

Scientific Article

Use of Radiation Therapy for the Treatment of Breast Cancer in 2019 Versus 2020



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Purpose: The COVID-19 pandemic disrupted medical care. Little is known about how radiation therapy (RT) ordering behavior changed during the pandemic. This study examined (1) whether there was a change in the rate at which orders for lumpectomy were followed by orders for RT and (2) whether there was a change in the percentage of RT orders for hypofractionated (HF) RT rather than conventionally fractionated (CF) RT.

Methods and Materials: Prior authorization order data from 2019 and 2020, pertaining to patients with commercial and Medicare Advantage health plans, were reviewed to determine whether patients had an order for RT in the 90 days after lumpectomy and if it was for CF or HF RT. Univariate analyses were conducted using χ^2 tests, and adjusted analyses were conducted using multivariate logistic regression, controlling for patient age, urbanicity, local median income, region, if the lumpectomy facility was academic, and if the lumpectomy facility was a hospital.

Results: In 2019, 47.7% of included lumpectomy orders (2200/4610) were followed by an RT order within 90 days, in contrast to 45.6% (1944/4263) in 2020 ($P = .048$). Of the RT orders meeting this study's definition of CF or HF, 75.3% of orders placed in 2019 (1387/1843) and 79.0% of orders placed in 2020 (1261/1597) were for HF ($P = .011$). Adjusted analysis found patients receiving a lumpectomy order in the first quarter of 2020 had significantly reduced odds (odds ratio, 0.84; 95% CI, 0.71-0.99) of receiving an order for RT after lumpectomy, relative to those with orders placed in the first quarter of 2019. Adjusted analysis likewise found significant evidence of increased use of HF RT during the pandemic.

Conclusions: In the population examined, physicians were less likely to order RT after lumpectomy in 2020 than in 2019, and if they did, were more likely to order HF RT.

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The data used in this study are owned by HealthHelp and Humana, organizations employing the authors, and are not public. The data in this study are protected by HIPAA, and are sensitive, private patient information which cannot be fully disclosed without the third party

entering into a Business Associate Agreement (BAA) in accordance with United States law and the requirements of Humana's Protected Health Information Vendor Ethics committee. Our policy also prevents us from sharing patient-level data. Requests for access to deidentified data should be sent to Herilyana Torres Fortier, fortierht@healthhelp.com. Requests for deidentified, aggregated data will be considered.

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Introduction

The COVID-19 pandemic substantially disrupted health care. On March 18, 2020, in response to the pandemic, the Centers for Medicare & Medicaid Services (CMS) issued a recommendation that all elective surgeries as well as all nonessential medical, surgical, and dental procedures be delayed to preserve access to personal protective equipment, beds, and ventilators.¹ Elective procedures were canceled, and many procedures were postponed. These postponements created a backlog of undiagnosed and untreated patients to be addressed when pandemic restrictions were lifted.^{2,3} Making matters more complicated, the pandemic caused a boom in physician retirements, as well as some physician deaths, increasing the difficulty of clearing the backlog due to the reduction in staffing.^{4,5}

Considering these challenges, providers may have compensated by ordering fewer treatments and using treatments with reduced intensity where possible. In 2020, experts stated that breast radiation therapy (RT) could be omitted, delayed, or shortened for some subgroups of patients to reduce the strain on health care resources.⁶ Further driving this trend, there were numerous RT fractionation schedule recommendations advocating for the increased use of hypofractionation published during the pandemic. However, a systematic review which evaluated the quality of evidence behind fractionation schedule recommendations made during the pandemic using the American Society of Radiation Oncology Recommendation Grading Classification System found that recommendations were made for hypofractionation using lower-quality evidence than had been the case for the highest-quality routinely used fractionation schedules from before the pandemic.^{7,8}

While several studies have been published of how cancer care was affected by the pandemic, the existing literature largely focuses on the care that patients received as characterized by claims, medical record, or survey data.⁹⁻¹² It is possible that physicians ordered care, but because of access issues, patients ultimately were less likely to receive it in 2020 than in 2019. In contrast to a claims- and survey-based analyses, this study examined how physician ordering behavior changed in response to the pandemic through an order-based analysis.

To characterize the effect of the pandemic on physician ordering, we tested 2 hypotheses. First, we examined whether patients were less likely to receive orders for RT for the treatment of breast cancer after lumpectomy in 2020 than in 2019, suggesting the pandemic caused patients to not receive RT. Then, we examined whether, among patients receiving orders for RT, patients in 2020 were more likely to receive orders for hypofractionated (HF) RT rather than conventionally fractionated (CF) RT, relative to patients in 2019.

