Association of Utilization Management Policy With Uptake of Hypofractionated Radiotherapy Among Patients With Early-Stage Breast Cancer

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IMPACTANCE Breast cancer accounts for the largest portion of cancer-related spending in the United States. Although hypofractionated radiotherapy after breast-conserving surgery is a cost-effective and convenient treatment strategy for patients with early-stage breast cancer, less than 40% of eligible women received hypofractionated radiotherapy in 2013.

OBJECTIVE To assess the association of a large commercial payer’s utilization management policy with the use of hypofractionated radiotherapy among women with early-stage breast cancer and its associated cost.

DESIGN, SETTING, AND PARTICIPANTS A retrospective, adjusted difference-in-differences economic analysis was conducted using administrative claims data from January 1, 2012, to June 1, 2018, of women 18 years or older with early-stage breast cancer who were eligible for hypofractionated radiotherapy according to 2011 guidelines from the American Society for Radiation Oncology and were continuously enrolled in 14 geographically diverse commercial health plans covering 6.9% of US adult women. Women who received mastectomy, brachytherapy, or less than 11 or more than 40 external beam fractions of radiotherapy were excluded. A utilization management policy was used to encourage the use of hypofractionated radiotherapy among women in fully insured and Medicare Advantage (fully insured) plans. Under the new policy, claims for extended-course radiotherapy were not reimbursed for fully insured women who were eligible for hypofractionated radiotherapy. This policy did not apply to women in self-insured or Medicare supplemental insurance (self-insured) plans, allowing these groups to serve as a comparison group.

MAIN OUTCOMES AND MEASURES The primary outcome was use of hypofractionated radiotherapy, and the secondary outcome was the cost of this type of radiotherapy.

RESULTS Of 10,540 eligible women, 3,619 (34.3%) were in fully insured plans and thus subject to the policy. There were no meaningful differences between the fully insured and self-insured groups in mean (SD) age at the start of radiotherapy (63.8 [8.6] vs 65.0 [8.9] years), mean (SD) Charlson Comorbidity Index score (3.0 [1.5] vs 3.2 [1.6]), or practice setting (outpatient hospital setting, 2,982 of 3,619 [82.4%] vs 5,600 of 6,921 [80.9%]). The policy was associated with an increase in use of hypofractionated radiotherapy among fully insured patients subject to the policy (adjusted percentage point difference-in-difference, 4.2%; 95% CI, 0.0%-8.4%; P = .05) and a nonsignificant decrease in radiotherapy-associated expenditures (~$2275 relative to self-insured patients; P = .09). Spillover analyses revealed a significantly higher uptake of hypofractionated radiotherapy among self-insured patients who were indirectly exposed to the policy (adjusted percentage point difference in difference, 8.5%; 95% CI, 3.6%–13.5%; P < .001) compared with those who were not exposed.

CONCLUSIONS AND RELEVANCE This study suggests that a payer’s utilization management policy was associated with direct and spillover increases in the use of hypofractionated radiotherapy, even after accounting for a long-term secular trend in the uptake of hypofractionated radiotherapy in the control groups. Utilization management may promote evidence-based cancer care.
Cancer care is the fastest growing area of medical spending in the United States. Breast cancer accounts for the largest portion of cancer-related spending in the United States because of the frequent need for multimodal therapy. Women with early-stage breast cancer often require whole-breast irradiation as part of their treatment. National guidelines endorse hypofractionated radiotherapy given over 3 to 5 weeks as a cost-effective strategy that yields equivalent outcomes with improved patient convenience compared with conventional fractionation radiotherapy. In 2011, the American Society for Radiation Oncology recommended hypofractionated radiotherapy for women older than 50 years with early-stage breast cancer, and in 2018, they recommended hypofractionated radiotherapy to nearly all patients with localized breast cancer. Nevertheless, as recently as 2013, only 35% of eligible women received hypofractionated radiotherapy.

