

Impact of Health Insurance Contract Timing on Breast Reconstruction Completion

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Background: Cost of breast reconstruction can create a substantial burden for patients. As patients hope to maximize insurance plan benefits, it is crucial to receive efficient, cost-reducing care. This study analyzes the impact of insurance cycle [calendar-based insurance (CBI) versus non-calendar-based insurance (NCBI)] on breast reconstruction.

Methods: Between January of 2014 and 2018, patients undergoing postmastectomy breast reconstruction performed by two senior surgeons (N.T.H. and S.S.T.) at a single academic institution were retrospectively evaluated. Data were collected on insurance contract timing (CBI versus NCBI) and insurance payor.

Results: A total of 514 patients were included: 136 patients on NCBI and 378 patients on CBI. Individuals enrolled in CBI were more likely than NCBI patients to have their last operation toward the end of the calendar year ($P < 0.0005$). In addition, individuals on private CBIs are more likely to have their last operation closer to the end of the year than those on public CBIs ($P < 0.0001$). Individuals enrolled in CBI were less likely to receive autologous reconstruction than individuals on NCBI ($P = 0.011$). Among patients on private CBIs, patients with all major revisions were more likely to start their reconstructive journey earlier in the year than patients who did not finish major revisions ($P = 0.011$). Lastly, individuals on private insurance also undergo more revision procedures than those on public insurance ($P < 0.0001$).

Conclusions: Insurance contract cycle and payor impact the timing of breast reconstruction. This study emphasizes the importance of both patient and provider working toward maximizing health insurance plan benefits. (*Plast. Reconstr. Surg.* 151: 489, 2023.)

The complexity of breast reconstruction after mastectomy can considerably increase the cost of treatment, potentially creating substantial burdens for patients and families. As a growing body of research powerfully demonstrated significant quality-of-life benefits of breast reconstruction, postmastectomy breast reconstruction began to be viewed as a necessary part of breast cancer care and recovery.^{1,2} The Women's Health and Cancer Rights Act of 1998 (WHCRA) provides protection through mandating that health insurance companies supply coverage to all aspects of postmastectomy breast reconstruction; as a result, some of the economic hurdles to care decreased and rates of breast reconstruction began to rise.³

Although this act transformed the care available to many breast cancer patients, significant disparities in access to care remain.⁴⁻⁶ Campaigns designed to minimize these disparities and educate women on breast reconstruction options, such as the Breast Cancer Patient Education Act of 2015, have allowed patients to take charge of understanding their options involved with health insurance.⁷

Breast reconstruction after mastectomy is typically a process involving multiple operating room visits. It can become crucial to receive optimal care within an efficient and cost-reducing time frame, as patients hope to maximize their yearly insurance health plan benefits. Although insurance payor status has been associated with

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differences in rates of reconstruction after mastectomy,^{3,8,9} the impact of insurance contract timing on breast reconstruction is unexplored. This study aims to bridge this gap in knowledge by analyzing the effect of insurance contract cycle [calendar-based insurance (CBI) versus non-calendar-based insurance (NCBI)] and insurance payor status on the timing of breast reconstructive surgery.

PATIENTS AND METHODS

Patient Selection and Analyzed Variables

Between January of 2014 and January of 2018, patients who underwent postmastectomy breast reconstruction performed by two senior surgeons (N.T.H. and S.S.T.) were retrospectively evaluated after obtaining approval through the University of Texas Southwestern Medical Center Institutional Review Board (STU 052015-021). The senior surgeons have shared standardized surgical strategies at a single academic institution.¹⁰

Reconstruction routes included either immediate or delayed-immediate reconstruction involving tissue expanders, implant-based reconstruction, or autologous reconstruction. Types of autologous reconstruction include deep inferior epigastric artery perforator, lumbar artery perforator, or profunda artery perforator flaps.

