

## Supplemental Online Content

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This supplemental material has been provided by the authors to give readers additional information about their work.

**eTable 1: CPT Codes**

<b>NSQIP</b>	<b>CPT Codes</b>	<b>Description</b>
<b>Lumpectomy</b>		
<b>Procedures</b>	19120	Removal of breast lesion
	19125	Excision of breast lesion
	19140	Removal of breast tissue
	19160	Mastectomy, partial
	19162	Mastectomy, partial, with axillary lymphadenectomy
	19301	Mastectomy, partial (e.g., lumpectomy, tylectomy, quadrantectomy, segmentectomy)
	19302	Mastectomy, partial (e.g., lumpectomy, tylectomy, quadrantectomy, segmentectomy); with axillary lymphadenectomy
<b>Mastectomy</b>		
<b>Procedures</b>	19180	Mastectomy, simple, complete
	19182	Mastectomy, subcutaneous
	19200	Mastectomy, radical, including pectoral muscles, axillary lymph nodes
	19220	Mastectomy, radical, including pectoral muscles, axillary, and internal mammary lymph nodes
	19240	Mastectomy, modified radical, including axillary lymph nodes, with/without pectoralis minor muscle, excluding pectoralis major
	19303	Mastectomy, simple, complete
	19304	Mastectomy, subcutaneous
	19305	Mastectomy, radical, including pectoral muscles, axillary lymph nodes
	19306	Mastectomy, radical, including pectoral muscles, axillary and internal mammary lymph nodes
	19307	Mastectomy, radical, including pectoral muscles, axillary and internal mammary lymph nodes

**eTable 2: Site-Specific Surgery Codes**

SEER/NCDB	Site-Specific Surgery Codes	Description
<b>Lumpectomy Procedures</b>		
	20	Partial mastectomy, NOS; less than total mastectomy, NOS
	21	Partial mastectomy WITH nipple resection
	22	Lumpectomy or excisional biopsy
	24	Segmental mastectomy (including wedge resection, quadrantectomy, tylectomy)
<b>Mastectomy Procedures</b>		
Laterality Not Specified		
	30	Subcutaneous mastectomy
	40	Total (simple) mastectomy
	50	Modified radical mastectomy
	60	Radical mastectomy, NOS
	70	Extended radical mastectomy
	80	Mastectomy, NOS
<b>Unilateral Mastectomy</b>		
	41	Total (simple) mastectomy WITHOUT removal of uninvolved contralateral breast
	51	Modified radical mastectomy WITHOUT removal of uninvolved contralateral breast
	61	Radical mastectomy, NOS, WITHOUT removal of uninvolved contralateral breast
	71	Extended radical mastectomy WITHOUT removal of uninvolved contralateral breast

	43	Total (simple) mastectomy WITHOUT removal of uninvolved contralateral breast with reconstruction NOS
	44	Total (simple) mastectomy WITHOUT removal of uninvolved contralateral breast with reconstruction, Tissue
	45	Total (simple) mastectomy WITHOUT removal of uninvolved contralateral breast with reconstruction, Implant
	46	Total (simple) mastectomy WITHOUT removal of uninvolved contralateral breast with reconstruction, Combined (Tissue and Implant)
	53	Modified radical mastectomy WITHOUT removal of uninvolved contralateral breast, Reconstruction, NOS
	54	Modified radical mastectomy WITHOUT removal of uninvolved contralateral breast, Reconstruction, Tissue
	55	Modified radical mastectomy WITHOUT removal of uninvolved contralateral breast, Reconstruction, Implant
	56	Modified radical mastectomy WITHOUT removal of uninvolved contralateral breast, Reconstruction, Combined (Tissue and Implant)
	64	Radical mastectomy WITHOUT removal of uninvolved contralateral breast, Reconstruction, NOS
	65	Radical mastectomy WITHOUT removal of uninvolved contralateral breast, Reconstruction, Tissue
	66	Radical mastectomy WITHOUT removal of uninvolved contralateral breast, Reconstruction, Implant
	67	Radical mastectomy WITHOUT removal of uninvolved contralateral breast, Reconstruction, Combined (Tissue and Implant)
Contralateral Prophylactic Mastectomy		
	42	42 Total (simple) mastectomy WITH removal of uninvolved contralateral breast
	52	Modified radical mastectomy WITH removal of uninvolved contralateral breast
	62	Radical mastectomy, NOS, WITH removal of uninvolved contralateral breast
	72	Extended radical mastectomy WITH removal of uninvolved contralateral breast

	47	Total (simple) mastectomy WITH removal of uninvolved contralateral breast with reconstruction NOS
	48	Total (simple) mastectomy WITH removal of uninvolved contralateral breast with reconstruction, Tissue
	49	Total (simple) mastectomy WITH removal of uninvolved contralateral breast with reconstruction, Implant
	75	Total (simple) mastectomy WITH removal of uninvolved contralateral breast with reconstruction, Combined (Tissue and Implant)
	57	Modified radical mastectomy WITH removal of uninvolved contralateral breast, Reconstruction, NOS
	58	Modified radical mastectomy WITH removal of uninvolved contralateral breast, Reconstruction, Tissue
	59	Modified radical mastectomy WITH removal of uninvolved contralateral breast, Reconstruction, Implant
	63	Modified radical mastectomy WITH removal of uninvolved contralateral breast, Reconstruction, Combined (Tissue and Implant)
	68	Radical mastectomy WITH removal of uninvolved contralateral breast, Reconstruction, NOS
	69	Radical mastectomy WITH removal of uninvolved contralateral breast, Reconstruction, Tissue
	73	Radical mastectomy WITH removal of uninvolved contralateral breast, Reconstruction, Implant
	74	Radical mastectomy WITH removal of uninvolved contralateral breast, Reconstruction, Combined (Tissue and Implant)
Other		
	76	76 Bilateral mastectomy for a single tumor involving both breasts, as for bilateral inflammatory carcinoma

**eTable 3: Demographics for Lumpectomy and Mastectomy Patients (2005–2017)**

<b>NSQIP</b>					
Variable		Lumpectomy (230,855)	Mastectomy (138,791)	p-value	Odds Ratio (95% CI)
Age*	<40	12.2% (28,153)	9.35% (12,956)	< 0.001	1.349 (1.319, 1.379)
	40–49	19.4% (44,677)	22.3% (30,904)	< 0.001	0.837 (0.824, 0.851)
	50–59	24.0% (55,399)	26.2% (36,270)	< 0.001	0.892 (0.878, 0.906)
	60–69	23.9% (55,066)	22.8% (31,525)	< 0.001	1.065 (1.049, 1.082)
	70–79	14.6% (33,773)	13.1% (18,205)	< 0.001	1.135 (1.113, 1.157)
	≥80	5.85% (13,483)	6.28% (8,705)	< 0.001	0.927 (0.901, 0.953)
Race	White	70.2% (162,030)	72.0% (99,971)	< 0.001	0.914 (0.901, 0.928)
	Black/African American	12.1% (27,816)	10.0% (13,976)	< 0.001	1.223 (1.197, 1.25)
	Asian or Pacific Islander	5.18% (11,947)	5.18% (7,184)	= 0.994	1 (0.97, 1.03)
	American Indian or Alaska Native	0.60% (1,394)	0.49% (691)	< 0.001	1.214 (1.107, 1.332)
	Other/Unknown	11.9% (27,668)	12.2% (16,969)	= 0.029	0.978 (0.958, 0.998)
Ethnicity	Hispanic/Spanish	7.01% (16,175)	5.66% (7,851)	< 0.001	1.257 (1.222, 1.292)
	Non-Hispanic/Spanish	83.5% (192,859)	84.4% (117,093)	< 0.001	0.941 (0.924, 0.958)
	Unknown	9.45% (21,821)	9.98% (13,847)	< 0.001	0.942 (0.921, 0.963)
<b>SEER</b>					
Variable		Lumpectomy (418,183)	Mastectomy (372,444)	p-value	Odds Ratio (95% CI)
Age	<40	2.50% (10,457)	6.94% (25,846)	< 0.001	0.344 (0.336, 0.352)
	40–49	14.2% (59,150)	20.5% (76,400)	< 0.001	0.638 (0.631, 0.646)
	50–59	24.7% (103,261)	24.9% (93,038)	= 0.003	0.985 (0.975, 0.995)
	60–69	28.6% (119,468)	23.6% (87,923)	< 0.001	1.294 (1.281, 1.307)
	70–79	20.0% (83,721)	15.6% (58,038)	< 0.001	1.356 (1.34, 1.372)