In 2016, in response to the low rate of hypofractionated radiotherapy, a large commercial payer developed a utilization management policy promoting hypofractionated radiotherapy for patients with early-stage breast cancer. Utilization management strategies, including formulary restriction, prior authorization, and peer review, have been associated with cost savings and uptake of evidence-based practice in some clinical settings. However, in oncology care, there has been little evidence of effectiveness amid concerns that utilization management places undue administrative burden on clinicians while restricting patient choice. In this study, we investigated the association of the utilization management policy with the uptake of hypofractionated radiotherapy for early-stage breast cancer in populations that were either directly subject to the policy (hereafter referred to as the direct effect) or indirectly exposed to the policy (hereafter referred to as the spillover effect), using quasi-experimental difference-in-differences analyses. This analysis allowed us to isolate the association of the policy with use of hypofractionated radiotherapy by accounting for a potential secular trend or for a long-term increase in the use of hypofractionated radiotherapy because of evolving care patterns toward evidence-based care. Our difference-in-differences approach also allowed us to measure both direct and spillover effects of a utilization management policy meant to encourage lower-cost, evidence-based treatment for patients with cancer. We hypothesized that the policy would be associated with an increased use of hypofractionated radiotherapy for breast cancer, compared with controls, in both populations who were directly subject or indirectly exposed to the policy.

Methods

Program Description
Starting January 1, 2016, the payer introduced a utilization management policy to encourage hypofractionated radiotherapy for eligible members with early-stage breast cancer in its fully insured and Medicare Advantage plans (hereafter referred to as fully insured). Under the new policy, claims for conventional fractionation radiotherapy were not reimbursed for fully insured patients who were eligible for hypofractionated radiotherapy according to 2011 guidelines from the American Society for Radiation Oncology. Exceptions to the policy could be made for certain reasons (eg, patient preference) after consultation between clinicians and payer representatives or if conventional fractionation radiotherapy was already under way at the time of the policy change. This policy did not apply to patients whose employers were self-insured or to members with Medicare supplemental insurance (self-insured), allowing these groups to serve as a comparison group. This research was exempt from University of Pennsylvania institutional review board approval because it involved a limited study database with masked patient identifiers. This study followed Consolidated Health Economic Evaluation Reporting Standards (CHEERS) reporting guidelines.

Data Source
We used administrative claims and health plan enrollment data from the HealthCore Integrated Research Environment for information on diagnoses, use of cancer treatment, costs, comorbidities, and rendering clinician identifiers. The HealthCore Integrated Research Environment is a repository of medical and pharmacy claims data for approximately 40 million members managed by 14 commercial health plans geographically dispersed across the United States from 2006 to the present. In 2016, the HealthCore Integrated Research Environment covered 6.9% of adult women (≥20 years) in the United States.

Study Population
We identified female enrollees in the health plans aged 18 years or older in fully insured or self-insured plans with International Classification of Diseases, Ninth Revision or International Statistical Classification of Diseases and Related Health Problems, Tenth Revision diagnosis codes for breast cancer who also had a diagnosis and/or Current Procedural Terminology code(s) for radiotherapy between January 1, 2012, and June 1, 2018 (see eTable 1 in the Supplement for all diagnostic and procedure codes). We included patients who were eligible for...
hypofractionated radiotherapy, identified using a previously published algorithm that is based on the 2011 American Society for Radiation Oncology guidelines (eTable 2 in the Supplement).\(^7\) The eFigure in the Supplement illustrates our cohort definition procedure, including inclusion and exclusion criteria. The index date for the start of radiotherapy was defined as the first date with codes for radiotherapy and diagnostic codes for breast cancer. Baseline patient characteristics were measured during the 12-month period prior to breast cancer diagnosis.

**Linking of Patients to Clinicians**  
We linked patients to clinicians to obtain clinician-level data, including practice location and clinician exposure to the policy. Based on prior literature,\(^{15}\) each patient was linked to the clinician identifier that appeared most often on the patient’s claims for external beam radiotherapy.

**Exposure to Policy**  
Exposure to the utilization management policy was defined as the earliest index date, beginning January 1, 2016, that a clinician treated a fully insured patient (Figure).\(^{16}\) Any patient linked to that clinician whose index date was before January 1, 2016, was classified as unexposed, and any patient linked to that clinician whose index date was on or after January 1, 2016, was classified as exposed. Because clinicians were likely to become aware of the policy only when faced with a patient for whom the clinician might receive a denial for conventional fractionation radiotherapy, the date-exposure method was thought to closely represent clinicians’ real-world exposure to the utilization management policy. eTable 3 in the Supplement provides an additional illustration of our exposure definition criteria.