Patient information was collected through a Research Electronic Data Capture database.¹¹ Information included data on patient demographics, timing of reconstruction (length of reconstruction, day of year of first and last reconstructive operation), type of reconstruction (implant-based or autologous), number of revision procedures, insurance payor status (private versus public), and insurance cycle contract timing (CBI versus NCBI). Insurance contract timing was categorized based on the time of year the health plan benefits and/or deductible reset. Completion of all major revisions was measured by the clinical judgment of two senior plastic surgeons.

Patients were excluded if health insurance billing information was not available; follow-up data were missing; or the patient underwent lumpectomy, partial mastectomy, or nipple-sparing mastectomy. Nipple-sparing mastectomies were excluded for two reasons: (1) to control for the number of revision procedures among groups, as surgical nipple reconstruction is considered a surgical revision; and (2) the presence of data showing criteria for nipple-sparing mastectomies such as tumors of a lesser grade, no lymphovascular invasion, or axillary node metastasis would have

created disparity among individuals diagnosed at a later stage.¹²

Statistical Analysis

Data were queried through the Research Electronic Data Capture database to apply inclusion and exclusion criteria. Differences between continuous variables were assessed using the independent *t* test. Differences in proportions were analyzed using the chi-square or the Fisher exact test. All statistical analyses were performed using Stata (v12.0; StataCorp, College Station, TX). Results were considered significant at a value of $P < 0.05$.

RESULTS

Demographics

A total of 514 patients were included in this study. A total of 136 patients (26.5%) were enrolled in NCBI, and 378 patients (73.5%) were enrolled in CBI. Of the individuals enrolled in CBI, 301 patients (79.6%) were enrolled in a private health insurance plan and 77 patients (20.4%) were enrolled in a public health insurance plan. Of the individuals enrolled in an NCBI, 58 individuals (42.6%) were enrolled in a private health insurance plan, 76 individuals (55.9%) were enrolled in a public health insurance plan, and two individuals (1.5%) had an unknown insurance payor that was not billed annually.

Patients on CBI were of an older age than those on NCBI, because of the inclusion of Medicare patients being commonly enrolled in CBI plans (aged 55.2 years vs. 50.9 years, respectively; $P < 0.001$). In addition, the racial distribution of patients was significantly different between those on CBI versus NCBI, as disadvantaged minorities may be covered under Medicaid, a public NCBI ($P = 0.001$) (Table 1).

CBI versus NCBI

Among patients of all insurance types, individuals in a CBI program were more likely than those in NCBI programs to have their last operation closer to the end of the calendar year (day 224 of year versus day 176 of year, respectively; $P < 0.0005$). There is no difference for the timing of the start of reconstruction (Table 2).

In addition, patients enrolled in CBI were less likely to receive autologous reconstruction than individuals on NCBI (56.6% versus 69.1%, respectively; $P = 0.011$). Patients enrolled in CBI were

Table 1. Univariate Analysis of Demographic Variables Based on Insurance Cycle Timing (CBI versus NCBI)

Characteristic	CBI (%)	NCBI (%)	P
No. of patients	378	136	
Mean age ± SD, yr	55.19 ± 10.74	50.91 ± 9.07	<0.001 ^{a,b}
Mean BMI ± SD, kg/m ²	29.12 ± 5.86	29.81 ± 6.05	0.244 ^a
Race			
Black	52 (13.75)	25 (18.38)	0.001 ^{b,c}
Hispanic	22 (5.82)	45 (33.09)	
White	287 (75.93)	60 (44.12)	
Other	17 (4.50)	6 (4.41)	
HTN			0.888 ^{b,c}
Yes	122 (32.27)	43 (31.62)	
No	256 (67.73)	93 (68.38)	
Diabetes			0.447 ^{b,c}
Yes	36 (9.52)	10 (7.35)	
No	342 (90.48)	126 (92.65)	
Autoimmune			0.214 ^{b,c}
Yes	24 (6.35)	13 (9.56)	
No	354 (93.65)	123 (90.44)	
Smoking			0.395 ^{b,c}
Current	12 (3.17)	5 (3.67)	
Former	100 (26.46)	28 (20.59)	
Never	266 (70.37)	103 (75.74)	
Prophylactic			0.228 ^{b,c}
Yes	28 (7.41)	6 (4.41)	
No	350 (92.59)	130 (95.59)	
Radiation therapy			0.190 ^{b,c}
Yes	148 (39.15)	62 (45.59)	
No	230 (60.85)	74 (54.41)	
Adjuvant chemotherapy			0.587 ^{b,c}
Yes	115 (30.42)	38 (27.94)	
No	263 (69.58)	98 (72.06)	

BMI, body mass index; HTN, hypertension.

