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Persistent Opioid Use and High-Risk Prescribing in Body Contouring Patients

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Abstract

Purpose: Opioid misuse is high among obese patients and often increases after bariatric surgery. However, the risk of new persistent use following post-bariatric body contouring procedures remains unknown.

Methods: We examined insurance claims from Clinformatics® Data Mart (OptumInsight, Eden Prairie, MN) between 2001 and 2015 for opioid-naïve patients undergoing five common body contouring procedures: abdominoplasty/panniculectomy, breast reduction, mastopexy, brachioplasty, and thighplasty (n=11,257). Our primary outcomes included both new persistent opioid use, defined as continued prescription fills between 90 and 180 days after the index operation, and the prevalence of high-risk prescribing. We used multilevel mixed-effects logistic regression to assess the risk of new persistent use, adjusting for clinical and sociodemographic covariates.

Results: In this cohort, 6.1% of previously opioid-naïve patients met the definition for new persistent use, and 12.9% were exposed to high-risk prescribing. New persistent use was higher in patients with high-risk prescribing (9.2%). New persistent use was highest among patients who underwent thighplasty (17.7%, 95% CI 0.03–0.33), after adjusting for other covariates. Increasing Charlson comorbidity indices (OR 1.11, CI 1.05–1.17), mood disorders (OR 1.27, CI 1.05–1.54), anxiety (OR 1.41, CI 1.16–1.73), tobacco use (OR 1.22, CI 1.00–1.49), neck pain (OR 1.23, CI

1.04–1.46), arthritis (OR 1.30, CI 1.08–1.58), and other pain disorders (OR 1.36, CI 1.16–1.60) were independently associated with persistent use.

Conclusions: Similar to other elective procedures, 6% of opioid-naïve patients developed persistent use, and 12% were exposed to high risk prescribing practices. Plastic surgeons should remain aware of relevant risk factors and direct patients toward opioid alternatives.

INTRODUCTION

The ongoing opioid epidemic in the United States carries significant morbidity and mortality [1–4]. In 2016, more than 64,000 deaths were due to drug overdose, which has nearly doubled in the last decade [4]. As a result, drug overdoses are now the leading cause of death for Americans under the age of 50 [4]. Of this number, most recent data demonstrates that 22,598 deaths occurred secondary to prescription opioids [1, 5]. Although many factors have contributed to this epidemic [6, 7], there has been increased awareness of the role surgical care may play in creating newly dependent opioid patients. [8–11].

Prior studies suggest that 6% of opioid-naïve patients continue to fill opioid prescriptions more than three months after undergoing major and minor surgical procedures [9]. Moreover, opioid misuse is higher among patients with obesity and following bariatric surgery [12,13], due in part to the prevalence of chronic pain and comorbid psychiatric conditions [14–17]. Body contouring procedures may further contribute to opioid use in these patients, and utilization of these procedures continues to rise [18]. To date, however, patterns of opioid use following body contouring procedures have not been well-described, and the risk factors associated with new persistent use remain undefined.

Given the combined risk factors of psychiatric comorbidities, high rates of obesity and bariatric surgery, and the potential for developing persistent pain after surgery, we hypothesized that body contouring patients would similarly develop persistent opioid use after surgery. Furthermore, we hypothesized that prescribing patterns will be marked by high-risk occurrences, such as high daily doses, overlapping prescriptions, and concurrent prescribing with benzodiazepines. To evaluate this, we analyzed a claims-based dataset to measure persistent opioid use after common body contouring procedures, as well as potential risk factors for the development of persistent use.

METHODS

Data Source and Study Cohort

After IRB exemption, we analyzed private insurance claims from Clinformatics® Data Mart (OptumInsight, Eden Prairie, MN), a national claims database. OptumInsight contains records for more than 140 million enrollees and includes data on patient demographics, insurance coverage, utilization of inpatient and outpatient services, and outpatient pharmacy claims. To obtain our cohort, we included all patients between the ages of 18 and 64 who underwent a body contouring surgical procedure between January 1, 2002 and September 30, 2014. Body contouring surgical procedures included breast reduction, mastopexy, abdominoplasty/panniculectomy, brachioplasty, and thighplasty. These procedures were identified in the database using Current Procedural Terminology (CPT) codes (See Table,

Supplemental Digital Content 1, which shows the body contouring procedures with Current Procedural Terminology (CPT) codes, [INSERT HYPER LINK](#)). Prior bariatric surgery was not required for inclusion in the cohort.