Methods and Materials

Study design

This study was reviewed by the Advarra institutional review board (Pro00057969) and received an exemption from oversight on September 28th, 2021, in accordance with the Department of Health and Human Services regulations found at 45 CFR 46.104(d).⁴ The study was conducted in accordance with the principles of the Declaration of Helsinki.

Data source and sample population

Data were provided by a company performing non-denial prior authorization on behalf of a national health care organization. Data pertained to individuals with commercial and Medicare Advantage health plans from the organization. To gain an understanding of RT and lumpectomy utilization, data on overall health plan enrollment and patient characteristics were additionally incorporated into the analysis.

An analysis of trends was conducted using aggregate data from the organization. Patient-level analyses used a set of inclusion and exclusion criteria to examine a population of patients for which RT claims were observable. Included patients were females aged 18 to 89 who had an order for a lumpectomy in 2019 or 2020. Patients were excluded if their order for lumpectomy was not authorized by prior authorization as ordered and if they were not continuously enrolled in their health plan for 90 days after lumpectomy. In the analysis of whether patients who received RT had HF or CF, only patients with orders that clearly constituted HF (15-21 fractions) or CF (28-35 fractions) were included. Patients with RT orders for a number of fractions not falling into these two ranges were excluded.

Measurement

Population-level analysis

In the population-level analysis, the 2 outcomes trended were lumpectomy orders per thousand health plan members and RT orders per patient with a lumpectomy order. RT orders were only counted if they occurred within 90 days of a lumpectomy. The independent variable in this analysis was the month of the lumpectomy order.

Individual-level analysis

In the individual-level analysis, the 2 dependent variables were whether the order for lumpectomy was followed by an order for RT within 90 days and whether the RT

order was for HF (15-21 fractions) or CF (28-35 fractions). Year of the lumpectomy order served as the independent variable for univariate analyses, and quarter of the lumpectomy order served as the independent variable for multivariate analyses.

Databases on patient demographics and clinical histories were used to create control variables for patient age, sex, history of coronary artery disease, history of congestive heart failure, history of coronary obstructive pulmonary disease, and history of diabetes. The average rate of obesity in patients' home states was determined using 2018 data from the Behavioral Risk Factor Surveillance Survey released by the Centers for Disease Control and Prevention.¹³ Region was assigned using the methodology used by CMS.¹⁴ Because of the heavy concentration of patients in CMS regions 3, 4, 5, and 6, indicator variables were created to contrast patients in those regions with a group of patients living in the other regions of the country.

The patients' home ZIP codes were mapped to other data sources to determine their urbanities and the median incomes. A table obtained from CMS was used to map each ZIP code to its urbanicity.¹⁵ ZIP codes were mapped to their respective median incomes using the American Community Survey's 2015 to 2019 5-year estimates, reporting income in 2019 inflation-adjusted dollars.¹⁶ Two binary variables related to local income were created: one capturing ZIP codes with median incomes < \$40,000 per year and the other capturing median incomes > \$80,000 per year.

Analysis

Population-level analysis

Month-by-month trendlines of lumpectomy orders per thousand patients enrolled in the health plan, stratified by age, were plotted. Month-by-month trendlines of the percentage of lumpectomy orders that were followed by an RT order within 90 days post lumpectomy, stratified by age, were additionally created to provide context into the extent to which RT was being used as a follow-up treatment to lung cancer. Mann-Kendall tests were conducted to assess the monotonicity of the overall trends. Monotonic trends are trends that are consistent in direction over time, either decreasing or increasing. Trendlines for the overall population were plotted alongside trendlines for 2 age-based subpopulations: patients aged 18 to 64 years and patients aged 65 to 89 years.

Individual-level analysis

A χ^2 test was used to determine the association between the year of the lumpectomy order (2019 versus 2020) and whether the lumpectomy was followed by an RT order within 90 days. A second χ^2 test was used to

assess whether, among RT orders meeting the definition of CF or HF, there was an association between the year of the preceding lumpectomy order and whether the RT order was for CF or HF.

Multivariate analyses were conducted using logistic regressions to assess the association between the quarter in which a patient received their lumpectomy order and whether that order was followed by an RT order within 90 days after controlling for the patient's age, urbanicity, the median income of their home ZIP code, their region, whether their lumpectomy order was placed in a hospital, and whether their lumpectomy order was placed in an academic setting. Results were reported as odds ratios with 95% CIs.

Results

Population-level trends

The overall trend in lumpectomy orders per thousand patients (Fig. 1) was not significantly monotonic when the unit of time considered in plotting the trendline was 1 month ($P = .09$; $\tau = -0.254$). The trendline showed lumpectomy orders were the least likely to have been placed in April 2020, and that there was a rebound in utilization in subsequent months. Patients aged 18 to 64 and 65 to 89 years exhibited similar patterns to the overall population.