**Outcomes**  
**Uptake in Use of Hypofractionated Radiotherapy**  
We defined hypofractionated radiotherapy as the presence of 11 to 24 radiation treatments (3-5 weeks of radiotherapy) and extended-course radiotherapy as the presence of 25 to 40 radiation treatments (5-8 weeks of radiotherapy). The method for counting radiation treatments has been previously described.\(^7\)

**Radiotherapy-Associated Expenditures**  
We evaluated radiotherapy-associated expenditures, defined as total costs of commercial and Medicare claims that included any codes for radiotherapy during a 3.5-month period, from 15 days before the index date to 90 days after the index date.\(^7\) Costs below the first percentile of the distribution were set equal to the first percentile, and costs above the 99th percentile of the distribution were set equal to the 99th percentile (winsorization) and all costs were inflation-adjusted to 2016 dollars using the medical care component of the Consumer Price Index (CPI).\(^{17}\)

**Covariates**  
Patient-level covariates included age, sex, Charlson Comorbidity Index score, region (Northeast, South, Midwest, or West), Medicare status, and an indicator for prior receipt of chemotherapy, identified from claims data during the 12-month period prior to diagnosis date.\(^{18}\) In the spillover analysis, we also included facility type as a covariate to account for differential uptake in the use of hypofractionated radiotherapy in freestanding office vs hospital settings. Finally, we included a clinician fixed effect for all analyses to control for unobserved clinician-specific factors that may be associated with the probability of use of hypofractionated radiotherapy—such as years of experience, academic medical center affiliation, and propensity to change one’s practice in response to specialty society guidelines.\(^{19}\)

**Statistical Analysis**  
Baseline demographic and patient characteristics were compared using standardized differences, with a threshold of \(\pm 0.10\) to determine statistical significance.\(^{19}\) We conducted a series of regression-adjusted difference-in-differences analyses to assess the direct and the spillover association of the utilization management policy with the use of hypofractionated radiotherapy and spending.

Our primary model assessed the direct association of the utilization management policy with all outcomes adjusted for all covariates. In this analysis, we excluded patients whose clinicians had fewer than 5 linked patients because these clinicians may not see enough patients to determine whether practice changes were associated with exposure to the utilization management policy.

Our secondary models assessed the indirect (spillover) association of the utilization management policy with outcomes among self-insured patients who were eligible for hypofractionated radiotherapy but who were not themselves subject to the policy owing to their insurance status. We report the same outcomes as in the primary model, using the
same covariates and applying the same exclusion of patients whose clinicians had fewer than 5 eligible patients. In the models assessing spillover, fully insured patients were excluded, and self-insured patients exposed to the utilization management policy through their linked physicians were compared with self-insured patients who were not exposed to the utilization management policy.

To assess spending, we used the same models except that the dependent variable was radiotherapy-related expenditures. In our analysis of the uptake in the use of hypofractionated radiotherapy, we used linear probability models to provide interpretable estimates of the main association in terms of the difference in the proportion of patients receiving hypofractionated radiotherapy. In cost analyses, we used generalized linear models with a log-link function and gamma distribution. All analyses were conducted using Stata SE, version 15.0 (StataCorp). All P values were from 2-sided tests and results were deemed statistically significant at P < .05.

**Sensitivity Analyses**

To examine the association with outcomes of a different definition of clinician-level exposure to the policy in the spillover model, we conducted a sensitivity analysis defining exposure using an indicator of whether a clinician had any linked patients who were eligible in fully insured plans during the same period that the utilization management policy was in place. We also conducted an additional analysis in the spillover model using separate intercepts for each calendar year, a method that allowed more granular control for secular trends but reduced the statistical power of the fixed-effects models. To account for potentially skewed cost data, we repeated all primary spending analyses using nonwinsorized data, meaning that we did not adjust costs below the first percentile or above the 99th percentile of the distribution.

Finally, it is possible that the CPI may overinflate earlier years of spending, skewing results toward the null. To account for this, we performed a sensitivity analysis using the Gross Domestic Product Implicit Price Deflator to adjust for inflation.20 This inflation index is not thought to lead to significant overinflation compared with the CPI.