We included only patients with continuous insurance coverage for 12 months prior to surgery and 6 months after surgery. Patients with hospital length of stay >30 days were excluded to eliminate confounding due to severe, unusual postoperative complications. To ensure patients with opioid use due to additional surgical procedures were not included in our cohort, patients with a subsequent anesthesia procedural code in the six months after the index surgical procedure were excluded. We also excluded any patients readmitted during the persistent use period (90–180 days after surgery), as reason for readmission could not be ascertained and may not reflect opioid use.

To increase the likelihood of an opioid-naïve cohort, we limited our analysis only to patients who did not fill an opioid prescription in the 11 months prior to the perioperative period. The perioperative period was defined as 30 days before to 14 days after discharge. Patients who did not fill an opioid prescription within the defined perioperative period were excluded.

Patient covariates

Information on patient demographics, socioeconomic status, geographic region of residence and clinical covariates were included. The Charlson Comorbidity Index score [19] and an indicator for history of tobacco use were used to assess patient comorbid conditions. Mental health conditions were classified as adjustment disorders, anxiety disorders, mood disorders, suicide or self-harm, disruptive disorders, personality disorders, psychosis, other mental health disorders, and alcohol or substance abuse disorders using the Agency of Healthcare Research and Quality Clinical Classification System (See Table, Supplemental Digital Content 2, which shows the Mental health disorders with Clinical Classification System codes, [INSERT HYPER LINK](#)) [20]. Pain disorders were determined using International Classification of Disease, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis codes (See Table, Supplemental Digital Content 3, which shows the Pain diagnoses with ICD-9 codes, [INSERT HYPER LINK](#)) and categorized as arthritis pain, back pain, neck pain, and other pain disorders.

Outcomes

Persistent opioid use was the primary outcome, defined as continued prescription fills between 90 and 180 days after discharge, among those patients who had filled an opioid prescription in the perioperative period [8]. The total quantity of opioids filled by the patient during the perioperative period of 30 days before surgery to 14 days after discharge were converted into oral morphine equivalents (OMEs) using standardized guidelines (e.g. codeine 30 mg= 4.5 OMEs, hydrocodone 30 mg=30 OMEs, oxycodone 30 mg=45 OMEs) [21]. Finally, patterns of high-risk prescribing during the perioperative period were identified within the cohort. High-risk prescribing was defined as at least one of the following: 1) patients with prescriptions from more than one prescriber, 2) patients with prescriptions of more than 100 OMEs per day, 3) patients with overlapping opioid and benzodiazepine

prescriptions, 4) patients with concurrent opioid prescriptions, and 5) patients with prescriptions for long-acting opioids [22].

Statistical Analysis

All analyses were conducted using Stata version 14.2 (StataCorp). Descriptive statistics were calculated for demographic variables and comorbidities. Differences between those with persistent opioid use and those without persistent opioid use were assessed with *t* tests and χ^2 tests. A multivariate logistic regression model was used to identify variables associated with both new persistent opioid use and high-risk prescribing, including age, gender, education, household income, US Census Bureau geographic region, surgical procedure, length of stay, Charlson Comorbidity Index, readmissions in the 90–180 days after surgery, history of tobacco use, mental health disorders, pain disorders, and total opioid prescription OME within the perioperative window. *P* values were 2-tailed, and significance was set at *P* < .05. All covariates were evaluated for multicollinearity using variance inflation factors and we found no significant multicollinearity in the variables included in the regression model.

RESULTS

Our final cohort included 11,257 opioid-naïve patients, all of whom filled perioperative opioid prescriptions. Within the cohort, 89.2% underwent breast reduction, 6.4% underwent mastopexy, 4.1% underwent abdominoplasty/panniculectomy, 0.2% underwent thighplasty, and 0.1% underwent brachioplasty. The mean age of the cohort was 41.0 (SD 11.9), and the vast majority of patients were Caucasian (70.1%) and female (99.1%). Back pain and arthritis were present in two thirds of the cohort (67.8% and 65.8%, respectively) and neck pain in half (52.3%), with 42.6% of patients carrying some other pain-related diagnosis.