The trend in RT orders per lumpectomy order (Fig. 2) was likewise not monotonic ($P = .64$; $\tau = -0.073$). It showed lumpectomy orders placed in March 2020 were the least likely to be followed by an RT order within 90 days, but otherwise depicted no clear trend. When patients were stratified by age, the populations aged 18 to 64 years and the population aged 65 to 89 years exhibited similar patterns to the overall population.

Individual-level analysis sample and descriptive statistics

For the individual-level analysis, there were 9734 lumpectomy orders meeting inclusion criteria (Fig. 3). After exclusion criteria were applied, 8873 lumpectomy orders remained. Of these orders, 4144 (46.7%) were followed by an RT order. Among the lumpectomy orders followed by an RT order, 3440 fit the study's definition of an order for CF or HF RT. Of these orders, 792 (23.0%) were for CF and 2648 (77.0%) were for HF.

On most of the characteristics examined, the patients who had an RT order did not differ significantly ($P < .05$) from those who did not (Table 1). Descriptive statistics showed that patients were significantly less likely to have had an RT order if their lumpectomy order

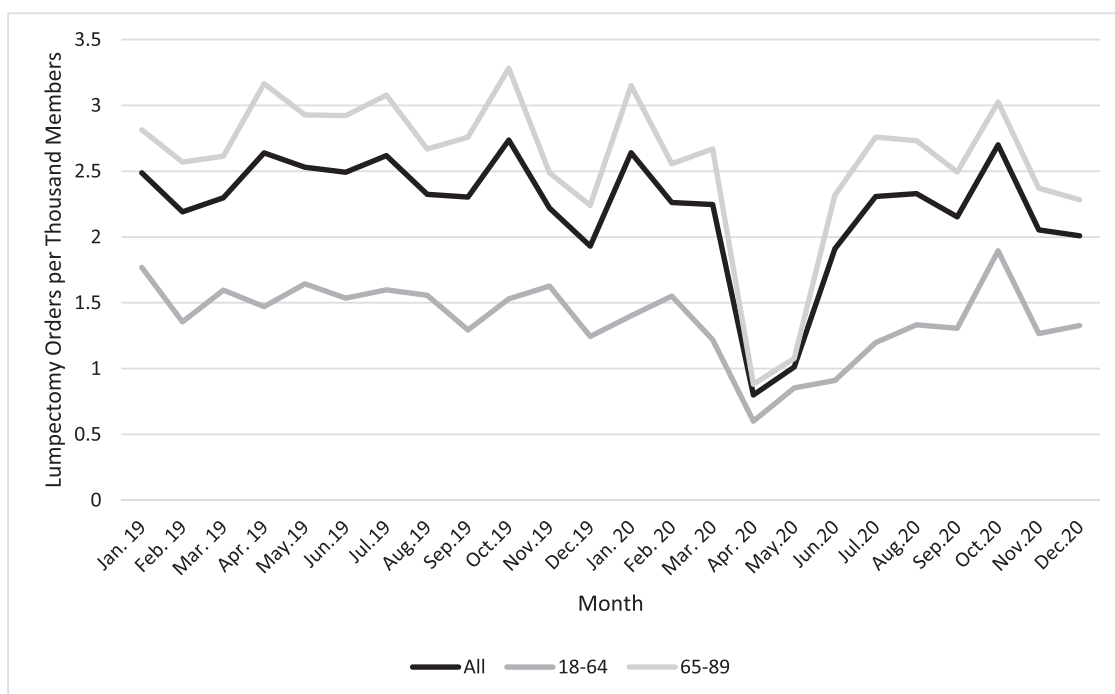


Figure 1 Lumpectomy utilization trends by age.

was placed in the first quarter of 2020, if they were older, if they lived in a rural area, if they lived in CMS Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee), if they did not live in CMS Region 6 (Arizona [AR], Louisiana [LA], New Mexico [NM], Oklahoma [OK], Texas [TX]),

and if they received their lumpectomy order from a physician in an academic setting. Among the patients receiving RT orders meeting the study’s definition of CF or HF, patients were significantly more likely to have had an HF order if they had their lumpectomy order in the third quarter of 2020, if they were older, if they lived in a