^aIndependent *t* test.

^bStatistically significant.

^cχ² test.

more likely to receive implant-based reconstruction than those enrolled in NCBI (37.6% versus 22.8%, respectively; *P* = 0.002) (Table 2).

Private versus Public

Individuals on private insurance are more likely than those on public insurance to have their last surgery closer to the end of the calendar year (day 226 of year versus day 176 of year, respectively; *P* < 0.0001) (Table 3). This association

holds true for privately and publicly insured individuals on a CBI plan (day 237 of year versus day 172 of year, respectively; *P* < 0.0001) but does not hold true for privately and publicly insured individuals on an NCBI plan (day 169 of year versus day 180 of year, respectively; *P* = 0.523) (Table 4).

In addition, among individuals enrolled in either private or public insurance, individuals on private insurance undergo more revision operations (1.26 versus 0.84, respectively; *P* < 0.0001, respectively) and total operating room visits (3.73 versus 3.37, respectively; *P* = 0.029) than those on public insurance (Table 3). Notably, patients enrolled in private CBI were more likely than those on private NCBI to have their last operation closer to the end of the calendar year (day 237 of year versus day 169 of year, respectively; *p* < 0.00001).

Completion of Major Revisions

Among individuals enrolled in CBI plans, patients who were judged to have completed all major revisions were more likely to both start their reconstructive journey earlier in the calendar year (day 165 of year versus day 186 of year, respectively; *P* = 0.099) and finish later in the calendar year (day 230 of year versus day 202 of year, respectively; *P* = 0.025) than those who did not complete all major revisions (Table 5). This association is amplified among those solely on a private CBI plan, as individuals considered complete were more likely to start their reconstructive journey closer to the beginning of the year than those considered incomplete (day 165 of year versus day 203 of year, respectively; *P* = 0.01).

DISCUSSION

With recent literature showing that more than 3.8 million women with a history of breast cancer are living in the United States, the importance of

Table 2. Univariate Analysis of Clinical Variables Based on Insurance Cycle Timing (CBI versus NCBI)

Characteristic	CBI (%)	NCBI (%)	P
No.	378	136	
Mean length of reconstruction ± SD, days	441.78 ± 331.12	444.69 ± 350.20	0.931 ^a
Mean day of year of first surgery ± SD	170.23 ± 104.93	176.63 ± 100.60	0.538 ^a
Mean day of year of last surgery ± SD	223.65 ± 100.73	175.91 ± 97.33	<0.0005 ^{a,b}
Mean total no. of operating room visits ± SD	3.71 ± 1.74	3.38 ± 1.62	0.054 ^a
Mean total no. of revision operations ± SD	1.18 ± 1.05	0.98 ± 1.05	0.052 ^a
Autologous reconstruction	214 (56.61)	94 (69.12)	0.011 ^{b,c}
Implant-based reconstruction	142 (37.56)	31 (22.79)	0.002 ^{b,c}

^aIndependent *t* test.

^bStatistically significant.

^cχ² test.