Out of 11,257 patients, 690 continued to fill opioid prescriptions more than three months after surgery, which comprised 6.1% of the cohort. Patients who developed persistent use differed significantly in several variables on bivariate analysis, all of which were controlled for in our regression (Table 1). Adjusted new persistent use was highest for patients undergoing thighplasty (17.7%), with abdominoplasty/panniculectomy having the second highest rate (8.1%) (Figure 1). Persistent users were also prescribed 300 oral morphine equivalents (OME) on average within the perioperative period, whereas non-persistent users were prescribed 225 OMEs (Table 2). Lastly, high-risk prescribing occurred in 1,451 patients, and 9.2% (133) of these patients developed persistent use.

After adjusting for significant covariates, neither age, gender, nor education level were significantly associated with persistent opioid use after surgery (Table 3). However, compared with patients earning <\$40,000 per year, all patients earning >\$40,000 exhibited lower odds of developing persistent use, with incomes \$50,000–59,000 (OR 0.54, CI 0.35–0.84), \$75,000–99,000 (OR 0.60, CI 0.43–0.84), and >\$100,000 (OR 0.62, CI 0.47–0.82). Higher odds of persistent use were also seen in patients from the Mountain (OR 1.48, CI 1.05–2.08) and West South Central (OR 1.49, CI 1.11–1.99) divisions. Patients undergoing thighplasty had greater likelihood of developing persistent opioid use compared with patients undergoing breast reductions (OR 3.66, CI 1.24–10.84). Also, the odds of persistent use increased by 10% with each additional point on the Charlson Comorbidity Index, (OR

1.11, CI 1.05–1.17). Increased likelihood of persistent use was also associated with tobacco (OR 1.22, CI 1.00–1.49), mood disorders (OR 1.27, CI 1.05–1.54), anxiety (OR 1.41, CI 1.16–1.73), arthritis (OR 1.30, CI 1.08–1.58), neck pain (OR 1.23, CI 1.04–1.46), and other pain disorders (OR 1.36, CI 1.16–1.60). Lastly, patients prescribed greater than 337.5 mg OMEs (75th percentile) during the perioperative period were more likely to become persistent users than those who were prescribed less than 337.5 mg OMEs (OR 1.53, CI 1.30–1.81).

After adjusting for the same covariates, the odds of high-risk prescribing were much higher for abdominoplasty/panniculectomy (OR 1.92, CI 1.50–2.47) compared with breast reductions. Patients with anxiety were more likely exposed to high-risk prescribing (OR 1.19, CI 1.02–1.39), as were patients with a diagnosis of neck pain (OR 1.25, CI 1.11–1.41) (Table 4).

DISCUSSION

Using administrative claims data, we found that more than 6.1% of body contouring patients were still filling opioid prescriptions more than 90 days after surgery. This rate increased to 9.2% with high-risk prescribing, which approached the rates of persistent use among both breast oncology and breast reconstruction patients [23, 24]. Patients who developed new persistent use tended to earn lower incomes, and were more likely to have other pain diagnoses and mental health problems. Being from the Mountain and West South Central divisions of the country was also associated with higher odds of persistent use, which likely affects ongoing practice pattern variations. Moreover, patients with a history of tobacco use, anxiety, and a greater number of comorbidities were at greater risk for persistent opioid use.

Body contouring comprises a large proportion of plastic surgery procedures, with more than 300,000 patients undergoing these operations in the United States last year [18]. A large percentage of patients undergo body contouring for purely cosmetic reasons, but insurance typically only covers procedures deemed medically necessary, often after massive weight loss [25]. The sequelae of massive weight loss include ptotic and atrophied breasts, significant skin redundancy of the abdomen and extremities, and skin breakdown [26,27]. Patients with redundant skin often have difficulties with exercise, clothes, and self-image, despite considerable weight loss [28]. Unfortunately, these consequences negatively impact both appearance and quality of life for patients who have just gone to great lengths to improve both [29].