	≥80	10.1% (42,126)	8.38% (31,199)	< 0.001	1.225 (1.207, 1.244)
Race	White	80.7% (337,576)	78.2% (291,235)	< 0.001	1.168 (1.155, 1.181)
	Black/African American	10.3% (42,980)	11.1% (41,252)	< 0.001	0.92 (0.907, 0.933)
	Asian or Pacific Islander	7.82% (32,720)	9.67% (36,003)	< 0.001	0.793 (0.781, 0.806)
	American Indian or Alaska Native	0.52% (2,169)	0.59% (2,183)	< 0.001	0.884 (0.833, 0.939)
	Other/Unknown	0.66% (2,738)	0.48% (1,771)	< 0.001	1.379 (1.299, 1.465)
Ethnicity	Hispanic/Spanish	10.3% (43,003)	11.3% (41,918)	< 0.001	0.904 (0.891, 0.917)
	Non-Hispanic/Spanish	89.7% (375,180)	88.8% (330,526)	< 0.001	1.106 (1.091, 1.122)
<b>NCDB</b>					
Variable		Lumpectomy (1,263,733)	Mastectomy (1,043,146)	p-value	Odds Ratio (95% CI)
Age	<40	2.36% (29,861)	7.37% (76,922)	< 0.001	0.304 (0.3, 0.308)
	40–49	13.8% (174,748)	20.9% (218,338)	< 0.001	0.606 (0.602, 0.61)
	50–59	24.7% (311,905)	25.3% (263,376)	< 0.001	0.97 (0.964, 0.976)
	60–69	29.2% (369,309)	23.6% (246,496)	< 0.001	1.334 (1.327, 1.342)
	70–79	20.4% (258,245)	15.2% (158,360)	< 0.001	1.435 (1.425, 1.445)
	≥80	9.47% (119,665)	7.64% (79,654)	< 0.001	1.265 (1.253, 1.277)
Race	White	84.0% (1,061,740)	82.6% (861,280)	< 0.001	1.11 (1.102, 1.118)
	Black/African American	10.8% (136,346)	11.4% (119,219)	< 0.001	0.937 (0.93, 0.945)
	Asian/Pacific Islander	3.15% (39,827)	3.92% (40,932)	< 0.001	0.797 (0.786, 0.808)
	American Indian, Aleutian, Eskimo	0.25% (3,145)	0.29% (3,106)	< 0.001	0.835 (0.795, 0.878)
	Other/Unknown	1.79% (22,675)	1.78% (18,609)	< 0.001	1.006 (0.986, 1.036)
Ethnicity	Hispanic/Spanish	4.97% (62,745)	5.76% (60,094)	< 0.001	0.855 (0.845, 0.865)
	Non-Hispanic/Spanish	90.4% (1,142,535)	89.4% (932,497)	< 0.001	1.119 (1.109, 1.128)
	Unknown	4.63% (58,453)	4.85% (50,555)	< 0.001	0.952 (0.941, 0.964)

\*As NSQIP patients with missing age data were still included, total number of patients is lower based on age variable compared to race and ethnicity. Abbreviations: NSQIP, National Surgical Quality Improvement Program; SEER, Surveillance, Epidemiology, and End Results Program; NCDB, National Cancer Database

**eTable 4: Demographics for Lumpectomy Patients in 2011 vs 2017 (NCDB)**

Variable		2011	2017	p-value
Age	<40	2.18%	1.88%	< 0.001
	40–49	13.9%	11.2%	< 0.001
	50–59	24.9%	23.0%	< 0.001
	60–69	29.5%	32.2%	< 0.001
	70–79	19.5%	23.7%	< 0.001
	≥80	10.1%	8.03%	< 0.001
Race	White	84.1%	82.3%	< 0.001
	Black	10.9%	11.2%	=0.065
	Asian/Pacific Islander	3.05%	4.05%	< 0.001
	American Indian, Aleutian, or Eskimo	0.25%	0.32%	=0.009
	Other/Unknown	1.67%	2.12%	< 0.001
Ethnicity	Hispanic/Spanish	4.83%	5.84%	< 0.001
	Non-Hispanic/Spanish	90.5%	92.1%	< 0.001
	Unknown	4.64%	2.06%	< 0.001
Facility Type	Academic/Research Program	29.3%	32.2%	< 0.001
	Community Center	9.47%	8.86%	< 0.001
	Comprehensive Community Cancer Program	44.6%	42.5%	< 0.001
	Integrated Network Cancer Programs	14.5%	14.6%	=0.689
	Unknown	2.18%	1.88%	< 0.001
Facility Location	East North Central	17.3%	17.2%	=0.610
	East South Central	5.26%	5.67%	< 0.001
	Middle Atlantic	17.2%	16.2%	< 0.001
	Mountain	4.35%	4.61%	=0.004

	New England	6.60%	6.50%	=0.349
	Pacific	11.7%	11.9%	=0.054
	South Atlantic	21.7%	21.8%	=0.332
	West North Central	6.83%	6.96%	=0.256
	West South Central	6.94%	7.25%	=0.005
	Unknown	2.18%	1.88%	< 0.001
Area Population Density	Metro	85.9%	86.2%	=0.112
	Urban	10.4%	10.7%	=0.035
	Rural	1.29%	1.21%	=0.079
	Unknown	2.34%	1.90%	< 0.001
Insurance/Payor	Private Insurance/Managed Care	51.2%	46.9%	< 0.001
	Medicaid	5.08%	5.21%	=0.177
	Medicare	39.6%	44.7%	< 0.001
	Other Government	0.89%	1.09%	< 0.001
	Not Insured	1.66%	1.18%	< 0.001
	Unknown	1.58%	0.92%	< 0.001
Median Income Quartile	<\$38,000	12.5%	11.5%	< 0.001
	\$38,000–\$47,999	18.8%	17.0%	< 0.001
	\$48,000–\$62,999	24.1%	22.7%	= 0.935
	>\$63,000	35.8%	33.6%	< 0.001
	Unknown	8.79%	15.2%	< 0.001
Charlson-Deyo Comorbidity Index	0	84.5%	82.8%	< 0.001
	1	12.6%	12.2%	=0.003
	2	2.29%	3.09%	< 0.001
	3+	0.59%	1.88%	< 0.001

Tumor Behavior	Invasive/Malignant	77.0%	79.7%	< 0.001
	In situ	22.9%	20.3%	< 0.001
Tumor Grade	1	24.1%	25.1%	< 0.001
	2	39.0%	42.6%	= 0.369
	3	26.2%	25.0%	< 0.001
	4	0.49%	0.17%	< 0.001
	Unknown	10.2%	7.11%	< 0.001
Histology	Ductal and Lobular Neoplasms	91.7%	92.4%	< 0.001
	Adenomas and Adenocarcinomas	4.98%	4.40%	< 0.001
	Epithelial Neoplasms NOS	0.48%	0.39%	=0.002
	Squamous Cell Neoplasms	0.46%	0.42%	=0.189
	Neoplasms NOS	0.06%	0.03%	=0.021
	Other	2.33%	2.34%	=0.785
Radiation-Surgery	Neoadjuvant	0.17%	0.29%	< 0.001
Sequence	Adjuvant	77.4%	71.9%	< 0.001
	None	21.3%	25.8%	< 0.001
	Other/Unknown	1.10%	2.05%	< 0.001
Chemotherapy-Surgery	Neoadjuvant	3.32%	4.57%	< 0.001
Sequence	Adjuvant	67.2%	66.3%	< 0.001
	None	25.8%	21.1%	=0.052
	Other/Unknown	3.66%	8.11%	< 0.001
ER Status	Positive	79.9%	83.5%	< 0.001
PR Status	Positive	70.1%	73.1%	< 0.001
HER2 Status	Positive	8.75%	9.29%	< 0.001
Hormonal Status	Triple Negative	8.80%	7.81%	< 0.001

Combination Results	ER/PR Positive, HER2 Negative	50.2%	53.9%	< 0.001
	Triple Positive	4.56%	4.96%	< 0.001
Clinical T Stage	0	0.40%	0.04%	< 0.001
	In Situ	20.8%	20.2%	< 0.001
	1	53.0%	56.7%	< 0.001
	2	14.6%	15.5%	< 0.001
	3	1.12%	1.19%	=0.135
	4	0.44%	0.36%	=0.003
	Unknown	9.61%	6.02%	< 0.001
Clinical N Stage	0	85.3%	90.2%	< 0.001
	Micrometastases	0.00%	0.00%	
	1	5.58%	5.59%	=0.880
	2	0.75%	0.51%	< 0.001
	3	0.33%	0.29%	=0.055
	Other/Unknown	7.99%	3.40%	< 0.001
Clinical M Stage	No metastases	92.9%	97.1%	< 0.001
	Micrometastases	0.006%	0.02%	=0.014
	Macrometastases	0.69%	0.35%	< 0.001
	Unknown	6.30%	2.52%	< 0.001
Overall Clinical Cancer	0	21.7%	20.4%	< 0.001
Stage	1	50.5%	54.4%	< 0.001
	2	16.4%	17.4%	< 0.001
	3	1.62%	1.43%	< 0.001
	4	0.68%	0.35%	< 0.001
	Unknown	9.15%	6.01%	< 0.001

Abbreviations: NSQIP, National Surgical Quality Improvement Program; NOS, not otherwise specified; ER, estrogen receptor; PR, progesterone receptor; T, tumor; N, node; M, metastasis