Table 3. Univariate Analysis of Clinical Variables Based on Insurance Payor Status (Private versus Public)

Characteristic	Private Insurance	Public Insurance	P
No. of patients	359	153	
Mean length of reconstruction ± SD, days	453.81 ± 331.60	415.07 ± 346.94	0.233 ^a
Mean day of year of first surgery ± SD	173.56 ± 106.51	167.12 ± 97.50	0.521 ^a
Mean day of year of last surgery ± SD	226.00 ± 98.51	175.75 ± 102.14	<0.0001 ^{a,b}
Mean total no. of operating room visits ± SD	3.73 ± 1.66	3.37 ± 1.82	0.029 ^{a,b}
Mean total no. of revision operations ± SD	1.26 ± 1.05	0.84 ± 1.02	<0.0001 ^{a,b}

^aIndependent *t* test.^bStatistically significant.**Table 4. Univariate Analysis of Clinical Variables Based on Insurance Payor Status (Private versus Public) among Individuals Who Were Enrolled in CBI and Individuals Enrolled in NCBI**

Characteristic	Private Insurance	Public Insurance	P
CBI cohort (<i>n</i> = 378)			
No.	301	77	
Mean length of reconstruction ± SD, days	451.89 ± 336.34	402.22 ± 308.75	0.241 ^a
Mean day of year of first surgery ± SD	172.97 ± 105.59	159.53 ± 102.27	0.317 ^a
Mean day of year of last surgery ± SD	236.98 ± 96.85	171.56 ± 99.26	<0.0001 ^{a,b}
Mean total no. of operating room visits ± SD	3.73 ± 1.69	3.61 ± 1.92	0.589 ^a
Mean total no. of revision operations ± SD	1.25 ± 1.05	0.91 ± 1.04	0.012 ^{a,b}
NCBI cohort (<i>n</i> = 136)			
No.	58	76	
Length of reconstruction ± SD, days	463.72 ± 308.40	428.09 ± 383.41	0.564 ^a
Day of year of first surgery ± SD	176.67 ± 112.05	174.82 ± 92.45	0.917 ^a
Day of year of last surgery ± SD	169.03 ± 87.41	179.99 ± 105.48	0.523 ^a
Total no. of operating room visits ± SD	3.74 ± 1.51	3.13 ± 1.68	0.031 ^{a,b}
Total no. of revision operations ± SD	1.28 ± 1.07	0.76 ± 0.99	0.004 ^{a,b}

^aIndependent *t* test.^bStatistically significant.**Table 5. Univariate Analysis of Clinical Variables Based on Completion of All Major Revisions as Judged by Two Senior Plastic Surgeons (N.T.H. and S.S.T.) among Individuals Who Were Enrolled in CBI^a**

Characteristic	Completed all Major Revisions	Did Not Complete all Major Revisions	P
No.	301	77	
Mean day of year of first surgery ± SD	165.33 ± 103.05	186.36 ± 109.97	0.099 ^{b,c}
Mean day of year of last surgery ± SD	230.05 ± 98.51	202.57 ± 105.58	0.025 ^{b,c}

^a*n* = 368.^bIndependent *t* test.^cStatistically significant.

access to breast reconstruction after mastectomy is clear.¹³ With advances in medicine dropping the breast cancer death rate 40% from 1989 to 2017, many women are left not only with the emotional and psychological burden of their diagnosis, but also with the financial stress of navigating insurance through breast reconstruction.¹³ Although the WHCRA ensured insurance coverage for all stages of breast reconstruction after mastectomy and the Breast Cancer Patient Education Act of 2015 provided educational resources to minimize disparities to care, gaps remain when it comes to discussions with patients about how to navigate their individual insurance plan benefits.

In this study, we highlight the impact of insurance contract cycle on the reconstruction process. First, individuals on a CBI program were more likely than those on NCBI programs to have their last operation closer to the end of the

calendar year ($P < 0.0005$). For a provider, this study predicts the increased demand for revision operations toward the end of the year and may highlight the prevalence of the postdeductible visits, as literature demonstrates postdeductible spending is primarily concentrated on elective procedures and preventive care.¹⁴ As many physicians struggle with the influx of patients in the last few months of every year, this study can encourage conversations between physician and patient about scheduling reconstructive operations in a manner that both reduces cost for the patient and provides care in an efficient time frame. This study also allows insurance payors to predict the cost of claims within the calendar year and potentially adopt models of elasticity to account for the difference in pre-deductible and post-deductible spending.¹⁵ Figure 1 displays the distribution of the month of the last operation for individuals on