**Results**

**Overall Patient Characteristics and Spending**

Between 2012 and 2018, 10 540 women received a diagnosis of early-stage breast cancer and were classified as eligible for hypofractionated radiotherapy (Table 1). Of these, 3619 (34.3%) were in the fully insured group and 6921 (65.7%) were in the self-insured group. Fully insured individuals were slightly younger than self-insured individuals at the start of radiotherapy (mean [SD] age, 63.8 [8.6] vs 65.0 [8.9] years). There

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Fully insured and Medicare supplemental (n = 6921)</th>
<th>Fully insured (including Medicare Advantage) (n = 3619)</th>
<th>Standardized difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year of radiotherapy start</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>1080 (15.6)</td>
<td>719 (19.9)</td>
<td>0.11</td>
</tr>
<tr>
<td>2013</td>
<td>1102 (15.9)</td>
<td>673 (18.6)</td>
<td>0.07</td>
</tr>
<tr>
<td>2014</td>
<td>1165 (16.8)</td>
<td>566 (15.6)</td>
<td>−0.03</td>
</tr>
<tr>
<td>2015</td>
<td>975 (14.1)</td>
<td>439 (12.1)</td>
<td>−0.06</td>
</tr>
<tr>
<td>2016</td>
<td>1032 (14.9)</td>
<td>479 (13.2)</td>
<td>−0.05</td>
</tr>
<tr>
<td>2017</td>
<td>1076 (15.5)</td>
<td>523 (14.5)</td>
<td>−0.03</td>
</tr>
<tr>
<td>2018 (partial data)</td>
<td>491 (7.1)</td>
<td>220 (6.1)</td>
<td>−0.04</td>
</tr>
<tr>
<td><strong>Patient characteristics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age at radiotherapy start, mean (SD), y</td>
<td>65.0 (8.9)</td>
<td>63.8 (8.6)</td>
<td>−0.14</td>
</tr>
<tr>
<td>50-54</td>
<td>945 (13.7)</td>
<td>553 (15.3)</td>
<td>0.05</td>
</tr>
<tr>
<td>55-59</td>
<td>1175 (17.0)</td>
<td>707 (19.5)</td>
<td>0.07</td>
</tr>
<tr>
<td>60-64</td>
<td>1332 (19.5)</td>
<td>865 (23.9)</td>
<td>0.11</td>
</tr>
<tr>
<td>65-69</td>
<td>1273 (18.4)</td>
<td>558 (15.4)</td>
<td>−0.08</td>
</tr>
<tr>
<td>≥70</td>
<td>2176 (31.4)</td>
<td>936 (25.9)</td>
<td>−0.12</td>
</tr>
<tr>
<td>Medicare recipient</td>
<td>1858 (26.8)</td>
<td>904 (25.0)</td>
<td>−0.04</td>
</tr>
<tr>
<td>CCI score, mean (SD)</td>
<td>3.2 (1.6)</td>
<td>3.0 (1.5)</td>
<td>−0.08</td>
</tr>
<tr>
<td>Practice setting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outpatient hospital setting</td>
<td>5600 (80.9)</td>
<td>2982 (82.4)</td>
<td>0.04</td>
</tr>
<tr>
<td>Inpatient setting</td>
<td>3 (0.04)</td>
<td>1 (0.02)</td>
<td>−0.01</td>
</tr>
<tr>
<td>Freestanding office</td>
<td>1318 (19.0)</td>
<td>636 (17.6)</td>
<td>−0.04</td>
</tr>
<tr>
<td>US Census region</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northeast</td>
<td>1659 (24.0)</td>
<td>764 (21.1)</td>
<td>−0.07</td>
</tr>
<tr>
<td>Midwest</td>
<td>1403 (20.3)</td>
<td>1127 (31.1)</td>
<td>0.25</td>
</tr>
<tr>
<td>South</td>
<td>1685 (24.3)</td>
<td>933 (25.8)</td>
<td>0.03</td>
</tr>
<tr>
<td>West</td>
<td>2174 (31.4)</td>
<td>795 (22.0)</td>
<td>−0.21</td>
</tr>
</tbody>
</table>

Abbreviation: CCI, Charlson Comorbidity Index.

Table 1. Patient Characteristics, Stratified by Insurance Typea

Authors’ analysis of administrative claims data. Data were not available for all of 2018.
there were no meaningful differences between the fully insured and self-insured groups in mean (SD) Charlson Comorbidity Index score (3.0 [1.5] vs 3.2 [1.6]) or practice setting in which radiotherapy was administered (outpatient hospital setting, 2982 of 3619 [82.4%] vs 5600 of 6921 [80.9%]). Fully insured patients were more likely than self-insured patients to be located in the Midwest (1127 [31.1%] vs 1403 [20.3%]). The proportion of fully insured patients who received hypofractionated radiotherapy increased from 22.4% (374 of 1669) in 2012 to 82.3% (330 of 401) in 2018, while the proportion of self-insured patients who received radiotherapy in a facility-owned or hospital-owned practice and whose linked physician cared for at least 10 patients eligible for hypofractionated radiotherapy. The utilization management policy was associated with nonsignificant decreases in radiotherapy-related expenditures in the fully insured group (−$2275 relative to self-insured patients; P = .09).

