181,186), %	Post-PSP (n=259,437), %	black Pre- PSP (n=21,505), %	Post-PSP (n=220,664), %	Latina Pre-PSP (n=8,337), %	Post-PSP (n=10,808), %
Age, y							
50–64	61.4	61.0	57.8	63.9	62.1	62.8	60.3
65+	38.6	39.0	42.2	36.1	37.9	37.2	39.7
Health Insurance							
Private	62.8	63.1	59.3	60.1	56.9	62.9	61.0
Medicare	37.2	36.9	40.7	39.9	43.1	37.1	39.0
Stage							
I	54.4	55.9	58.0	44.0	48.4	48.7	53.1
II	30.6	30.0	28.6	35.2	33.4	33.9	32.2
III	10.6	10.0	9.0	14.1	12.0	13.2	10.6
IV	4.4	4.1	4.4	6.7	6.3	4.1	4.1
Income ^a							
<\$38,000	14.4	11.2	14.1	38.9	37.0	21.7	20.8
\$38,000–\$47,999	21.4	21.2	21.0	22.5	22.9	22.2	21.9
\$48,000–\$62,999	26.6	27.3	27.0	20.1	21.1	28.2	28.5
\$63,000+	36.2	38.9	37.6	17.3	18.8	26.5	28.6
No High School ^a							
>=29%	13.8	10.6	13.5	31.0	29.9	40.9	41.6
20–28%	23.3	21.8	23.4	36.3	35.9	23.4	23.4
14–19%	32.9	34.8	33.5	21.9	23.7	21.5	21.2
<14%	28.6	31.5	29.4	9.6	10.4	12.9	13.7

^aZIP code-level income and education levels

Note: Bold figures denote statistically significant changes ($p < 0.05$) between pre- and post-PSP

Adjusted^a racial/ethnic proportion differences in stage I breast cancer, before and after the implementation of the preventive services provision (PSP).

Table 2

	Pre-PSP P	Difference PD (95% CI)	Post-PSP P	Difference PD (95% CI)
white	55.7	Reference	59.2	Reference
black	46.1	-9.5 (-8.9, -10.4)	50.5	-8.6 (-8.0, -9.2)
Latina	50.6	-5.2 (-4.0, -6.1)	55.1	-4.3 (-3.2, -5.2)

^aAdjusted for age, ZIP code-level economic indicators (i.e. median household income, percent with high school education), and insurance type
PD refers to proportion difference