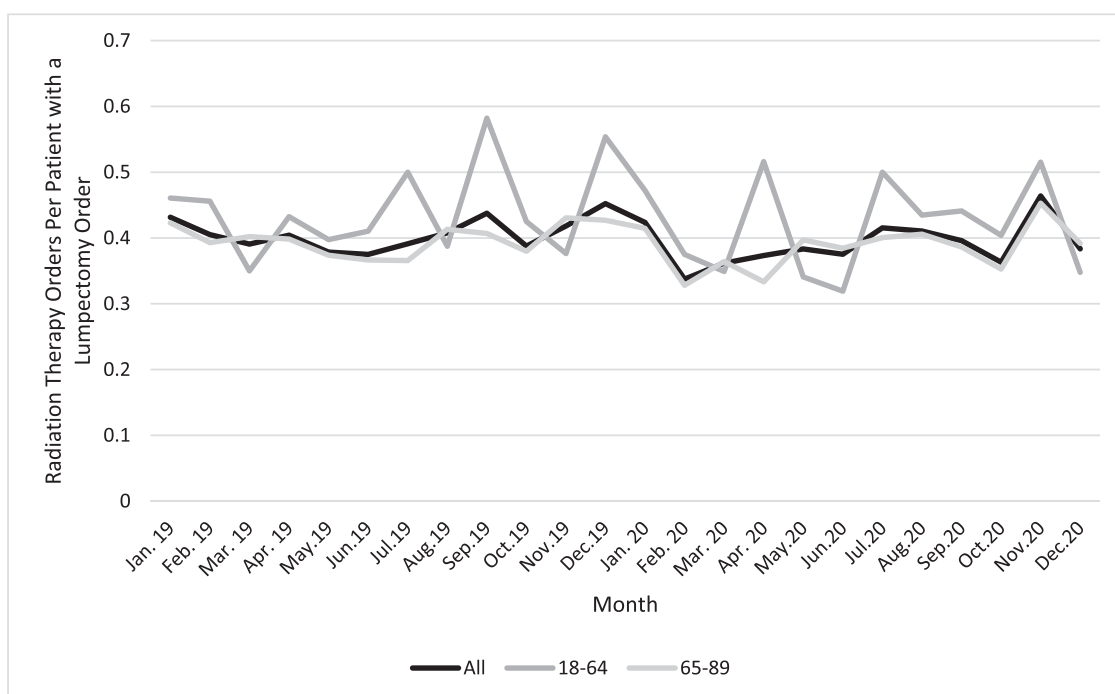


Figure 2 Radiation therapy trends among patients with lumpectomy orders by age.