**eTable 5: Demographics for Unilateral Mastectomy and Contralateral Mastectomy Patients (2005–2017)**

<b>NSQIP</b>					
Variable		Unilateral Mastectomy (101,131)	Contralateral Prophylactic Mastectomy (35,312)	p-value	Odds Ratio (95% CI)
Age*	<40	7.33% (7,396)	13.4% (4,728)	< 0.001	0.511 (0.492, 0.532)
	40–49	19.2% (19,389)	30.4% (10,723)	< 0.001	0.545 (0.53, 0.561)
	50–59	25.2% (25,413)	29.2% (10,309)	< 0.001	0.816 (0.794, 0.839)
	60–69	24.3% (24,563)	19.3% (6,802)	< 0.001	1.348 (1.308, 1.39)
	70–79	15.7% (15,874)	6.56% (2,315)	< 0.001	2.66 (2.542, 2.785)
	≥80	8.20% (8,277)	1.21% (428)	< 0.001	7.281 (6.6, 8.048)
Race	White	69.8% (70,577)	77.6% (27,409)	< 0.001	0.666 (0.647, 0.685)
	Black/African American	11.1% (11,204)	7.63% (2,694)	< 0.001	1.508 (1.443, 1.577)
	Asian or Pacific Islander	5.80% (5,867)	3.60% (1,272)	< 0.001	1.648 (1.549, 1.755)
	American Indian or Alaska Native	0.56% (569)	0.32% (112)	< 0.001	1.778 (1.449, 2.198)
	Other/Unknown	12.8% (12,914)	10.8% (3,825)	< 0.001	1.205 (1.16, 1.252)
Ethnicity	Hispanic/Spanish	5.89% (5,963)	5.08% (1,793)	< 0.001	1.171 (1.109, 1.237)
	Non-Hispanic/Spanish	83.7% (84,599)	86.2% (30,434)	< 0.001	0.82 (0.792, 0.849)
	Unknown	10.5% (10,569)	8.74% (3,085)	< 0.001	1.219 (1.169, 1.272)
<b>SEER</b>					
Variable		Unilateral Mastectomy (239,074)	Contralateral Prophylactic Mastectomy (90,781)	p-value	Odds Ratio (95% CI)
Age	<40	4.84% (11,564)	12.7% (11,554)	< 0.001	0.349 (0.339, 0.358)
	40–49	16.7% (40,031)	30.7% (27,865)	< 0.001	0.454 (0.446, 0.462)

	50–59	23.7% (56,611)	28.7% (26,052)	< 0.001	0.771 (0.758, 0.784)
	60–69	25.2% (60,124)	19.6% (17,807)	< 0.001	1.377 (1.351, 1.403)
	70–79	18.8% (44,827)	6.89% (6,250)	< 0.001	3.121 (3.036, 3.209)
	≥80	10.8% (25,917)	1.38% (1,253)	< 0.001	8.688 (8.205, 9.206)
Race	White	76.3% (182,324)	83.9% (76,172)	< 0.001	0.616 (0.604, 0.629)
	Black	11.9% (28,602)	8.64% (7,845)	< 0.001	1.437 (1.399, 1.475)
	Asian or Pacific Islander	10.8% (25,754)	6.39% (5,805)	< 0.001	1.767 (1.716, 1.821)
	American Indian or Alaska Native	0.59% (1,414)	0.58% (530)	= 0.819	1.013 (0.916, 1.122)
	Other/Unknown	0.41% (980)	0.47% (429)	= 0.015	0.867 (0.773, 0.974)
Ethnicity	Hispanic/Spanish	11.7% (27,897)	9.78% (8,876)	< 0.001	1.219 (1.189, 1.25)
	Non-Hispanic/Spanish	88.3% (211,177)	90.2% (81,905)	< 0.001	0.82 (0.8, 0.841)
<b>NCDB</b>					
Variable		Unilateral Mastectomy (582,611)	Contralateral Prophylactic Mastectomy (291,494)	p-value	Odds Ratio (95% CI)
Age	<40	5.07% (29,536)	12.9% (37,469)	< 0.001	0.362 (0.356, 0.368)
	40–49	16.9% (99,021)	30.4% (88,577)	< 0.001	0.469 (0.464, 0.474)
	50–59	23.9% (139,399)	28.8% (83,871)	< 0.001	0.779 (0.771, 0.786)
	60–69	25.4% (147,813)	19.7% (57,420)	< 0.001	1.386 (1.371, 1.401)
	70–79	18.5% (107,951)	6.99% (20,393)	< 0.001	3.023 (2.976, 3.072)
	≥80	10.1% (58,891)	1.29% (3,764)	< 0.001	8.597 (8.316, 8.891)
Race	White	80.9% (471,316)	86.9% (253,440)	< 0.001	0.636 (0.628, 0.644)
	Black	12.7% (73,725)	8.28% (24,132)	< 0.001	1.605 (1.581, 1.63)
	Asian/Pacific Islander	4.45% (25,922)	2.77% (8,073)	< 0.001	1.635 (1.581, 1.63)
	American Indian, Aleutian, Eskimo	0.30% (1,769)	0.27% (792)	= 0.009	1.118 (1.027, 1.217)

	Other/Unknown	1.70% (9,879)	1.74% (5,057)	= 0.183	0.977 (0.944, 1.011)
Ethnicity	Hispanic/Spanish	6.01% (35,031)	4.86% (14,157)	< 0.001	1.253 (1.228, 1.279)
	Non-Hispanic/Spanish	89.2% (519,839)	90.8% (264,563)	< 0.001	0.843 (0.83, 0.856)
	Unknown	4.76% (27,741)	4.38% (12,774)	< 0.001	1.091 (1.068, 1.115)

\*As NSQIP patients with missing age data were still included, total number of patients is lower based on age variable compared to race and ethnicity.  
Abbreviations: No., number; NSQIP, National Surgical Quality Improvement Program; SEER, Surveillance, Epidemiology, and End Results Program; NCDB, National Cancer Database

**eTable 6: Unilateral Mastectomy and Contralateral Prophylactic Mastectomy Rates**

	Year	Total No. of Mastectomies	No. of Unilateral Mastectomies	Unilateral Mastectomy Rate	No. of Contralateral Prophylactic Mastectomies	Contralateral Prophylactic Mastectomy Rate
NSQIP*	2005	973	883	907.5	90	92.5
	2006	3,234	2,719	840.8	515	159.2
	2007	6,292	5,125	814.5	1,167	185.5
	2008	8,071	6,507	806.2	1,564	193.8
	2009	9,795	7,570	772.8	2,225	227.2
	2010	9,596	7,426	773.9	2,170	226.1
	2011	9,881	7,775	786.9	2,106	213.1
	2012	12,083	9,038	748.0	3,045	252.0
	2013	14,000	9,677	691.2	4,323	308.8
	2014	14,331	10,102	704.9	4,229	295.1
	2015	15,340	10,837	706.5	4,503	293.5
	2016	16,353	11,641	711.9	4,712	288.1
	2017	16,494	11,831	717.3	4,663	282.7
		Overall Trend	IRR, 0.984: 95% CI, 0.980 – 0.989: p < 0.001		IRR, 1.048: 95% CI, 1.033 – 1.064: p < 0.001	
	Trend 2005–2013	IRR, 0.976: 95% CI, 0.968 – 0.984: p < 0.001		IRR, 1.087: 95% CI, 1.063 – 1.111: p < 0.001		
	Trend 2013–2017	IRR, 1.008: 95% CI, 1.006 – 1.011: p < 0.001		IRR, 0.980: 95% CI, 0.975 – 0.985: p < 0.001		
SEER**	2005	22,163	19,065	860.2	3,098	139.8
	2006	23,173	19,408	837.5	3,765	162.5
	2007	24,903	20,011	803.6	4,892	196.4

	2008	26,048	20,245	777.2	5,803	222.8
	2009	27,084	20,514	757.4	6,570	242.6
	2010	26,520	19,548	737.1	6,972	262.9
	2011	26,627	18,993	713.3	7,634	286.7
	2012	27,344	19,016	695.4	8,328	304.6
	2013	27,579	18,087	655.8	9,492	344.2
	2014	25,985	16,792	646.2	9,193	353.8
	2015	25,127	16,410	653.1	8,717	346.9
	2016	23,762	15,511	652.8	8,251	347.2
	2017	23,540	15,474	657.3	8,066	342.7
	Overall Trend	IRR, 0.975: 95% CI, 0.970 – 0.979: p < 0.001		IRR, 1.071: 95% CI, 1.052 – 1.090: p < 0.001		
	Trend 2005–2013	IRR, 0.968: 95% CI, 0.966 – 0.971: p < 0.001		IRR, 1.107: 95% CI, 1.094 – 1.121: p < 0.001		
	Trend 2013–2017	IRR, 1.001: 95% CI, 0.997 – 1.005: p < 0.001		IRR, 0.998: 95% CI, 0.991 – 1.004: p = 0.471		
NCDB**	2005	48,918	39,832	814.3	9,086	185.7
	2006	52,262	41,347	791.1	10,915	208.9
	2007	58,904	44,292	751.9	14,612	248.1
	2008	63,750	45,998	721.5	17,752	278.5
	2009	68,252	48,044	703.9	20,208	296.1
	2010	69,126	47,548	687.8	21,578	312.2
	2011	71,579	47,563	664.5	24,016	335.5
	2012	74,358	47,471	638.4	26,887	361.6
	2013	77,634	47,427	610.9	30,207	389.1
	2014	76,013	45,632	600.3	30,381	399.7
	2015	74,052	43,956	593.6	30,096	406.4

	2016	70,966	42,622	600.6	28,344	399.4
	2017	68,291	40,879	598.6	27,412	401.4
	Overall Trend		IRR, 0.972: 95% CI, 0.968 – 0.977: p < 0.001		IRR, 1.059: 95% CI, 1.044 – 1.074: p < 0.001	
	Trend 2005–2013		IRR, 0.966: 95% CI, 0.964 – 0.967: p < 0.001		IRR, 1.087: 95% CI, 1.075 – 1.099: p < 0.001	
	Trend 2013–2017		IRR, 0.996: 95% CI, 0.992 – 0.999: p = 0.042		IRR, 1.006: 95% CI, 1.000 – 1.013: p = 0.044	
<p>*No. of mastectomies excluding bilateral prophylactic mastectomies  **No. of mastectomies with laterality specified in the database  Rates are expressed per 1000 total mastectomies</p>						