**Spillover Analyses**

We assessed the spillover association with outcomes of the utilization management policy among self-insured patients who were not directly subject to the utilization management policy. There was no significant difference in mean age or Charlson Comorbidity Index score between self-insured patients who were exposed and self-insured patients who were unexposed to the policy; exposed patients were more likely to receive radiotherapy in an outpatient facility and to be located in the South or Midwest (eTable 4 in the Supplement). Spillover analyses revealed a significantly higher uptake in the use of hypofractionated radiotherapy among exposed patients compared with patients whose linked clinicians had no exposure to fully insured patients (adjusted percentage point difference-in-difference, 8.5%; 95% CI, 3.6%-13.5%; P < .001) (Table 3). There were no significant differences in spending between

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### Table 2. Direct Association of Reimbursement Policy With Receipt of Hypofractionated Radiotherapy and Radiotherapy-Related Expenditures a

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean (95% CI)</th>
<th>Pre-post policy difference (95% CI)</th>
<th>Difference in differencesb</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prepolicy period</td>
<td>Postpolicy period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted probability of hypofractionated radiotherapy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fully insured/Medicare Advantage, %</td>
<td>39.6 (37.8 to 41.4)</td>
<td>72.9 (69.1 to 76.7)</td>
<td>33.3 (28.6 to 37.9)</td>
<td>4.2 (0.0 to 8.4)</td>
</tr>
<tr>
<td>Self-insured/Medicare supplemental, %</td>
<td>41.3 (40.1 to 42.5)</td>
<td>70.4 (67.4 to 73.5)</td>
<td>29.1 (25.2 to 33.0)</td>
<td></td>
</tr>
<tr>
<td>Adjusted radiotherapy cost per patient during the 3.5-mo radiotherapy treatment period</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fully insured/Medicare Advantage, $</td>
<td>27 929 (27 194 to 28 664)</td>
<td>22 324 (20 689 to 23 959)</td>
<td>−5606 (−7545 to −3666)</td>
<td>−2275</td>
</tr>
<tr>
<td>Self-insured/Medicare supplemental, $</td>
<td>25 656 (25 096 to 26 215)</td>
<td>22 324 (21 178 to 23 471)</td>
<td>−3331 (−4891 to −1771)</td>
<td></td>
</tr>
</tbody>
</table>

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### Table 3. Spillover Association of Reimbursement Policy With Receipt of Hypofractionated Radiotherapy and Radiotherapy-Related Expenditures Among Self-insured Cohorta

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Not exposed</th>
<th>Exposed</th>
<th>Adjusted absolute difference (95% CI)</th>
<th>P value for difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted % receiving hypofractionated radiotherapy in postpolicy period, %</td>
<td>64.8 (61.5 to 68.2)</td>
<td>73.3 (70.7 to 75.9)</td>
<td>8.5 (3.6 to 13.5)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Adjusted radiotherapy costs during the 3.5-mo radiotherapy treatment period, $</td>
<td>22 535 (16 890 to 28 179)</td>
<td>22 192 (21 044 to 23 381)</td>
<td>−342 (−5807 to 5122)</td>
<td>.90</td>
</tr>
</tbody>
</table>

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a Authors’ analysis of administrative claims data. Each row represents marginal-effect estimates from a different regression model. There were 2599 patients in self-insured (or Medicare supplemental) plans in the postpolicy period.

b Negative value for adjusted difference in difference means that the cost among fully insured patients decreased more than cost among self-insured patients.

c Costs are inflation-adjusted to 2016 dollars using the medical price component of the Consumer Price Index.
exposed and unexposed patients in the self-insured group; adjusted radiotherapy-related expenditures were $22,192 (95% CI, $21,044-$23,381) for exposed self-insured patients and $22,535 (95% CI, $16,890-$28,179) for unexposed self-insured patients, for an adjusted difference-in-differences of $342 ($P = .90).