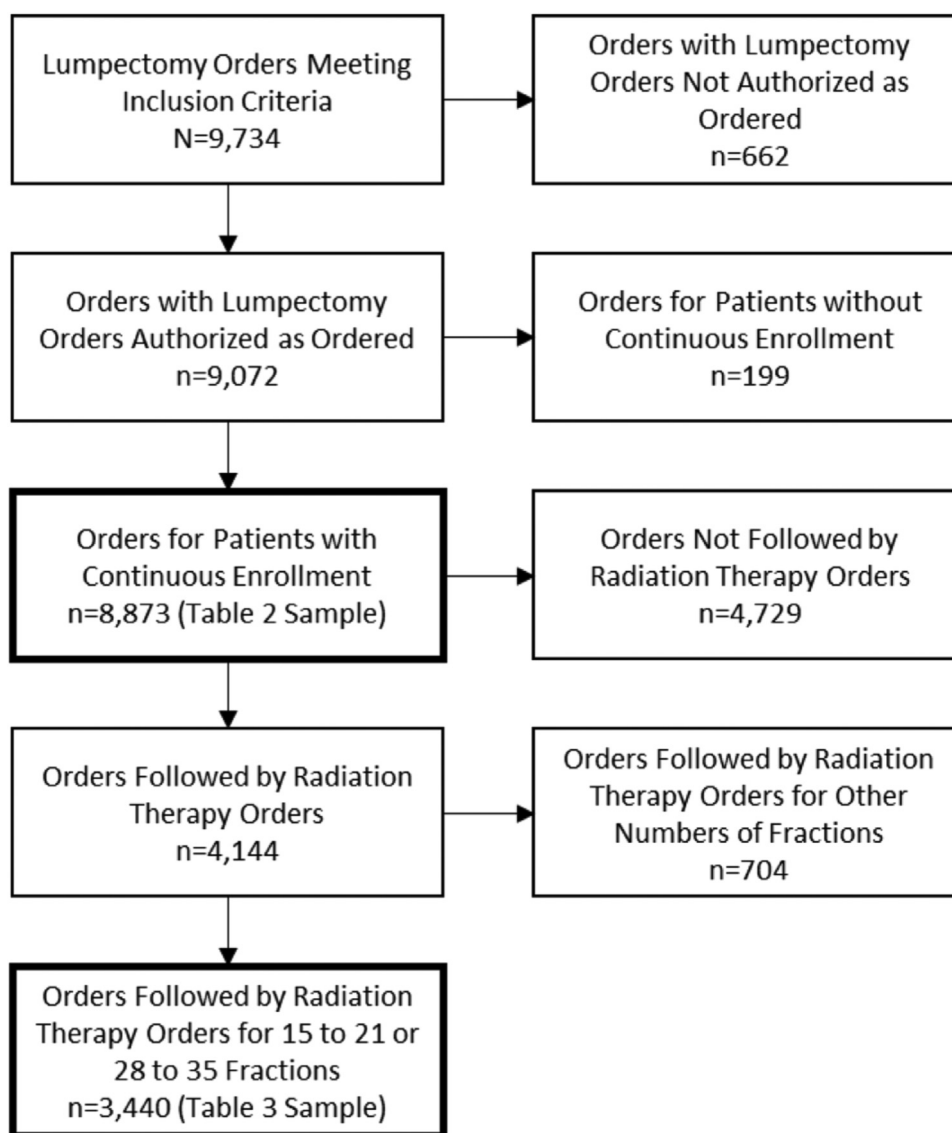


Figure 3 Participant selection diagram.

ZIP code with local income above \$80,000 per year, and if they lived in CMS Region 5 (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin). Patients were significantly less likely to have had an HF order if they lived in a ZIP code with median income below \$40,000 per year or if they lived in CMS Region 6 (AR, LA, NM, OK, TX).

Timing of lumpectomy and receipt of an RT order

In 2019, 2200 of the 4610 lumpectomy orders (47.7%) meeting inclusion criteria were followed by an RT order within 90 days, whereas in 2020, 1944 of the 4263 lumpectomy orders (45.6%) meeting inclusion criteria were followed by an RT order within 90 days, a significant difference ($P = .048$).

Multivariate analysis found that orders for lumpectomy had significantly lower odds of being followed by orders for RT within 90 days if they were placed in the first quarter of 2020, if they pertained to an older patient, if they pertained to a patient in CMS Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee), and if they were placed in an academic setting. None of the factors examined were associated with increased odds of a lumpectomy order being followed by an RT order.

Timing of lumpectomy and receipt of an HF order

Of the RT orders meeting this study’s definition of CF or HF, 1387 of the 1843 orders (75.3%) placed in 2019,

Table 1 Descriptive statistics

Variable	Did not have RT order (n = 4,729)	Had RT order (n = 4,144)	Total (N = 8,873)	P Value	Had CF order (n = 792)	Had HF order (n = 2,648)	Total (N = 3,440)	P Value
Q2 2019, n (%)	652 (13.8)	576 (13.9)	1228 (13.8)	.903	109 (13.8)	364 (13.7)	473 (13.8)	1.000
Q3 2019, n (%)	628 (13.3)	558 (13.5)	1186 (13.4)	.822	113 (14.3)	345 (13.0)	458 (13.3)	.400
Q4 2019, n (%)	588 (12.4)	557 (13.4)	1145 (12.9)	.168	104 (13.1)	361 (13.6)	465 (13.5)	.762
Q1 2020, n (%)	688 (14.5)	538 (13.0)	1226 (13.8)	.036	91 (11.5)	350 (13.2)	441 (12.8)	.224
Q2 2020, n (%)	352 (7.4)	284 (6.9)	636 (7.2)	.301	67 (8.5)	173 (6.5)	240 (7.0)	.074
Q3 2020, n (%)	621 (13.1)	551 (13.3)	1172 (13.2)	.844	86 (10.9)	376 (14.2)	462 (13.4)	.018
Q4 2020, n (%)	658 (13.9)	571 (13.8)	1229 (13.9)	.878	92 (11.6)	362 (13.7)	454 (13.2)	.150
Age, mean [SD]	71.0 [9.39]	69.3, [8.35]	70.2, [8.96]	<.001	68.2, [8.55]	69.6, [8.14]	69.3, [8.26]	<.001
Rural urbanicity (vs urban), n (%)	962 (20.3)	753 (18.2)	1715 (19.3)	.011	142 (17.9)	484 (18.3)	626 (18.2)	.865
Local income <\$40k (vs ≥ or unknown), n (%)	623 (13.2)	565 (13.6)	1188 (13.4)	.546	124 (15.7)	336 (12.7)	460 (13.4)	.036
Local income >\$80k (vs ≤ or unknown), n (%)	804 (17.0)	719 (17.4)	1523 (17.2)	.684	103 (13.0)	483 (18.2)	586 (17.0)	.001
Region 3 (DE, DC, MD, PA, VA, WV vs other), n (%)	458 (9.7)	372 (9.0)	830 (9.4)	.269	74 (9.3)	237 (9.0)	311 (9.0)	.789
Region 4 (AL, FL, GA, KY, MS, NC, SC, TN vs other), n (%)	1715 (36.3)	1372 (33.1)	3087 (34.8)	.002	276 (34.8)	892 (33.7)	1168 (34.0)	.573
Region 5 (IL, IN, MI, MN, OH, WI vs other), n (%)	893 (18.9)	755 (18.2)	1648 (18.6)	.438	108 (13.6)	538 (20.3)	646 (18.8)	<.001
Region 6 (AR, LA, NM, OK, TX vs other), n (%)	811 (17.1)	858 (20.7)	1669 (18.8)	<.001	199 (25.1)	501 (18.9)	700 (20.3)	.000
Order from academic setting (vs nonacademic), n (%)	267 (5.6)	194 (4.7)	461 (5.2)	.046	29 (3.7)	134 (5.1)	163 (4.7)	.126
Order from hospital (vs nonhospital), n (%)	3860 (81.6)	3387 (81.7)	7247 (81.7)	.917	652 (82.3)	2158 (81.5)	2810 (81.7)	.634