Abbreviations: No., number; NSQIP, National Surgical Quality Improvement Program; SEER, Surveillance, Epidemiology, and End Results Program; NCDB, National Cancer Database; IRR, incidence rate ratio

**eTable 7: NSQIP Demographics for Lumpectomy and Mastectomy Patients (2005–2017)**

Variable		Lumpectomy	Mastectomy	p-value	Odds Ratio (95% CI)
Age	<40	12.2% (28,153)	9.35% (12,956)	< 0.001	1.349 (1.319, 1.379)
	40–49	19.4% (44,677)	22.3% (30,904)	< 0.001	0.837 (0.824, 0.851)
	50–59	24.0% (55,399)	26.2% (36,270)	< 0.001	0.892 (0.878, 0.906)
	60–69	23.9% (55,066)	22.8% (31,525)	< 0.001	1.065 (1.049, 1.082)
	70–79	14.6% (33,773)	13.1% (18,205)	< 0.001	1.135 (1.113, 1.157)
	≥80	5.85% (13,483)	6.28% (8,705)	< 0.001	0.927 (0.901, 0.953)
Race	White	70.2% (162,030)	72.0% (99,971)	< 0.001	0.914 (0.901, 0.928)
	Black/African American	12.1% (27,816)	10.1% (13,976)	< 0.001	1.223 (1.197, 1.25)
	Asian or Pacific Islander	5.18% (11,947)	5.18% (7,184)	= 0.994	1 (0.97, 1.03)
	American Indian or Alaska Native	0.60% (1,394)	0.49% (691)	< 0.001	1.214 (1.107, 1.332)
	Other/Unknown	11.9% (27,668)	12.2% (16,969)	= 0.029	0.978 (0.958, 0.998)
Ethnicity	Hispanic/Spanish	7.01% (16,175)	5.66% (7,851)	< 0.001	1.257 (1.222, 1.292)
	Non-Hispanic/Spanish	83.5% (192,859)	84.4% (117,093)	< 0.001	0.941 (0.924, 0.958)
	Unknown	9.45% (21,821)	9.98% (13,847)	< 0.001	0.942 (0.921, 0.963)
Procedure Status	Inpatient	5.26% (12,150)	58.8% (81,621)	< 0.001	0.039 (0.038, 0.04)
	Outpatient	94.8% (218,705)	41.2% (57,170)	< 0.001	25.684 (25.136, 26.265)
ASA Classification	1	13.2% (30,244)	6.23% (8,634)	< 0.001	2.289 (2.233, 2.347)
	2	59.2% (135,617)	59.6% (82,667)	= 0.007	0.981 (0.968, 0.995)
	3	26.5% (60,830)	32.8% (45,417)	< 0.001	0.742 (0.731, 0.753)
	4	1.09% (2,490)	1.39% (1,920)	< 0.001	0.782 (0.736, 0.831)
	5	0.00% (9)	0.00% (3)	= 0.553	1.815 (0.453, 10.422)

\*As NSQIP patients with missing age data were still included, total number of patients is lower based on age variable compared to race and ethnicity. Abbreviations: No., number; NSQIP, National Surgical Quality Improvement Program

**eTable 8: SEER Demographics for Lumpectomy and Mastectomy Patients (2005–2017)**

Variable		Lumpectomy	Mastectomy	p-value	Odds Ratio (95% CI)
Age	<40	2.50% (10,457)	6.94% (25,846)	< 0.001	0.344 (0.336, 0.352)
	40–49	14.2% (59,150)	20.5% (76,400)	< 0.001	0.638 (0.631, 0.646)
	50–59	24.7% (103,261)	24.9% (93,038)	= 0.003	0.985 (0.975, 0.995)
	60–69	28.6% (119,468)	23.6% (87,923)	< 0.001	1.294 (1.281, 1.307)
	70–79	20.0% (83,721)	15.6% (58,038)	< 0.001	1.356 (1.34, 1.372)
	≥80	10.1% (42,126)	8.38% (31,199)	< 0.001	1.225 (1.207, 1.244)
Race	White	80.7% (337,576)	78.2% (291,235)	< 0.001	1.168 (1.155, 1.181)
	Black	10.3% (42,980)	11.1% (41,252)	< 0.001	0.92 (0.907, 0.933)
	Asian or Pacific Islander	7.82% (32,720)	9.67% (36,003)	< 0.001	0.793 (0.781, 0.806)
	American Indian or Alaska Native	0.52% (2,169)	0.59% (2,183)	< 0.001	0.884 (0.833, 0.939)
	Other/Unknown	0.66% (2,738)	0.48% (1,771)	< 0.001	1.379 (1.299, 1.465)
Ethnicity	Hispanic/Spanish	10.3% (43,003)	11.3% (41,918)	< 0.001	0.904 (0.891, 0.917)
	Non-Hispanic/Spanish	89.7% (375,180)	88.8% (330,526)	< 0.001	1.106 (1.091, 1.122)
Area Population Density	Metro	91.1% (380,839)	89.1% (331,715)	< 0.001	1.252 (1.234, 1.271)
	Urban	5.27% (22,045)	6.36% (23,667)	< 0.001	0.82 (0.805, 0.836)
	Rural	3.56% (14,904)	4.46% (16,597)	< 0.001	0.792 (0.775, 0.811)
	Unknown/Alaska/Hawaii	0.09% (395)	0.13% (465)	< 0.001	0.756 (0.66, 0.867)
Median Income Quartile	<\$40,000	3.06% (12,812)	4.57% (17,003)	< 0.001	0.661 (0.645, 0.676)
	\$40,000–\$49,999	10.4% (43,668)	11.6% (43,276)	< 0.001	0.887 (0.874, 0.899)
	\$50,000–\$59,999	17.3% (72,133)	18.4% (68,490)	< 0.001	0.925 (0.914, 0.936)
	\$60,000–\$69,999	28.9% (120,678)	28.9% (107,978)	= 0.189	0.994 (0.984, 1.003)

	>\$70,000	40.4% (168,823)	36.4% (135,640)	< 0.001	1.182 (1.171, 1.193)
	Unknown	0.02% (69)	0.02% (57)	= 0.721	1.078 (0.748, 1.559)
Tumor Behavior	Malignant	77.3% (323,115)	84.3% (313,934)	< 0.001	0.633 (0.626, 0.641)
	In situ	22.7% (95,068)	15.7% (58,510)	< 0.001	1.579 (1.561, 1.597)
Tumor Grade	1	23.7% (98,964)	15.4% (57,208)	< 0.001	1.708 (1.689, 1.728)
	2	40.3% (168,420)	39.9% (148,852)	= 0.005	1.013 (1.004, 1.022)
	3	26.4% (110,306)	35.6% (132,536)	< 0.001	0.649 (0.642, 0.655)
	4	1.38% (5,754)	1.72% (6,408)	< 0.001	0.797 (0.769, 0.826)
	Unknown	8.31% (34,739)	7.37% (27,440)	< 0.001	1.139 (1.12, 1.158)
Histology	Ductal and Lobular Neoplasms	91.6% (382,984)	93.2% (347,026)	< 0.001	0.797 (0.784, 0.81)
	Adenomas and Adenocarcinomas	5.06% (21,165)	3.15% (11,736)	< 0.001	1.638 (1.601, 1.677)
	Epithelial Neoplasms NOS	0.42% (1,766)	0.71% (2,661)	< 0.001	0.589 (0.555, 0.626)
	Squamous Cell Neoplasms	0.29% (1,229)	0.22% (799)	< 0.001	1.371 (1.253, 1.501)
	Neoplasms NOS	0.08% (313)	0.14% (502)	< 0.001	0.555 (0.48, 0.64)
	Other	2.57% (10,726)	2.61% (9,720)	= 0.212	0.982 (0.955, 1.01)
ER Status	Positive	78.8% (329,535)	73.8% (274,981)	< 0.001	1.318 (1.304, 1.331)
PR Status	Positive	68.1% (284,942)	62.0% (231,047)	< 0.001	1.309 (1.297, 1.321)
HER2 Status	Positive	6.17% (25,815)	9.36% (34,848)	< 0.001	0.637 (0.627, 0.648)
Hormonal Status	Triple Negative	4.92% (20,562)	6.38% (23,761)	< 0.001	0.759 (0.744, 0.774)
Combination Results	ER/PR Positive, HER2 Negative	34.1% (142,545)	29.8% (111,077)	< 0.001	1.217 (1.205, 1.228)
	Triple Positive	3.29% (13,776)	4.37% (16,273)	< 0.001	0.746 (0.728, 0.763)
T Stage	0	0.03% (122)	0.11% (412)	< 0.001	0.263 (0.214, 0.323)
	In Situ	22.8% (95,313)	15.9% (59,175)	< 0.001	1.563 (1.545, 1.581)
	1	55.7% (232,929)	39.6% (147,480)	< 0.001	1.918 (1.901, 1.935)