**Sensitivity Analyses**

In the spillover model, sensitivity analyses that examined more granular adjustments for secular trends and different exposure measurement methods did not change the direction of the association between the policy and outcomes (eTable 5 in the Supplement). Results of spending models using nonwin- sorized data (eTable 6 in the Supplement) and an alternative inflation index (eTable 7 in the Supplement) remained nonsignificant in both direct and spillover analyses.

**Discussion**

We evaluated the association outcomes of a commercial payer’s utilization management policy intended to increase the uptake in the use of hypofractionated radiotherapy regimens for eligible patients with breast cancer. The utilization management policy was associated with increased rates of hypofractionated radiotherapy use, even when accounting for a secular trend of increasing hypofractionated radiotherapy use in the general population. The magnitude of this secular trend was larger than has previously been observed during similar periods. The association of the policy with the use of hypofractionated radiotherapy was moderate, at an increase of 4.2 percentage points. In addition, clinicians exposed to the policy were substantially more likely to use hypofractionated radiotherapy for patients not directly subject to the policy, demonstrating strong evidence of a spillover effect of the policy. There was no association of the policy with spending. In 2018, nearly 80% of eligible women with early-stage breast cancer received hypofractionated radiotherapy; this percentage was slightly higher among patients subject to the utilization management policy.

There are 2 important implications of our findings. First, our study extends the literature by suggesting that utilization management policies can promote evidence-based practice in oncology. More important, there was a secular trend toward increased use of hypofractionated radiotherapy; there was a nearly 50 percentage point increase in the proportion of women receiving hypofractionated radiotherapy during the study period. Because of the secular trend, the magnitude of the isolated policy’s association with outcomes was not large. Nevertheless, in our fully adjusted analysis, there was a 4.2 percentage point absolute association of the policy with rates of hypofractionated radiotherapy. The spillover effects of the policy may have been associated with the secular trend seen among self-insured patients. Thus, it is possible that the true direct effect of the utilization management policy is larger than what we have estimated.

Second, we found that, conditional on clinician exposure to the utilization management policy, there were significant spillover associations between the utilization management policy and uptake in the use of hypofractionated radiotherapy among patients not subject to the policy. Spillover effects of policies have been suggested in other evaluations of clinical guidelines and reimbursement policies not related to utilization management. The mechanisms of this spillover effect may be rooted in behavioral economic theory; radiation oncologists’ therapeutic norms may be associated with utilization management programs that reduce choice overload. To reduce cognitive burden, radiation oncologists may develop therapeutic norms that guide their treatment choices without optimizing on individual patient financial gain or health benefit. Because radiation oncologists who treat patients subject to the utilization management policy may have incorporated hypofractionated radiotherapy into therapeutic norms, changes in the choices of radiotherapy for fully insured enrollees may “spill over” to self-insured enrollees.

We did not find a direct association or a spillover association between the utilization management policy and spending. Prior data have suggested that hypofractionated radiotherapy is associated with less radiotherapy-related expenditures than conventional fractionation radiotherapy.

It is likely that the mild increase in hypofractionated radiotherapy associated with the policy implementation did not provide a sufficiently strong signal in spending models, which may be associated with external factors other than utilization, including practice-level and area-level variation in pricing.

It is possible that using the CPI for inflation adjustment may have overinflated earlier years of data, biasing our analysis toward the null. However, we felt justified using the CPI given that the CPI has precedent in similar radiotherapy-related spending analyses in the literature. Furthermore, spending results were consistent even when using an alternative inflation index that is not thought to overinflate earlier years of cost data. Given that one of the purported benefits of utilization management is spending control, policy makers must balance the possible effect of this policy and similar policies against their additional administrative costs.

This study adds to the literature by showing that utilization management policies may have positive direct and spillover associations with the outcomes of patients with cancer, even in the setting of a secular trend toward increasing evidence-based practice. Utilization management policies may have broad use among oncology clinicians, although in the presence of a secular trend toward evidence-based practice, such programs should be periodically reevaluated to assess their ongoing association with utilization and spending.

**Limitations**

This study had several limitations. First, this was a nonrandomized study and could make only associational, not causal, inferences. To address this limitation, we used a quasi-experimental design with multiple sensitivity analyses and definitions of exposure variables to assess whether the findings were robust. Second, we could not characterize some details of practices, including academic vs community affiliation and training details about clinicians, which may be associated with an uptake in the use of hypofractionated ra-
diotherapy and other evidence-based practices. Instead, we controlled for all unobserved clinician-level factors with fixed effects.