Abbreviations: AL = Alabama; AR = Arizona; CF = conventionally fractionated; DC = Washington DC; DE = Delaware; FL = Florida; GA = Georgia; HF = hypofractionated; IL = Illinois; IN = Indiana; KY = Kentucky; LA = Louisiana; MD = Maryland; MI = Michigan; MN = Minnesota; MS = Mississippi; NC = North Carolina; NM = New Mexico; OH = Ohio; OK = Oklahoma; PA = Pennsylvania; Q = quarter; RT = radiation therapy; SC = South Carolina; TN = Tennessee; TX = Texas; VA = Virginia; WI = Wisconsin; WV = West Virginia.
Radiation therapy orders were considered hypofractionated if they were for 15 to 21 fractions and conventionally fractionated if they were for 28 to 35 fractions.

Table 2 Odds of an order for radiation therapy after lumpectomy

	Odds Ratio	95% Confidence Interval
Q2 2019 versus Q1 2019	0.95	0.80-1.12
Q3 2019 versus Q1 2019	0.95	0.80-1.12
Q4 2019 versus Q1 2019	1.01	0.85-1.20
Q1 2020 versus Q1 2019	0.84	0.71-0.99
Q2 2020 versus Q1 2019	0.87	0.71-1.06
Q3 2020 versus Q1 2019	0.96	0.81-1.13
Q4 2020 versus Q1 2019	0.92	0.78-1.09
Age	0.98	0.97-0.98
Rural urbanicity (vs. urban)	0.90	0.81-1.01
Local income below \$40k (versus \geq or unknown)	1.06	0.93-1.20
Local income above \$80k (versus \leq or unknown)	0.98	0.87-1.10
Region 3 (DE, DC, MD, PA, VA, WV vs. other)	0.88	0.74-1.04
Region 4 (AL, FL, GA, KY, MS, NC, SC, TN vs. other)	0.83	0.73-0.94
Region 5 (IL, IN, MI, MN, OH, WI vs. other)	0.92	0.80-1.05
Region 6 (AR, LA, NM, OK, TX vs. other)	1.10	0.96-1.27
Order from academic setting (vs. nonacademic)	0.81	0.67-0.98
Order from hospital (vs. nonhospital)	0.98	0.87-1.09

Abbreviations: AL = Alabama; AR = Arizona; DC = Washington DC; DE = Delaware; FL = Florida; GA = Georgia; IL = Illinois; IN = Indiana; KY = Kentucky; LA = Louisiana; MD = Maryland; MI = Michigan; MN = Minnesota; MS = Mississippi; NC = North Carolina; NM = New Mexico; OH = Ohio; OK = Oklahoma; PA = Pennsylvania; Q = quarter; SC = South Carolina; TN = Tennessee; TX = Texas; VA = Virginia; WI = Wisconsin; WV = West Virginia.

and 1261 of the 1597 orders (79.0%) placed in 2020 were for HF, a significant difference ($P = .011$).

Multivariate analysis (Table 3) found that among patients receiving orders for either CF or HF, lumpectomy orders had significantly higher odds of being followed by HF RT orders if the lumpectomy order was placed in the fourth quarter of 2019, first quarter of 2020, third quarter of 2020, fourth quarter of 2020, if the lumpectomy order pertained to an older patient, to a patient living in a ZIP code with above \$80,000 median income, to a patient living in CMS Region 5 (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin), and to a patient not living in CMS Region 6 (AR, LA, NM, OK, TX).