	2	18.3% (76,439)	29.4% (109,541)	< 0.001	0.537 (0.531, 0.543)
	3	1.37% (5,743)	8.19% (30,536)	< 0.001	0.156 (0.152, 0.16)
	4	0.64% (2,654)	4.71% (17,547)	< 0.001	0.129 (0.124, 0.135)
	Unknown	1.19% (4,983)	2.08% (7,753)	< 0.001	0.567 (0.547, 0.588)
N Stage	0	83.4% (348,733)	63.4% (236,176)	< 0.001	2.897 (2.867, 2.928)
	Micrometastases	2.71% (11,338)	3.98% (14,837)	< 0.001	0.672 (0.655, 0.689)
	1	10.1% (42,228)	19.3% (71,793)	< 0.001	0.47 (0.464, 0.477)
	2	1.99% (8,299)	7.52% (27,998)	< 0.001	0.249 (0.243, 0.255)
	3	0.85% (3,532)	4.68% (17,434)	< 0.001	0.173 (0.167, 0.18)
	Other/Unknown	0.97% (4,053)	1.13% (4,206)	< 0.001	0.857 (0.82, 0.895)
M Stage	No metastases	98.3% (411,146)	96.4% (359,170)	< 0.001	2.159 (2.097, 2.224)
	Micrometastases	0.01% (23)	0.01% (27)	= 0.396	0.759 (0.416, 1.374)
	Macrometastases	0.89% (3,712)	2.40% (8,949)	< 0.001	0.364 (0.35, 0.378)
	Unknown	0.79% (3,302)	1.15% (4,298)	< 0.001	0.682 (0.651, 0.714)
Overall Cancer Stage	0	22.8% (95,328)	15.9% (59,157)	< 0.001	1.564 (1.546, 1.582)
	1	47.9% (200,217)	30.3% (112,953)	< 0.001	2.11 (2.091, 2.13)
	2	23.3% (97,417)	32.8% (122,200)	< 0.001	0.622 (0.616, 0.628)
	3	3.37% (14,075)	16.0% (59,639)	< 0.001	0.183 (0.179, 0.186)
	4	0.89% (3,713)	2.40% (8,955)	< 0.001	0.364 (0.35, 0.378)
	Unknown	1.78% (7,433)	2.56% (9,540)	< 0.001	0.688 (0.668, 0.71)

Abbreviations: No., number; SEER, Surveillance, Epidemiology, and End Results Program

**eTable 9: NCDB Demographics for Lumpectomy and Mastectomy Patients (2005–2017)**

Variable		Lumpectomy	Mastectomy	p-value	Odds Ratio (95% CI)
Age	<40	2.36% (29,861)	7.37% (76,922)	< 0.001	0.304 (0.3, 0.308)
	40–49	13.8% (174,748)	20.9% (218,338)	< 0.001	0.606 (0.602, 0.61)
	50–59	24.7% (311,905)	25.3% (263,376)	< 0.001	0.97 (0.964, 0.976)
	60–69	29.2% (369,309)	23.6% (246,496)	< 0.001	1.334 (1.327, 1.342)
	70–79	20.4% (258,245)	15.2% (158,360)	< 0.001	1.435 (1.425, 1.445)
	≥80	9.47% (119,665)	7.64% (79,654)	< 0.001	1.265 (1.253, 1.277)
Race	White	84.0% (1,061,740)	82.6% (861,280)	< 0.001	1.11 (1.102, 1.118)
	Black/African American	10.8% (136,346)	11.4% (119,219)	< 0.001	0.937 (0.93, 0.945)
	Asian/Pacific Islander	3.15% (39,827)	3.92% (40,932)	< 0.001	0.797 (0.786, 0.808)
	American Indian, Aleutian, or Eskimo	0.25% (3,145)	0.29% (3,106)	< 0.001	0.835 (0.795, 0.878)
	Other/Unknown	1.79% (22,675)	1.78% (18,609)	< 0.001	1.006 (0.986, 1.036)
Ethnicity	Hispanic/Spanish	4.97% (62,745)	4.63% (58,453)	< 0.001	0.855 (0.845, 0.865)
	Non-Hispanic/Spanish	90.4% (1,142,535)	89.4% (932,497)	< 0.001	1.119 (1.109, 1.128)
	Unknown	4.63% (58,453)	4.85% (50,555)	< 0.001	0.952 (0.941, 0.964)
Facility Type	Academic/Research Program	29.8% (376,160)	28.8% (300,844)	< 0.001	1.046 (1.04, 1.052)
	Community Center	9.28% (117,266)	8.19% (85,519)	< 0.001	1.145 (1.135, 1.156)
	Comprehensive Community Cancer Program	44.2% (558,028)	41.8% (436,006)	< 0.001	1.101 (1.095, 1.107)
	Integrated Network Cancer Programs	14.4% (182,418)	13.8% (143,855)	< 0.001	1.055 (1.047, 1.062)
	Unknown	2.36% (29,861)	7.37% (76,922)	< 0.001	0.304 (0.3, 0.308)
Facility Location	East North Central	17.6% (222,016)	15.5% (161,843)	< 0.001	1.161 (1.152, 1.169)
	East South Central	5.40% (68,238)	6.99% (72,870)	< 0.001	0.76 (0.752, 0.768)

	Middle Atlantic	16.3% (206,429)	12.9% (134,682)	< 0.001	1.317 (1.307, 1.327)
	Mountain	4.43% (55,921)	4.42% (46,149)	= 0.972	1 (0.988, 1.013)
	New England	6.87% (86,805)	4.52% (47,161)	< 0.001	1.558 (1.54, 1.576)
	Pacific	11.9% (150,064)	10.9% (113,712)	< 0.001	1.101 (1.092, 1.11)
	South Atlantic	21.6% (272,778)	21.1% (219,764)	< 0.001	1.031 (1.025, 1.038)
	West North Central	6.68% (84,431)	7.65% (79,825)	< 0.001	0.864 (0.855, 0.873)
	West South Central	6.89% (87,190)	8.65% (90,218)	< 0.001	0.783 (0.775, 0.79)
	Unknown	2.36% (29,861)	7.37% (76,922)	< 0.001	0.304 (0.3, 0.308)
Area Population Density	Metro	85.9% (1,085,604)	83.9% (876,072)	< 0.001	1.162 (1.154, 1.171)
	Urban	10.5% (132,190)	11.8% (123,221)	< 0.001	0.872 (0.865, 0.879)
	Rural	1.23% (15,498)	1.56% (16,279)	< 0.001	0.783 (0.766, 0.801)
	Unknown	2.41% (30,441)	2.64% (27,574)	< 0.001	0.909 (0.894, 0.924)
Insurance/Payor	Private Insurance/Managed Care	50.9% (64,4370)	56.0% (584,266)	< 0.001	0.817 (0.813, 0.821)
	Medicaid	4.86% (61,392)	6.79% (70,909)	< 0.001	0.7 (0.692, 0.708)
	Medicare	40.3% (509,286)	32.3% (337,205)	< 0.001	1.413 (1.406, 1.421)
	Other Government	0.94% (11,824)	1.09% (11,392)	< 0.001	0.855 (0.834, 0.878)
	Not Insured	1.49% (18,771)	2.05% (21,425)	< 0.001	0.719 (0.705, 0.733)
Median Income Quartile	<\$38,000	12.5% (157,933)	14.2% (147,592)	< 0.001	0.867 (0.86, 0.873)
	\$38,000–\$47,999	18.5% (234,214)	19.5% (203,234)	< 0.001	0.94 (0.934, 0.946)
	\$48,000–\$62,999	23.9% (303,040)	23.9% (250,095)	= 0.935	1 (0.994, 1.006)
	>\$63,000	35.3% (445,711)	33.4% (348,026)	< 0.001	1.088 (1.082, 1.094)
	Unknown	9.72% (122,835)	9.03% (94,199)	< 0.001	1.085 (1.075, 1.094)
Charlson-Deyo	0	84.6% (1,069,513)	83.2% (868,065)	< 0.001	1.111 (1.103, 1.119)

Comorbidity Index	1	12.1% (153,365)	13.2% (137,450)	< 0.001	0.91 (0.903, 0.917)
	2	2.38% (30,084)	2.65% (27,649)	< 0.001	0.896 (0.881, 0.911)
	3+	0.85% (10,771)	0.96% (9,982)	< 0.001	0.89 (0.866, 0.915)
Tumor Behavior	Invasive/Malignant	77.4% (977,674)	84.0% (876,668)	< 0.001	0.649 (0.645, 0.653)
	In situ	22.6% (286,059)	15.9% (166,478)	< 0.001	1.541 (1.53, 1.551)
Tumor Grade	1	23.7% (298,972)	15.1% (157,530)	< 0.001	1.742 (1.73, 1.754)
	2	39.4% (497,385)	39.4% (411,172)	= 0.369	0.998 (0.992, 1.003)
	3	25.9% (326,784)	35.3% (367,909)	< 0.001	0.64 (0.637, 0.644)
	4	0.59% (7,492)	0.74% (7,683)	< 0.001	0.804 (0.778, 0.83)
	Unknown	10.5% (133,100)	9.48% (98,852)	< 0.001	1.125 (1.115, 1.134)
Histology	Ductal and Lobular Neoplasms	91.9% (1,161,075)	93.6% (976,637)	< 0.001	0.77 (0.762, 0.778)
	Adenomas and Adenocarcinomas	4.88% (61,619)	3.06% (31,896)	< 0.001	1.625 (1.603, 1.648)
	Epithelial Neoplasms NOS	0.45% (5,656)	0.68% (7,100)	< 0.001	0.656 (0.633, 0.679)
	Squamous Cell Neoplasms	0.42% (5,289)	0.29% (3,086)	< 0.001	1.416 (1.355, 1.481)
	Neoplasms NOS	0.06% (729)	0.08% (876)	< 0.001	0.687 (0.622, 0.759)
	Other	2.32% (29,365)	2.26% (23,551)	= 0.001	1.03 (1.012, 1.048)
Radiation-Surgery	Neoadjuvant	0.30% (3,820)	0.39% (4,094)	< 0.001	0.77 (0.736, 0.804)
Sequence	Adjuvant	74.8% (945,357)	23.8% (248,538)	< 0.001	9.493 (9.434, 9.551)
	None	23.4% (295,328)	74.7% (778,664)	< 0.001	0.104 (0.103, 0.104)
	Other/Unknown	1.52% (19,228)	1.14% (11,850)	< 0.001	1.345 (1.314, 1.376)
Chemotherapy-Surgery	Neoadjuvant	3.41% (43,075)	8.15% (84,988)	< 0.001	0.398 (0.393, 0.403)
Sequence	Adjuvant	61.8% (780,947)	52.4% (547,141)	< 0.001	1.466 (1.459, 1.474)
	None	23.4% (296,025)	23.3% (243,219)	= 0.052	1.006 (1, 1.012)