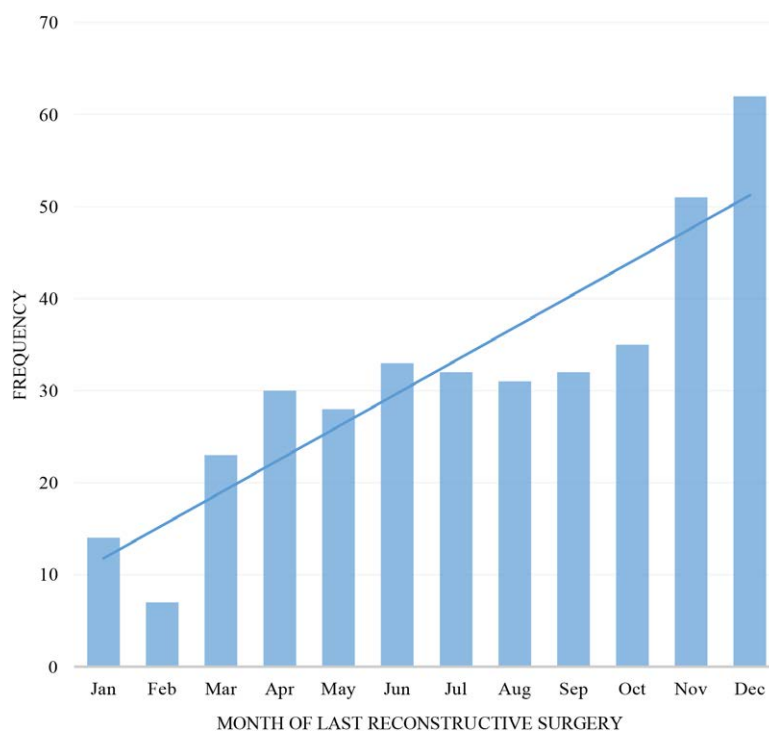


Fig. 1. Bar graph of month of last reconstructive operation for individuals on CBI.

CBI, showing a clear spike in surgery in the later months of the year. Likewise, [Figure 2](#) displays information for individuals on NCBI but does not illustrate the end-of-year increased demand. A limitation to the statistical importance of this finding is the tendency for patients to seek end-of-year operating room dates because of the potential use of scheduled holidays for recovery time so that patients may not miss valuable salary and/or work opportunities. However, we would expect this to equally affect CBI versus NCBI surgical timings. Although this factor may influence patient decision-making, the comparison between [Figure 1](#) and [Figure 2](#) shows an uneven spike in end-of-year surgical revisions, highlighting the impact of one's health insurance contract.

With this study highlighting the impact of insurance contract on timing of reconstruction, it is noticed that insurance contract timing also impacts type of reconstruction, as patients enrolled in CBI were less likely to undergo autologous reconstruction than individuals on NCBI ($P = 0.011$). As patients may receive a breast cancer diagnosis at any point within the year, patients on CBI may feel restricted by the December 31 deductible reset date and opt for a reconstructive option with fewer revision procedures that can be completed within the calendar year, such as implant-based reconstruction. When discussing

autologous versus implant-based reconstruction decision-making, it is crucial to also bring to light the other factors that undoubtedly influence patients to choose one mode of reconstruction over the other. With studies demonstrating the increased likelihood for obese women to experience surgical complications, medical complications, and rates of reoperation, the impact of body mass index on the decision to undergo an extensive procedure such as autologous reconstruction is likely observed.¹⁶ However, in this study, [Table 1](#) illustrates no difference in body mass index between CBI and NCBI patients ($P = 0.244$). Other factors that may influence breast reconstruction type include socioeconomic factors such as the ability to readily take off significant time from work for recovery. In addition, studies have shown surgical bias in type of reconstruction when stratified by household income.¹⁷ As a public insurance such as Medicaid is considered an NCBI, socioeconomic status is a factor that may play a role in implicit surgical bias.