Conclusions

A commercial payer’s utilization management policy was associated with direct and spillover increases in the uptake in the use of hypofractionated radiotherapy among patients with early-stage breast cancer between 2012 and 2018. Utilization management in oncology may be associated with increases in evidence-based practice in populations that are both directly and not directly subject to the policy. Furthermore, such a policy may have an association over and above a secular trend with uptake of evidence-based practice, although the policy may not demonstrate cost savings.

ARTICLE INFORMATION

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Author Contributions: Drs Parikh and Chi had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Concept and design: Parikh, Fishman, Chi, Zimmerman, Barron, Sylwestrzak, Bekelman.

Drafting of the manuscript: Parikh, Fishman, Chi, Sylwestrzak.

Acquisition, analysis, or interpretation of data: Parikh, Fishman, Chi, Zimmerman, Barron, Sylwestrzak, Bekelman.

Statistical analysis: Parikh, Fishman, Chi, Gupta.

Obtained funding: Chi, Sylwestrzak.

Administrative, technical, or material support: Parikh, Sylwestrzak.

Supervision: Barron, Sylwestrzak, Bekelman.

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**Invited Commentary**

**Evaluating a Utilization Management Policy in Radiation Oncology**

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**Overuse of medical services** has been a pervasive problem within the United States, in large part owing to the fee-for-service payment model. Amid expansion of commercial health insurance in the 1960s, utilization review arose as a method for payers to assess the appropriateness of recommended services, thereby controlling costs. Although utilization review has the potential to benefit all stakeholders by ensuring that patients receive appropriate care, controlling health care spending, and aligning clinicians with evidence-based care, there is also potential for harm. Critics contend that utilization management tools, such as prior authorization, can hinder access to treatments without lower-cost alternatives. The American Society for Radiation Oncology (ASTRO) has made utilization management reform a central platform of its advocacy efforts, arguing that prior authorization results in increased patient anxiety, administrative burden, and unnecessary delays. Despite this debate, investigation into the association of utilization management with radiation oncology services remains limited.

In this issue of *JAMA Oncology*, Parikh and colleagues evaluated the association of a utilization management policy with the delivery of breast radiotherapy. In 2016, in an effort to increase uptake of shorter, less costly courses of radiotherapy for women with early-stage breast cancer, a large commercial payer enacted a policy of denying claims for standard fractionation in patients eligible for hypofractionation based on 2011 ASTRO guidelines. More important, only patients in fully insured and Medicare Advantage plans were subjected to the policy, while those whose employers were self-insured or those with Medicare supplemental insurance were not, allowing the authors to compare these groups and evaluate the outcome of the policy using difference-in-differences analysis. The primary model assessed the association of the policy with the probability of hypofractionation and found an adjusted difference-in-difference increase of 4.2% among patients subjected to the policy vs those who were not. This increase was elicited in the presence of a strong secular trend, with the proportion of patients receiving hypofractionation rising from approximately 20% to 80% in both groups during the study period from 2012 to 2018. Interestingly, spillover analyses revealed a significantly higher use of hypofractionation among patients not directly subjected to the policy but whose clinicians were exposed to the policy, suggesting that its use reached wider than the target population.

This study provides critical insight into the outcomes of a utilization management policy in a real-world, commercial setting, for which public access to data has been limited. The observed modest increase in hypofractionation without proven reduction in overall spending should be interpreted in the context of the imperfect data supporting hypofractionation during the study period, as well as the payer’s choice to use a le tolerant policy that allowed clinicians to continue standard fractionation for multiple reasons, including patient preference. The top-down, blunt nature of prior authorization algorithms generally functions better in clinical situations in which there are minimal exceptions to guidelines and little room for subjectivity. In that regard, the policy’s outcome in 2016 may not have been fully realized, as the existing ASTRO guideline still allowed for consideration of standard fractionation for many patients with early-stage disease. The updated 2018 ASTRO guideline is significantly less permissive and would potentially lend itself to stricter prior authorization requirements.

In the same vein, caution is warranted in extrapolating the results of this analysis to other areas of radiation oncology where there are no evidence-based guidelines and/or significant subjectivity.

Given the debate surrounding utilization management, this study also offers suggestion as to how such policies could be restructured to more efficiently execute their intended purpose. Even in the setting of growing bodies of evidence, diffusion of new medical practices can be remarkably slow, partially evidenced in the robust secular trend witnessed in this study. Although utilization management strategies may