	Other/Unknown	11.4% (143,686)	16.1% (167,798)	< 0.001	0.669 (0.664, 0.674)
ER Status	Positive	79.2% (1,001,134)	73.8% (769,350)	< 0.001	1.357 (1.349, 1.365)
PR Status	Positive	69.2% (874,013)	62.9% (656,070)	< 0.001	1.323 (1.316, 1.33)
HER2 Status	Positive	6.36% (80,312)	9.98% (104,108)	< 0.001	0.612 (0.606, 0.618)
Hormonal Status	Triple Negative	5.68% (71,888)	7.52% (78,396)	< 0.001	0.742 (0.735, 0.75)
Combination Results	ER/PR Positive, HER2 Negative	35.7% (450,733)	31.3% (326,619)	< 0.001	1.216 (1.21, 1.223)
	Triple Positive	3.39% (42,918)	4.71% (49,094)	< 0.001	0.712 (0.702, 0.721)
Clinical T Stage	0	0.34% (4,298)	0.51% (5,311)	< 0.001	0.667 (0.64, 0.694)
	In Situ	18.8% (237,942)	13.9% (145,849)	< 0.001	1.427 (1.417, 1.437)
	1	48.1% (607,972)	32.1% (334,453)	< 0.001	1.965 (1.954, 1.975)
	2	13.4% (169,757)	22.6% (235,705)	< 0.001	0.532 (0.528, 0.535)
	3	1.04% (13,192)	6.38% (66,542)	< 0.001	0.155 (0.152, 0.158)
	4	0.40% (5,101)	4.14% (43,179)	< 0.001	0.094 (0.091, 0.097)
	Unknown	17.8% (225,471)	20.3% (212,107)	< 0.001	0.851 (0.845, 0.856)
Clinical N Stage	0	78.4% (990,425)	63.9% (667,233)	< 0.001	2.042 (2.03, 2.053)
	Micrometastases	0.00% (5)	0.00% (14)	= 0.019	0.295 (0.083, 0.866)
	1	5.09% (64,418)	13.4% (139,791)	< 0.001	0.347 (0.344, 0.351)
	2	0.66% (8,278)	2.75% (28,723)	< 0.001	0.233 (0.227, 0.239)
	3	0.29% (3,724)	1.62% (16,884)	< 0.001	0.18 (0.173, 0.186)
	Other/Unknown	15.6% (196,883)	18.3% (190,501)	< 0.001	0.826 (0.82, 0.832)
Clinical M Stage	No metastases	90.6% (1,144,275)	89.1% (928,924)	< 0.001	1.178 (1.168, 1.188)
	Micrometastases	0.01% (112)	0.01% (104)	= 0.412	0.889 (0.675, 1.172)
	Macrometastases	0.58% (7,375)	1.76% (18,394)	< 0.001	0.327 (0.318, 0.336)
	Unknown	8.86% (111,971)	9.18% (95,724)	< 0.001	0.962 (0.954, 0.971)

Overall Clinical Cancer	0	19.9% (252,620)	14.9% (154,995)	< 0.001	1.432 (1.422, 1.442)
Stage	1	45.7% (577,967)	28.7% (299,668)	< 0.001	2.091 (2.079, 2.103)
	2	15.1% (190,867)	25.8% (269,134)	< 0.001	0.512 (0.508, 0.515)
	3	1.51% (19,114)	9.00% (93,904)	< 0.001	0.155 (0.153, 0.158)
	4	0.57% (7,196)	1.78% (18,511)	< 0.001	0.317 (0.308, 0.326)
	Unknown	17.1% (215,969)	19.8% (206,934)	< 0.001	0.833 (0.827, 0.839)

Abbreviations: No., number; NCDB, National Cancer Database

**eTable 10: NSQIP Demographics for Unilateral Mastectomy and Contralateral Mastectomy Patients (2005–2017)**

Variable		Unilateral Mastectomy	Contralateral Prophylactic Mastectomy	p-value	Odds Ratio (95% CI)
Age	<40	7.33% (7,396)	13.4% (4,728)	< 0.001	0.511 (0.492, 0.532)
	40–49	19.2% (19,389)	30.4% (10,723)	< 0.001	0.545 (0.53, 0.561)
	50–59	25.2% (25,413)	29.2% (10,309)	< 0.001	0.816 (0.794, 0.839)
	60–69	24.3% (24,563)	19.3% (6,802)	< 0.001	1.348 (1.308, 1.39)
	70–79	15.7% (15,874)	6.56% (2,315)	< 0.001	2.66 (2.542, 2.785)
	≥80	8.20% (8,277)	1.21% (428)	< 0.001	7.281 (6.6, 8.048)
Race	White	69.8% (70,577)	77.6% (27,409)	< 0.001	0.666 (0.647, 0.685)
	Black/African American	11.1% (11,204)	7.63% (2,694)	< 0.001	1.508 (1.443, 1.577)
	Asian or Pacific Islander	5.80% (5,867)	3.60% (1,272)	< 0.001	1.648 (1.549, 1.755)
	American Indian or Alaska Native	0.56% (569)	0.32% (112)	< 0.001	1.778 (1.449, 2.198)
	Other/Unknown	12.8% (12,914)	10.8% (3,825)	< 0.001	1.205 (1.16, 1.252)
Ethnicity	Hispanic/Spanish	5.89% (5,963)	5.08% (1,793)	< 0.001	1.171 (1.109, 1.237)
	Non-Hispanic/Spanish	83.7% (84,599)	86.2% (30,434)	< 0.001	0.82 (0.792, 0.849)
	Unknown	10.5% (10,569)	8.74% (3,085)	< 0.001	1.219 (1.169, 1.272)
Procedure Status	Inpatient	56.9% (57,520)	63.7% (22,502)	< 0.001	0.751 (0.732, 0.77)
	Outpatient	43.1% (43,611)	36.3% (12,810)	< 0.001	1.332 (1.299, 1.366)
ASA	1	5.51% (5,569)	7.16% (2,525)	< 0.001	0.757 (0.721, 0.795)
Classification	2	57.9% (58,537)	64.2% (22,635)	< 0.001	0.769 (0.75, 0.789)
	3	34.9% (35,239)	27.9% (9,868)	< 0.001	1.379 (1.343, 1.417)
	4	1.65% (1,670)	0.70% (247)	< 0.001	2.384 (2.083, 2.737)
	5	0.00% (3)	0.00% (0)	= 0.573	NA (0.144, NA)

\*As NSQIP patients with missing age data were still included, total number of patients is lower based on age variable compared to race and ethnicity. Abbreviations: No., number; NSQIP, National Surgical Quality Improvement Program

**eTable 11: SEER Demographics for Unilateral Mastectomy and Contralateral Mastectomy Patients (2005–2017)**

Variable		Unilateral Mastectomy	Contralateral Prophylactic Mastectomy	P-value	Odds Ratio (95% CI)
Age	<40	4.84% (11,564)	12.7% (11,554)	< 0.001	0.349 (0.339, 0.358)
	40–49	16.7% (40,031)	30.7% (27,865)	< 0.001	0.454 (0.446, 0.462)
	50–59	23.7% (56,611)	28.7% (26,052)	< 0.001	0.771 (0.758, 0.784)
	60–69	25.2% (60,124)	19.6% (17,807)	< 0.001	1.377 (1.351, 1.403)
	70–79	18.8% (44,827)	6.89% (6,250)	< 0.001	3.121 (3.036, 3.209)
	≥80	10.8% (25,917)	1.38% (1,253)	< 0.001	8.688 (8.205, 9.206)
Race	White	76.3% (182,324)	83.9% (76,172)	< 0.001	0.616 (0.604, 0.629)
	Black	11.9% (28,602)	8.64% (7,845)	< 0.001	1.437 (1.399, 1.475)
	Asian or Pacific Islander	10.8% (25,754)	6.39% (5,805)	< 0.001	1.767 (1.716, 1.821)
	American Indian or Alaska Native	0.59% (1,414)	0.58% (530)	= 0.819	1.013 (0.916, 1.122)
	Other/Unknown	0.41% (980)	0.47% (429)	= 0.015	0.867 (0.773, 0.974)
Ethnicity	Hispanic/Spanish	11.7% (27,897)	9.78% (8,876)	< 0.001	1.219 (1.189, 1.25)
	Non-Hispanic/Spanish	88.3% (211,177)	90.2% (81,905)	< 0.001	0.82 (0.8, 0.841)
Area Population	Metro	88.4% (211,226)	90.3% (81,996)	< 0.001	0.813 (0.792, 0.834)
Density	Urban	6.69% (15,990)	5.66% (5,137)	< 0.001	1.195 (1.157, 1.235)
	Rural	4.82% (11,514)	3.92% (3,554)	< 0.001	1.242 (1.195, 1.291)
	Unknown/Alaska/Hawaii	0.14% (344)	0.10% (94)	= 0.004	1.39 (1.103, 1.766)
Median Income	<\$40,000	4.96% (11,848)	3.79% (3,438)	< 0.001	1.325 (1.274, 1.377)
Quartile	\$40,000–\$49,999	12.6% (30,158)	9.85% (8,939)	< 0.001	1.322 (1.289, 1.355)
	\$50,000–\$59,999	18.3% (43,643)	19.4% (17,598)	< 0.001	0.929 (0.911, 0.947)
	\$60,000–\$69,999	28.5% (68,089)	29.8% (27,044)	< 0.001	0.939 (0.923, 0.954)
	>\$70,000	35.7% (85,315)	37.2% (33,747)	< 0.001	0.938 (0.923, 0.953)