In this study, both insurance cycle timing and type were analyzed to find that individuals on private insurance are more likely than those on public insurance to have their last surgery closer to the end of the calendar year ($P < 0.0001$), particularly among those with CBI ($P < 0.0001$) but not with those on NCBI ($P = 0.523$). As deductibles and

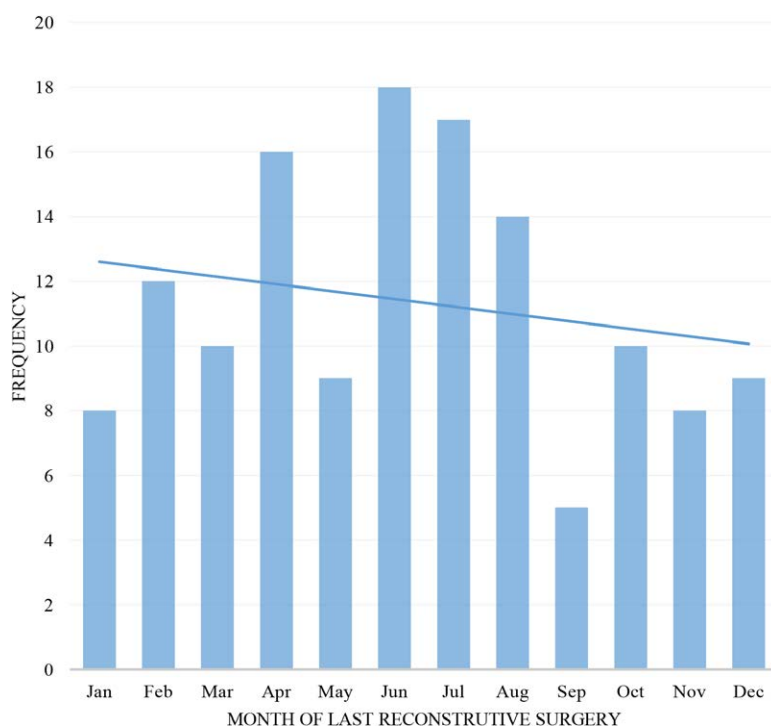


Fig. 2. Bar graph of month of last reconstructive surgery for individuals on NCBI.

maximum out-of-pocket costs tend to be higher for a patient on private insurance compared to a patient on public insurance, this finding may be explained by the high cost of private CBI plans serving as a motive for patients to finish reconstruction before the calendar year resets. For a patient, this study suggests the importance of cost discussions related to maximizing health insurance yearly benefits to both optimize reconstructive decision-making and lessen financial stress.

In addition, among individuals enrolled in either private or public insurance, individuals on private insurance receive more revision procedures ($P < 0.0001$) and total operating room visits ($P = 0.029$) than those on public insurance. This study further emphasizes the remaining disparities prevalent in access to care, as this may be explained in part by the lower reimbursement offered by government insurance to providers¹⁸ or explained by less available resources to either take time off or recover from a procedure in the public insurance group. As the WHCRA mandated insurance companies to cover breast reconstruction including symmetry procedures, it is important to note that nipple reconstruction, in particular, is viewed differently from state to state. Although Medicare covers breast reconstruction procedures including nipple reconstruction, Medicaid coverage of nipple reconstruction can vary from state

to state. With this study including mainly residents of Texas, this did not play a role. However, clinician understanding of patient insurance status may help guide reconstructive decision-making regarding Medicaid coverage in other states.

Physician reimbursement for procedures also may play a role in the difference in revision rates among different insurance types. With a study following reconstruction over a 10-year period, it is found that the average reimbursement for physicians was 16.3% for Medicaid, 28.3% for Medicare, and 67.2% for private insurance.¹⁸ In addition, it was found that the highest hourly reimbursement was for privately insured patients undergoing implant-based reconstruction.¹⁸ This area of research is of great importance, as eliminating physician bias is crucial to improvement in patient care.