Opioid analgesics have been the traditional method of pain control following body contouring procedures, and multimodal anesthesia and opioid alternatives have not been extensively studied. In breast reductions, intraoperative local anesthesia, preoperative pain management, and pain pumps were shown to decrease post-operative opioid use [30–32]. Holzman et al. advocated for the use of tumescence to promote same-day discharge in abdominoplasty patients, and suggested that opioid use would decrease with tumescence utilization, although the study did not include a control group [33]. Some surgeons place pain pumps in abdominoplasty patients, which resulted in decreased narcotic use 72 hours post-operatively [34].

Other surgeons perform field blocks, which decrease post-operative opioid consumption [35], rendered most effective by using a systematic approach that addresses the various manipulated tissue planes [36]. In a review by Vyas et al., blocks utilizing liposomal bupivacaine were found to be both safe and well tolerated in various plastic surgery procedures and functions as a viable alternative to opioids for treating post-operative pain [37]. The cost of such drugs is worth considering, as they may not be cost-effective for all plastic surgery procedures [38, 39], but the upfront cost may be significantly less than the long-term cost of opioid addiction.

Interestingly, body contouring patients seem to be uniquely predisposed to persistent opioid consumption. A recent study described that 21.1% of patients developed persistent postoperative pain after body contouring [17], for which opioids are not a recommended treatment [40]. Similar to our findings with respect to opioid fills, patients with mood disorders and anxiety were more likely to develop prolonged pain after surgery [17]. More specifically, patients undergoing thighplasties were most likely to develop persistent use. While studies evaluating the effect of patient demographics and psychiatric comorbidities on pain and recovery are lacking, the rate of complications after thighplasties are high [41]. Complications during the post-operative period, as well as the unique stress placed on thighplasty wounds from walking and sitting, may result in prolonged pain after surgery.

In this context, consideration of non-opioid pain medications during the perioperative period is critical. Acetaminophen results in improved analgesia when taken in conjunction with narcotics and simultaneously decreases opioid consumption [17] and should be prescribed after plastic surgery procedures [42]. Multiple meta-analyses studying gabapentin and pregabalin concluded that both drugs improve pain control post-operatively and decrease narcotic use with very acceptable risk-benefit ratios [43]. In a systematic review by Kelley et al., ibuprofen was found to provide comparable pain control to narcotics and was not associated with increased bleeding risk in soft tissue surgery [44]. Another review article discussed the safety of ketorolac in plastic surgery, finding that its perioperative use reduced opioid use and did not result in increased hematoma rates in various plastic surgery procedures [45]. Perhaps most salient is the recommendation to provide multimodal analgesia in body contouring, which can lower the total doses of medications and also shorten discharge times [46, 47]. Taken together, the evidence supports the safe use of opioid alternatives for soft tissue plastic surgery for postoperative pain control.

To date, while some guidance exists for opioid prescribing in chronic pain [48,49], protocols for post-operative prescribing are notably absent. While not directly addressing post-operative pain, Frieden and Houry suggest that three or fewer days of opioids is often sufficient for treating acute pain, and a prescription lasting more than seven days is seldom required [49]. Interestingly, our findings align with prior work that suggests that opioid doses exceeding the 75th percentile in the perioperative period were associated with much greater likelihood of persistent use after surgery [9]. Although we cannot assess causality, opioid prescribing in the postoperative period is a critical aspect of care, which may provide early warning signs regarding patients with the potential to go on to new persistent use. Our study sample consisted entirely of opioid naïve patients, but with a high rate of pre-existing pain conditions. As such, it is possible that patients continue to use opioids to manage pain

other than surgical site pain in the postoperative period, contributing to new persistent use [50]. Most importantly, we are currently working to develop tailored opioid prescribing guidelines for various procedures, based upon normative opioid consumption, to prevent the development of persistent opioid use in opioid-naïve patients.

Our study had several limitations. We were unable to examine all body contouring patients, since administrative claims data can only provide information on procedures covered by insurance, and thus the results cannot be generalized to the entire body contouring population. Also, more granular data surrounding body mass index and preoperative weight loss were unavailable, and thus we could not determine the impact of either covariate on persistent use. Future studies evaluating the relationship between opioid use after bariatric procedures, resultant weight loss, and subsequent body contouring procedures would also be of immense value. Additionally, the data could not provide specific measures of acute pain in the perioperative period or more granular aspects of clinical care or patient characteristics that impact opioid use. Technical details of the various procedures also could not be considered. Finally, we do not have information regarding opioid consumption from claims data.