	Unknown	0.01% (21)	0.02% (15)	= 0.063	0.532 (0.261, 1.109)
Tumor Behavior	Malignant	85.7% (204,915)	82.3% (74,708)	< 0.001	1.291 (1.264, 1.317)
	In situ	14.3% (34,159)	17.7% (16,073)	< 0.001	0.775 (0.759, 0.791)
Tumor Grade	1	15.5% (36,935)	14.9% (13,517)	< 0.001	1.044 (1.022, 1.067)
	2	40.5% (96,750)	39.5% (35,819)	< 0.001	1.043 (1.027, 1.06)
	3	35.7% (85,431)	36.9% (33,502)	< 0.001	0.951 (0.936, 0.966)
	4	1.88% (4,489)	1.49% (1,349)	< 0.001	1.269 (1.193, 1.35)
	Unknown	6.47% (15,469)	7.26% (6,594)	< 0.001	0.883 (0.857, 0.91)
Histology	Ductal and Lobular Neoplasms	93.2% (222,792)	94.1% (85,400)	< 0.001	0.862 (0.835, 0.89)
	Adenomas and Adenocarcinomas	2.93% (7,004)	3.39% (3,075)	< 0.001	0.861 (0.824, 0.899)
	Epithelial Neoplasms NOS	0.61% (1,455)	0.63% (575)	= 0.425	0.961 (0.871, 1.06)
	Squamous Cell Neoplasms	0.23% (553)	0.14% (128)	< 0.001	1.642 (1.352, 2.006)
	Neoplasms NOS	0.06% (148)	0.09% (82)	= 0.008	0.685 (0.52, 0.909)
	Other	2.98% (7,122)	1.68% (1,521)	< 0.001	1.802 (1.704, 1.907)
ER Status	Positive	74.0% (176,944)	74.4% (67,509)	= 0.039	0.982 (0.965, 0.999)
PR Status	Positive	61.6% (147,354)	63.8% (57,921)	< 0.001	0.911 (0.897, 0.926)
HER2 Status	Positive	8.49% (20,308)	11.7% (10,588)	< 0.001	0.703 (0.686, 0.721)
Hormonal Status	Triple Negative	5.71% (13,653)	8.33% (7,558)	< 0.001	0.667 (0.648, 0.687)
Combination Results	ER/PR Positive, HER2 Negative	28.2% (67,455)	33.4% (30,361)	< 0.001	0.782 (0.769, 0.795)
	Triple Positive	3.85% (9,205)	5.77% (5,236)	< 0.001	0.654 (0.632, 0.678)
T Stage	0	0.09% (237)	0.16% (143)	< 0.001	0.629 (0.509, 0.78)
	In Situ	14.5% (34,653)	17.8% (16,198)	< 0.001	0.781 (0.765, 0.797)
	1	38.8% (92,672)	42.2% (38,308)	< 0.001	0.867 (0.854, 0.881)
	2	30.8% (73,566)	27.4% (24,895)	< 0.001	1.176 (1.157, 1.197)

	3	8.67% (20,719)	7.58% (6,879)	< 0.001	1.157 (1.125, 1.191)
	4	5.44% (13,002)	3.02% (2,740)	< 0.001	1.848 (1.772, 1.928)
	Unknown	1.77% (4,225)	1.78% (1,618)	= 0.768	0.991 (0.935, 1.051)
N Stage	0	61.7% (147,473)	65.9% (59,902)	< 0.001	0.83 (0.817, 0.843)
	Micrometastases	4.01% (9,578)	4.01% (3,639)	= 0.976	0.999 (0.961, 1.039)
	1	19.7% (47,057)	19.6% (17,753)	= 0.413	1.008 (0.989, 1.028)
	2	8.40% (20,087)	6.16% (5,593)	< 0.001	1.397 (1.355, 1.441)
	3	5.33% (12,740)	3.52% (3,197)	< 0.001	1.542 (1.482, 1.605)
	Other/Unknown	0.89% (2,139)	0.77% (697)	< 0.001	1.167 (1.07, 1.273)
M Stage	No metastases	96.3% (230,179)	97.6% (88,625)	< 0.001	0.63 (0.6, 0.66)
	Micrometastases	0.01% (11)	0.01% (10)	= 0.049	0.418 (0.161, 1.097)
	Macrometastases	2.63% (6,293)	1.68% (1,527)	< 0.001	1.58 (1.493, 1.673)
	Unknown	1.08% (2,591)	0.68% (619)	< 0.001	1.596 (1.461, 1.746)
Overall Cancer Stage	0	14.5% (34,649)	17.8% (16,191)	< 0.001	0.781 (0.765, 0.797)
	1	29.5% (70,403)	32.5% (29,472)	< 0.001	0.868 (0.854, 0.883)
	2	33.5% (80,117)	32.4% (29,424)	< 0.001	1.051 (1.034, 1.068)
	3	17.6% (42,067)	13.6% (12,365)	< 0.001	1.354 (1.325, 1.384)
	4	2.63% (6,298)	1.68% (1,527)	< 0.001	1.581 (1.494, 1.674)
	Unknown	2.32% (5,540)	1.99% (1,802)	< 0.001	1.171 (1.11, 1.237)

Abbreviations: No., number; SEER, Surveillance, Epidemiology, and End Results Program

**eTable 12: NCDB Demographics for Unilateral Mastectomy and Contralateral Mastectomy Patients (2005–2017)**

Variable		Unilateral Mastectomy	Contralateral Prophylactic Mastectomy	P-value	Odds Ratio (95% CI)
Age	<40	5.07% (29,536)	12.9% (37,469)	< 0.001	0.362 (0.356, 0.368)
	40–49	16.9% (99,021)	30.4% (88,577)	< 0.001	0.469 (0.464, 0.474)
	50–59	23.9% (139,399)	28.8% (83,871)	< 0.001	0.779 (0.771, 0.786)
	60–69	25.4% (147,813)	19.7% (57,420)	< 0.001	1.386 (1.371, 1.401)
	70–79	18.5% (107,951)	6.99% (20,393)	< 0.001	3.023 (2.976, 3.072)
	≥80	10.1% (58,891)	1.29% (3,764)	< 0.001	8.597 (8.316, 8.891)
Race	White	80.9% (471,316)	86.9% (253,440)	< 0.001	0.636 (0.628, 0.644)
	Black	12.7% (73,725)	8.28% (24,132)	< 0.001	1.605 (1.581, 1.63)
	Asian/Pacific Islander	4.45% (25,922)	2.77% (8,073)	< 0.001	1.635 (1.581, 1.63)
	American Indian, Aleutian, or Eskimo	0.30% (1,769)	0.27% (792)	= 0.009	1.118 (1.027, 1.217)
	Other/Unknown	1.70% (9,879)	1.74% (5,057)	= 0.183	0.977 (0.944, 1.011)
Ethnicity	Hispanic/Spanish	6.01% (35,031)	4.86% (14,157)	< 0.001	1.253 (1.228, 1.279)
	Non-Hispanic/Spanish	89.2% (519,839)	90.8% (264,563)	< 0.001	0.843 (0.83, 0.856)
	Unknown	4.76% (27,741)	4.38% (12,774)	< 0.001	1.091 (1.068, 1.115)
Facility Type	Academic/Research Program	29.3% (170,419)	26.9% (78,483)	< 0.001	1.122 (1.111, 1.133)