Similarly, insurance contract timing impacts the extent of revision procedures a patient may receive, perhaps leading to some patients not achieving their optimal result. This study noted that among individuals enrolled in CBI plans, patients who were judged to have completed all major revisions were more likely to have started their reconstructive journey earlier in the calendar year ($P < 0.1$) and finish later in the calendar year ($P = 0.025$) than those who did not complete all major revisions. This aspect of the study brings

to light the realization that individuals diagnosed with breast cancer closer to the beginning of the calendar year may be better able to achieve mastectomy, reconstruction, and major revisions within a single calendar year, leading to less out-of-pocket cost. In addition, individuals who undergo their first reconstructive procedure later in the year perhaps find trouble completing all the major revisions within the cost-reducing time frame. Of course, the limitation of this finding includes that clinical judgment of two senior surgeons was used in the absence of clinically defined endpoints for completion of major revisions.

With these findings, three aspects clinicians should consider when counseling a patient about reconstruction options include, first, is the patient on a private or a public insurance? Second, what time of year do the insurance benefits reset? Third, what time of year is the patient starting reconstruction (Table 6)? Using this information,

Table 6. Questions Clinicians Should Consider Regarding Patient Insurance Status

Question	Strategy
Is the patient on a private or a public insurance?	
Private	Patients may be more likely to use end of year for surgical operations. Patients may have more surgical revision procedures and operating room visits.
Public	Patients may be less likely to use end of year for surgical operations. Patients may have fewer surgical revision procedures and operating room visits.
What time of year do the insurance benefits reset?	
CBI	Patients on a calendar-based insurance plan may be more likely to use end of year for surgical operations. Patients may also be more likely to undergo implant-based reconstruction.
NCBI	Patients on an NCBI plan may be more likely to undergo autologous reconstruction.
What time of year is the patient starting reconstruction?	
First half of year	Patients may be more able to finish all reconstructive revisions within calendar year if on CBI.
Last half of year	Patients may not be as able to finish all reconstructive revisions within calendar year if on CBI.

clinicians may be better able to understand the impact that a patient's insurance status may have on the reconstruction journey.

Although the impact of type of insurance billing cycle has been examined in this article, future directions of this study should examine the impact of the health plan deductible on timing of reconstruction, as high-deductible health plans (HDHP) may pose greater barriers to revision procedures than low-deductible health plans. Literature currently shows that women on HDHPs experienced delays in certain breast cancer services such as diagnostic breast imaging, breast biopsy, and chemotherapy initiation.¹⁹ Between the years 2004 and 2011, the percentage of women with metastatic breast cancer enrolled in HDHPs nearly tripled, whereas those enrolled in low-deductible health plans nearly halved.²⁰ With breast cancer patients constituting a particularly vulnerable patient population subject to high costs of cancer and reconstructive care, the deductible surely has a large impact. Further research into breast reconstruction may illuminate a need for policymakers to reduce out-of-pocket cost for breast cancer recovery treatments.

Despite the contributions of these findings, limitations remain. First, this study was a retrospectively designed study and therefore has distinct disadvantages. Second, this study did not account for patient-reported comments on reasons behind scheduling operations during particular times of the year. Third, this study was performed at a single institution and thus may not be fully representative of patients who receive care at multicenter institutions nationwide. However, these findings will help guide patients, providers, and insurance companies. For patients, this study suggests the importance of cost discussions and reconstructive decision-making tailored with the individual health insurance in mind. For a provider, this study predicts the increased demand for revision operations toward the end of the year. Lastly, this study allows insurance payors to predict the timing and cost of insurance claims within the calendar year.

CONCLUSIONS

The central question of CBI versus NCBI is an essential point for providers to take into consideration when consulting a new patient. Insurance contract cycle affects both the timing and completion of breast reconstruction, providing insight into patient, provider, and insurance payors. As the timing of an insurance contract may impact

whether it is financially possible for a patient to complete revision reconstructive procedures, it is important to ensure that breast reconstruction is equally available to every woman wishing to undergo reconstruction, independent of the time of year of breast cancer diagnosis and mastectomy.