Discussion

Given the mandate from CMS to delay nonessential care to increase the health care system's capacity for managing COVID-19, it is unsurprising that physicians ordered less care in 2020 than in 2019.¹ Patients were less likely to receive orders for RT in 2020, and if they did, they received orders for fewer fractions—thus requiring less contact with the health care system. While there had been research published before the pandemic suggesting that HF RT for the treatment of breast cancer produces equivalent outcomes

and may even boost adherence, HF RT was nonetheless less frequently ordered in 2019 than in 2020.¹⁷⁻²⁰

Although contemporaneous public benchmarks on the rate of use of HF RT in the treatment of breast cancer are not available at the time of writing, there are studies that examine the use of HF RT in an earlier period. An analysis of the National Cancer Database found that use of HF whole breast RT increased from 26.2% of patients receiving treatment in 2012 to 67.0% in 2016.²¹ A prior analysis of our population examining the use of whole breast HF RT found that in the 1-year period ending July 31, 2017, 53.2% of orders and 59.0% of claims were for HF RT. In the following year, after the implementation of a virtual tumor board, 60.3% of orders and 71.5% of claims were for HF RT.²² These rates are lower than the ones that were observed by our study, which found 75.3% of orders in 2019 and 79.0% of orders in 2020 to be for HF RT.

Scientific activities during the pandemic may have played a role in the shift toward HF RT. In March 2020, researchers reviewed the prepandemic literature and guidelines promoting the use of HF RT, leading to the publication of an article describing means of deferring or shortening treatment.⁶ Furthermore, during the initial months of the pandemic, several fractionation schedules supporting the use of HF RT for the treatment of breast cancer were released.⁷

Table 3 Odds of an order for hypofractionated radiation therapy

	Odds Ratio	95% Confidence Interval
Q2 2019 versus Q1 2019	1.31	0.97-1.76
Q3 2019 versus Q1 2019	1.24	0.92-1.66
Q4 2019 versus Q1 2019	1.44	1.06-1.94
Q1 2020 versus Q1 2019	1.59	1.17-2.17
Q2 2020 versus Q1 2019	1.03	0.73-1.47
Q3 2020 versus Q1 2019	1.77	1.29-2.42
Q4 2020 versus Q1 2019	1.61	1.18-2.20
Age	1.02	1.01-1.03
Rural urbanicity (vs. urban)	1.07	0.87-1.33
Local income below \$40k (versus \geq or unknown)	0.86	0.68-1.08
Local income above \$80k (versus \leq or unknown)	1.46	1.15-1.85
Region 3 (DE, DC, MD, PA, VA, WV vs. other)	0.90	0.65-1.25
Region 4 (AL, FL, GA, KY, MS, NC, SC, TN vs. other)	0.99	0.78-1.26
Region 5 (IL, IN, MI, MN, OH, WI vs. other)	1.43	1.08-1.90
Region 6 (AR, LA, NM, OK, TX vs. other)	0.75	0.58-0.97
Order from academic setting (vs. nonacademic)	1.44	0.95-2.18
Order from hospital (vs. nonhospital)	0.99	0.80-1.23

Abbreviations: AL = Alabama; AR = Arizona; DC = Washington DC; DE = Delaware; FL = Florida; GA = Georgia; IL = Illinois; IN = Indiana; KY = Kentucky; LA = Louisiana; MD = Maryland; MI = Michigan; MN = Minnesota; MS = Mississippi; NC = North Carolina; NM = New Mexico; OH = Ohio; OK = Oklahoma; PA = Pennsylvania; Q = quarter; SC = South Carolina; TN = Tennessee; TX = Texas; VA = Virginia; WI = Wisconsin; WV = West Virginia.

Radiation therapy orders were considered hypofractionated if they were for 15 to 21 fractions, and conventionally fractionated if they were for 28 to 35 fractions.

The drop in lumpectomies ordered in April 2020 (Fig. 1) may have been driven by the March 18, 2020 recommendation by CMS that physicians delay all nonessential medical and surgical procedures.¹ Given the potential for breast cancer screening and lumpectomy to be deferred, it is possible that this recommendation, as well as concerns about COVID-19, accounted for the change in ordering observed. One claims-based study of the traditional Medicare population found that breast cancer screening utilization was 85% lower in March through July 2020 than it was in March through July 2019.²³ This reduction in screening may also have had a downstream negative effect on RT utilization, as some cancers may have been missed because of a lack of screening.