	Community Center	8.75% (50,975)	5.94% (17,301)	< 0.001	1.52 (1.493, 1.547)
	Comprehensive Community Cancer Program	42.9% (249,844)	40.2% (117,170)	< 0.001	1.117 (1.107, 1.127)
	Integrated Network Cancer Programs	14.1% (81,837)	14.1% (41,071)	= 0.584	0.996 (0.984, 1.009)
	Unknown	5.07% (29,536)	12.9% (37,469)	< 0.001	0.362 (0.356, 0.368)
Facility Location	East North Central	16.6% (96,659)	12.9% (37,807)	< 0.001	1.335 (1.318, 1.352)
	East South Central	6.92% (40,330)	7.31% (21,321)	< 0.001	0.942 (0.926, 0.959)
	Middle Atlantic	13.5% (78,665)	11.3% (32,898)	< 0.001	1.227 (1.21, 1.244)
	Mountain	4.08% (23,765)	5.15% (15,025)	< 0.001	0.783 (0.766, 0.799)
	New England	4.69% (27,327)	3.81% (11,104)	< 0.001	1.243 (1.215, 1.271)
	Pacific	11.8% (68,669)	9.93% (28,942)	< 0.001	1.212 (1.195, 1.23)
	South Atlantic	21.6% (126,135)	19.8% (57,821)	< 0.001	1.117 (1.104, 1.129)
	West North Central	7.74% (44,942)	8.82% (25,698)	< 0.001	0.865 (0.851, 0.879)
	West South Central	7.99% (46,583)	8.03% (23,409)	= 0.569	0.995 (0.979, 1.012)
	Unknown	5.07% (29,536)	12.9% (37,469)	< 0.001	0.362 (0.356, 0.368)
Area Population	Metro	83.8% (488,198)	84.9% (247,411)	< 0.001	0.921 (0.91, 0.933)
Density	Urban	12.0% (70,011)	10.9% (32,008)	< 0.001	1.107 (1.092, 1.123)
	Rural	1.66% (9,690)	1.45% (4,235)	< 0.001	1.147 (1.106, 1.19)
	Unknown	2.53% (14,712)	2.69% (7,840)	< 0.001	0.937 (0.912, 0.964)

Insurance/Payor	Private Insurance/Managed Care	49.8% (290,194)	72.9% (212,523)	< 0.001	0.369 (0.365, 0.372)
	Medicaid	7.24% (42,200)	5.99% (17,478)	< 0.001	1.224 (1.202, 1.247)
	Medicare	38.7% (225,224)	17.3% (50,406)	< 0.001	3.014 (2.981, 3.048)
	Other Government	0.99% (5,803)	1.34% (3,894)	< 0.001	0.743 (0.713, 0.774)
	Not Insured	2.21% (12,855)	1.48% (4,310)	< 0.001	1.503 (1.452, 1.557)
Median Income	<\$38,000	15.3% (89,161)	10.8% (31,454)	< 0.001	1.494 (1.473, 1.514)
Quartile	\$38,000–\$47,999	20.2% (117,502)	17.6% (51,385)	< 0.001	1.18 (1.167, 1.194)
	\$48,000–\$62,999	24.2% (140,739)	23.9% (69,688)	= 0.010	1.014 (1.003, 1.024)
	>\$63,000	31.7% (184,712)	37.5% (109,224)	< 0.001	0.775 (0.768, 0.782)
	Unknown	8.67% (50,497)	10.2% (29,743)	< 0.001	0.835 (0.823, 0.848)
Charlson-Deyo	0	81.1% (472,480)	87.2% (254,051)	< 0.001	0.632 (0.624, 0.64)
Comorbidity Index	1	14.6% (85,140)	10.6% (31,025)	< 0.001	1.437 (1.417, 1.457)
	2	3.11% (18,095)	1.69% (4,918)	< 0.001	1.868 (1.809, 1.929)
	3+	1.18% (6,896)	0.52% (1,500)	< 0.001	2.316 (2.189, 2.451)
Tumor Behavior	Invasive/Malignant	85.3% (497,153)	82.7% (240,986)	< 0.001	1.219 (1.205, 1.234)
	In situ	14.7% (85,458)	17.3% (50,508)	< 0.001	0.82 (0.81, 0.83)
Tumor Grade	1	14.9% (87,302)	14.7% (42,896)	= 0.001	1.021 (1.009, 1.034)

	2	40.1% (233,503)	38.4% (111,994)	< 0.001	1.072 (1.062, 1.082)
	3	35.5% (207,045)	36.6% (106,611)	< 0.001	0.956 (0.947, 0.965)
	4	0.82% (4,755)	0.66% (1,925)	< 0.001	1.238 (1.174, 1.306)
	Unknown	8.58% (50,006)	9.63% (28,068)	< 0.001	0.881 (0.868, 0.895)
Histology	Ductal and Lobular Neoplasms	93.5% (544,880)	94.3% (274,794)	< 0.001	0.878 (0.861, 0.894)
	Adenomas and Adenocarcinomas	2.84% (16,532)	3.30% (9,625)	< 0.001	0.855 (0.834, 0.877)
	Epithelial Neoplasms NOS	0.64% (3,754)	0.64% (1,862)	= 0.766	1.009 (0.954, 1.067)
	Squamous Cell Neoplasms	0.32% (1,886)	0.19% (580)	< 0.001	1.629 (1.483, 1.791)
	Neoplasms NOS	0.07% (377)	0.08% (222)	= 0.056	0.85 (0.718, 1.007)
	Other	2.61% (15,182)	1.51% (4,411)	< 0.001	1.741 (1.683, 1.802)
Radiation-Surgery	Neoadjuvant	0.39% (2,313)	0.29% (870)	< 0.001	1.332 (1.231, 1.441)
Sequence	Adjuvant	24.6% (143,182)	23.6% (68,911)	< 0.001	1.052 (1.042, 1.063)
	None	73.9% (430,699)	75.1% (218,926)	< 0.001	0.94 (0.93, 0.949)
	Other/Unknown	1.10% (6,417)	0.96% (2,787)	< 0.001	1.154 (1.103, 1.207)
Chemotherapy-	Neoadjuvant	7.25% (42,265)	9.97% (29,071)	< 0.001	0.706 (0.695, 0.717)
Surgery Sequence	Adjuvant	54.1% (315,271)	50.8% (148,058)	< 0.001	1.142 (1.132, 1.153)

	None	22.5% (131,313)	23.5% (68,538)	< 0.001	0.947 (0.937, 0.957)
	Other/Unknown	16.1% (93,762)	15.7% (45,827)	< 0.001	1.028 (1.016, 1.041)
ER Status	Positive	74.3% (433,055)	73.5% (214,134)	< 0.001	1.046 (1.036, 1.057)
PR Status	Positive	62.9% (366,531)	63.8% (185,918)	< 0.001	0.963 (0.954, 0.972)
HER2 Status	Positive	9.38% (54,642)	12.2% (35,492)	< 0.001	0.747 (0.736, 0.757)
Hormonal Status	Triple Negative	6.90% (40,215)	9.53% (27,785)	< 0.001	0.704 (0.692, 0.715)
Combination Results	ER/PR Positive, HER2 Negative	30.6% (178,324)	34.5% (100,670)	< 0.001	0.836 (0.828, 0.844)
	Triple Positive	4.24% (24,681)	6.03% (17,583)	< 0.001	0.689 (0.676, 0.703)
Clinical T Stage	0	0.47% (2,746)	0.52% (1,522)	= 0.001	0.902 (0.847, 0.961)
	In Situ	12.9% (75,725)	15.8% (46,114)	< 0.001	0.795 (0.785, 0.805)
	1	30.6% (178,368)	35.8% (104,217)	< 0.001	0.793 (0.785, 0.8)
	2	22.9% (133,496)	23.4% (68,151)	< 0.001	0.974 (0.964, 0.984)
	3	6.71% (39,106)	6.16% (17,967)	< 0.001	1.095 (1.075, 1.116)
	4	4.82% (28,079)	2.88% (8,383)	< 0.001	1.71 (1.668, 1.753)
	Unknown	21.5% (125,091)	15.5% (45,140)	< 0.001	1.492 (1.475, 1.51)
Clinical N Stage	0	62.5% (363,924)	68.8% (200,416)	< 0.001	0.756 (0.749, 0.763)
	Micrometastases	0.00% (6)	0.00% (5)	= 0.523	0.6 (0.153, 2.487)
	1	13.6% (79,128)	14.2% (41,476)	< 0.001	0.947 (0.935, 0.96)

	2	2.92% (17,023)	2.37% (6,904)	< 0.001	1.241 (1.206, 1.276)
	3	1.68% (9,784)	1.48% (4,310)	< 0.001	1.138 (1.098, 1.18)
	Other/Unknown	19.4% (112,746)	13.2% (38,383)	< 0.001	1.582 (1.563, 1.602)
Clinical M Stage	No metastases	88.7% (516,472)	91.0% (265,325)	< 0.001	0.77 (0.759, 0.782)
	Micrometastases	0.01% (41)	0.01% (42)	= 0.001	0.488 (0.31, 0.77)
	Macrometastases	1.98% (11,516)	1.22% (3,548)	< 0.001	1.637 (1.575, 1.7)
	Unknown	9.37% (54,582)	7.75% (22,579)	< 0.001	1.231 (1.211, 1.251)
Overall Clinical	0	13.7% (79,823)	16.7% (48,529)	< 0.001	0.795 (0.785, 0.805)
Cancer Stage	1	27.4% (159,526)	31.9% (92,913)	< 0.001	0.806 (0.798, 0.814)
	2	26.0% (151,702)	26.8% (78,159)	< 0.001	0.961 (0.951, 0.971)
	3	9.60% (55,943)	8.10% (23,618)	< 0.001	1.205 (1.186, 1.224)
	4	1.99% (11,615)	1.22% (3,553)	< 0.001	1.649 (1.587, 1.713)
	Unknown	21.3% (124,002)	15.3% (44,722)	< 0.001	1.492 (1.474, 1.51)

Abbreviations: No., number; NCDB, National Cancer Database