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REFERENCES

- Cederna PS, Yates WR, Chang P, Cram AE, Ricciardelli EJ. Postmastectomy reconstruction: comparative analysis of the psychosocial, functional, and cosmetic effects of transverse rectus abdominis musculocutaneous flap versus breast implant reconstruction. *Ann Plast Surg.* 1995;35:458–468.
- Dean C, Chetty U, Forrest AP. Effects of immediate breast reconstruction on psychosocial morbidity after mastectomy. *Lancet* 1983;1:459–462.
- Yang RL, Newman AS, Lin IC, et al. Trends in immediate breast reconstruction across insurance groups after enactment of breast cancer legislation. *Cancer* 2013;119:2462–2468.
- Wexelman B, Schwartz JA, Lee D, Estabrook A, Ma AM. Socioeconomic and geographic differences in immediate reconstruction after mastectomy in the United States. *Breast J.* 2014;20:339–346.
- Albornoz CR, Bach PB, Pusic AL, et al. The influence of sociodemographic factors and hospital characteristics on the method of breast reconstruction, including microsurgery: a U.S. population-based study. *Plast Reconstr Surg.* 2012;129:1071–1079.
- Jagsi R, Jiang J, Momoh AO, et al. Trends and variation in use of breast reconstruction in patients with breast cancer undergoing mastectomy in the United States. *J Clin Oncol.* 2014;32:919–926.
- Congress.gov. Breast Cancer Patient Education Act of 2015, H. R. 2540, 114th Congress (2015–2016). Available at: <https://www.congress.gov/bill/114th-congress/house-bill/2540>. Accessed March 15, 2021.
- Restrepo DJ, Boczar D, Huayllani MT, et al. Influence of race, income, insurance, and education on the rate of breast reconstruction. *Anticancer Res.* 2019;39:2969–2973.
- Roughton MC, DiEgidio P, Zhou L, Stitzenberg K, Meyer AM. Distance to a plastic surgeon and type of insurance plan are independently predictive of postmastectomy breast reconstruction. *Plast Reconstr Surg.* 2016;138:203e–211e.
- Haddock NT, Suszynski TM, Teotia SS. An individualized patient-centric approach and evolution towards total autologous free flap breast reconstruction in an academic setting. *Plast Reconstr Surg Glob Open* 2020;8:e2681.
- Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap): a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform.* 2009;42:377–381.
- Mallon P, Feron J-G, Couturaud B, et al. The role of nipple-sparing mastectomy in breast cancer: a comprehensive review of the literature. *Plast Reconstr Surg.* 2013;131:969–984.
- DeSantis CE, Ma J, Gaudet MM, et al. Breast cancer statistics, 2019. *CA Cancer J Clin.* 2019;69:438–451.
- Guo A, Zhang J. What to expect when you are expecting: are health care consumers forward-looking?. *J Health Econ.* 2019;67:102216.
- Dalton CM. Estimating demand elasticities using nonlinear pricing. *Int J Ind Organ.* 2014;37:178–191.
- Panayi AC, Agha RA, Sieber BA, Orgill DP. Impact of obesity on outcomes in breast reconstruction: a systematic review and meta-analysis. *J Reconstr Microsurg.* 2018;34:363–375.
- Chouairi F, Mets EJ, Gabrick KS, Dinis J, Avraham T, Alperovich M. Impact of insurance payer on type of breast reconstruction performed. *Plast Reconstr Surg.* 2020;145:1e–8e.
- Odom EB, Schmidt AC, Myckatyn TM, Buck DW II. A cross-sectional study of variations in reimbursement for breast reconstruction: is a healthcare disparity on the horizon?. *Ann Plast Surg.* 2018;80:282–286.
- Wharam JF, Zhang F, Lu CY, et al. Breast cancer diagnosis and treatment after high-deductible insurance enrollment. *J Clin Oncol.* 2018;36:1121–1127.
- Leopold C, Wagner AK, Zhang F, et al. Total and out-of-pocket expenditures among women with metastatic breast cancer in low-deductible versus high-deductible health plans. *Breast Cancer Res Treat.* 2018;171:449–459.