We hypothesize that RT order rates were lower and the relative use of HF RT increased due to efforts by physicians to conserve medical resources. The order data we examined suggest that ordering behavior changed during the pandemic. There may have been some degree of substitution between treatment modalities in response to the constraints imposed by the pandemic. An analysis of claims for the treatment of lung cancer found that there was a significantly monotonic per-capita reduction in the use of use of RT between January 2020 and December 2021. The study

additionally considered surgery and systemic therapy utilization and did not find a significant monotonic trend in the per capita rate at which patients began treatment with 1 or more of the 3 treatment modalities during that period, suggesting that some substitution between RT, surgery, and systemic therapy may have occurred.²⁴

The findings of this study are consistent with other studies that have examined the effect of the pandemic on breast cancer treatment using other approaches. One survey-based study of US patients with breast cancer found that 44% reported delayed treatment due to the pandemic, and that younger patients were significantly more likely to report delays than older patients.⁹ A second study examining clinical data from electronic health records found that between February 2020 and April 2020, 42.6% of patients with breast cancer experienced a delay in treatment and that older patients were more likely to experience a COVID-19-related delay in breast cancer treatment than younger patients.²⁵ Treatment delays could have manifested in our data set as nontreatment if they resulted in a patient receiving RT more than 90 days after lumpectomy. In contrast to the survey-based findings and in congruence with the electronic health record-based findings, our study found that patients receiving

RT orders were significantly younger (Table 1) and that younger age was significantly associated with increased odds of an RT order following lumpectomy after controlling for other factors (Table 2).

The dip in RT utilization during the second quarter of 2020 shown in Table 1 is consistent with what is reported in the literature. A survey of 222 US-based radiation oncology practice leaders conducted during the second half of April 2020 found that practices were treating 68% of their typical volume, with 92% implementing treatment postponement for lower risk patients. Furthermore, the survey found that care did not grind to a complete halt—all the respondents reported that they had maintained uninterrupted operations.¹¹

Other studies have also found that the pandemic led to a more conservative approach to RT. A survey posed to 285 US-based members of the American Society for Radiation Oncology found that in the hypothetical clinical scenarios presented, the respondents were more likely to have provided HF RT or no further treatment during the peak of the pandemic than prepandemic. Increased uptake of HF RT for the treatment of breast cancer occurred outside of the US as well. A survey of 22 Swiss radiation oncology departments found that the 82% reported using HF RT for the treatment of breast cancer during the pandemic versus 64% before the pandemic. Furthermore, 9% of the respondents omitted RT for select patients with breast cancer who had plans for treatment with hormone therapy, and 50% of respondents used upfront hormone therapy to delay RT initiation for select patients with breast cancer.¹⁰

Limitations

This study included data pertaining to 1 national health care organization whose health plan membership primarily lived in the Southern United States. As a result, the findings are not nationally representative. Likewise, the patients all had either commercial or Medicare Advantage health plans, and, thus, the findings cannot speak to the access to care available to people without a health plan or with other forms of health plans, such as those offered by Medicaid.

Another limitation of the study was that it used 1 definition of CF and HF, which was more reflective of prepandemic practice patterns than what was performed subsequently. During the pandemic, there was a push for increased use of HF, including at lower fractionation schedules.^{6,7} Evidence supporting the use of 5 fraction regimens strengthened in 2020 with the publication of the FAST-Forward trial.²⁶ Some patients may have been provided ultra-HF RT consisting of 5 fractions, as there was evidence supporting its use predating the pandemic.²⁷ As a result, our findings may understate orders for HF, since patients with orders for fewer than 15 fractions were

excluded. On a related note, the order data did not capture whether whole breast or partial breast irradiation had been ordered. Partial breast irradiation is sometimes delivered in fewer than 15 fractions, and such orders were excluded from the analysis.²⁸

While this study presents findings on ordering behavior—the care that physicians intended for patients to receive—the care that was ultimately delivered may have differed. The pandemic reduced access to care, and it is possible that not all care ordered was ultimately delivered. As such, the findings should not be interpreted as representing how the care delivered to patients changed during the pandemic.

Conclusion

In the population examined, physicians were less likely to order RT after lumpectomy in 2020 than in 2019, and if they did, they were more likely to order HF in 2020 than in 2019. These findings suggest that physician ordering behavior changed during the pandemic. Additional research is needed to characterize the health effects of these changes in ordering behavior.

Disclosures

Adam C. Powell and Amin J. Mirhadi report an employment or consulting relationship with HealthHelp/WNS at the time of authorship. James W. Long, Ajay K. Bhatnagar, and Bryan A. Loy report employment by Humana Inc at the time of authorship. Adam C. Powell additionally reports employment by Payer+Provider Syndicate and stock ownership of Amazon, Berkshire Hathaway, JPMorgan Chase, Payer+Provider Syndicate, Target, and Walmart.

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