

Appendix Table 4 - Unadjusted and adjusted analyses of factors associated with $\geq 75^{\text{th}}$ percentile of opioid filling. Random intercept adjusted risk ratio accounts for provider-level clustering.

CI=confidence interval

RR=risk ratio

Characteristic	Value	Unadjusted RR (95% CI)	Fixed Intercept Adjusted RR (95% CI)	Random Intercept Adjusted RR (95% CI)
Age (years)	30-39	1.40 (1.30 - 1.52)	1.34 (1.24 - 1.45)	1.30 (1.19 - 1.42)
	40-49	1.47 (1.37 - 1.58)	1.37 (1.28 - 1.47)	1.34 (1.24 - 1.45)
	50-59	1.47 (1.37 - 1.57)	1.37 (1.28 - 1.47)	1.33 (1.23 - 1.44)
	60-69	1.35 (1.26 - 1.44)	1.26 (1.17 - 1.35)	1.25 (1.16 - 1.34)
	70-79	1.26 (1.17 - 1.35)	1.17 (1.08 - 1.26)	1.14 (1.05 - 1.23)
	80+	1.02 (0.93 - 1.12)	0.89 (0.82 - 0.98)	0.85 (0.76 - 0.95)
	18-29	Ref	Ref	Ref
Breast cancer diagnosis	Yes	1.17 (1.14 - 1.20)	1.19 (1.16 - 1.22)	1.28 (1.21 - 1.36)
	No	Ref	Ref	Ref
Charlson Comorbidity Index Score	2+	1.12 (1.07 - 1.17)	1.12 (1.07 - 1.16)	1.09 (1.04 - 1.14)
	0-1	Ref	Ref	Ref
Hospital Type	Missing	0.70 (0.64 - 0.77)	0.81 (0.74 - 0.88)	0.77 (0.64 - 0.92)
	Pediatric	1.12 (0.77 - 1.64)	0.92 (0.64 - 1.32)	0.80 (0.53 - 1.23)
	Small	1.17 (1.00 - 1.37)	1.36 (1.17 - 1.58)	1.07 (0.86 - 1.34)
	Teaching	1.08 (1.05 - 1.11)	1.02 (1.00 - 1.05)	0.91 (0.84 - 1.00)
	Community	Ref	Ref	Ref
Location of residence	Missing	1.12 (0.80 - 1.57)	1.17 (0.84 - 1.62)	1.05 (0.79 - 1.40)
	Urban	1.14 (1.09 - 1.18)	1.16 (1.12 - 1.21)	1.02 (0.98 - 1.07)
	Rural	Ref	Ref	Ref
Sex	Male	1.22 (1.13 - 1.33)	1.20 (1.11 - 1.31)	1.09 (1.01 - 1.18)

	Female	Ref	Ref	Ref
Socioeconomic status (quintiles)	2	0.94 (0.90 - 0.98)	0.95 (0.91 - 0.98)	0.97 (0.94 - 1.00)
	3	0.92 (0.89 - 0.96)	0.92 (0.89 - 0.96)	0.95 (0.92 - 0.98)
	4	0.92 (0.89 - 0.96)	0.92 (0.89 - 0.96)	0.95 (0.92 - 0.98)
	5 - Highest quintile	0.90 (0.86 - 0.93)	0.91 (0.87 - 0.94)	0.94 (0.92 - 0.97)
	1 - Lowest quintile	Ref	Ref	Ref
Type of procedure	Excision total breast +/- axillary intervention	1.25 (1.19 - 1.30)	1.29 (1.23 - 1.35)	1.34 (1.24 - 1.46)
	Excision radical breast +/- axillary intervention	1.63 (1.55 - 1.71)	1.45 (1.39 - 1.52)	1.41 (1.26 - 1.58)
	Bilateral surgery	1.52 (1.45 - 1.58)	1.53 (1.46 - 1.60)	1.40 (1.30 - 1.51)
	Excision partial breast only +/- axillary intervention	Ref	Ref	Ref
Year of surgery	2013	0.96 (0.91 - 1.00)	0.97 (0.92 - 1.01)	0.94 (0.89 - 1.00)
	2014	1.02 (0.97 - 1.07)	1.02 (0.98 - 1.07)	1.02 (0.95 - 1.10)
	2015	0.97 (0.92 - 1.02)	0.98 (0.93 - 1.03)	1.00 (0.93 - 1.09)
	2016	0.94 (0.89 - 0.98)	0.95 (0.90 - 1.00)	0.97 (0.89 - 1.06)
	2017	0.75 (0.71 - 0.79)	0.77 (0.73 - 0.81)	0.80 (0.72 - 0.88)
	2018	0.54 (0.50 - 0.57)	0.55 (0.51 - 0.58)	0.58 (0.51 - 0.67)
	2019	0.28 (0.25 - 0.30)	0.28 (0.26 - 0.30)	0.30 (0.23 - 0.40)
	2020	0.23 (0.20 - 0.26)	0.22 (0.20 - 0.25)	0.23 (0.18 - 0.30)
	2012	Ref	Ref	Ref