CONCLUSIONS

Persistent opioid use after body contouring occurs in 6.2% of patients, most of whom likely underwent these procedures after massive weight loss. High-risk prescribing occurred in 12.9% of patients, with 9.2% of this subgroup going on to persistent use. Going forward, it is important for clinicians to be aware of the patient-level factors that increase the risk of persistent use, and avoid high-risk prescribing.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.
Adjusted new persistent opioid use, by procedure.

Table 1.

Cohort characteristics.

	Overall	Persistent Opioid Use	No Persistent Opioid Use	P value
	(N=11257)	(N=690)	(N=10567)	
Age, mean (SD), y	41.0 (11.9)	42.7 (11.6)	40.9 (11.9)	<0.001*
Gender				
Female	11163 (99.1)	679 (98.4)	10484 (99.2)	0.002*
Male	89 (0.8)	9 (1.3)	80 (0.8)	
Unknown	5 (0.1)	2 (0.3)	3 (0.0)	
Race/ethnicity				
Caucasian	7888 (70.1)	483 (70.0)	7405 (70.1)	0.907
African-American	1778 (15.8)	116 (16.8)	1662 (15.7)	
Hispanic	770 (6.8)	43 (6.2)	727 (6.9)	
Asian	161 (1.4)	9 (1.3)	152 (1.4)	
Unknown	660 (5.9)	39 (5.6)	621 (5.9)	
Education				
Less than high school	29 (0.3)	2 (0.3)	27 (0.3)	0.030*
High school diploma	2852 (25.3)	206 (29.9)	2646 (25.0)	
Less than bachelor degree	5963 (53.0)	345 (50.0)	5618 (53.2)	
College degree or more	2134 (19.0)	115 (16.6)	2019 (19.1)	
Unknown	279 (2.5)	22 (3.2)	257 (2.4)	
Income				
<\$40K	1080 (9.6)	98 (14.2)	982 (9.3)	<0.001*
\$40K-\$49K	523 (4.7)	40 (5.8)	483 (4.6)	
\$50K-\$59K	580 (5.1)	29 (4.2)	551 (5.2)	
\$60K-\$74K	845 (7.5)	56 (8.1)	789 (7.5)	
\$75K-\$99K	1279 (11.4)	68 (9.9)	1211 (11.5)	
\$100K+	3445 (30.6)	187 (27.1)	3258 (30.8)	
Unknown	3505 (31.1)	212 (30.8)	3293 (31.2)	
Type of Surgery				
Breast reduction	10041 (89.2)	591 (85.7)	9450 (89.4)	<0.001*
Mastopexy	719 (6.4)	50 (7.3)	669 (6.3)	
Abdominoplasty/panniculectomy	460 (4.1)	43 (6.2)	417 (4.0)	
Thighplasty	22 (0.2)	5 (0.7)	17 (0.2)	
Brachioplasty	15 (0.1)	1 (0.1)	14 (0.1)	
>1 Body Contouring Procedure per Encounter				0.40
Yes	174 (1.6)	8 (1.2)	166 (1.6)	
No	11,083 (98.5)	682 (98.8)	10,401 (98.4)	
Length of stay, mean (SD)	0.79 (2.01)	0.94(1.94)	0.78 (2.01)	0.0465*

	Overall	Persistent Opioid Use	No Persistent Opioid Use	P value
	(N=11257)	(N=690)	(N=10567)	
Charlson Comorbidity Index, mean (SD)	0.66 (1.36)	0.96 (1.80)	0.64 (1.33)	<0.001*
History of Tobacco use				
Yes	1775 (15.8)	141 (20.4)	1634 (15.5)	<0.001*
No	9482 (84.2)	549 (79.6)	8933 (84.5)	
Mental health disorders				
Adjustment	734 (6.5)	64 (9.3)	670 (6.3)	0.002*
Anxiety	1760 (15.6)	169 (24.5)	1591 (15.1)	<0.001*
Mood	2260 (20.1)	197 (28.6)	2063 (19.5)	<0.001*
Suicide or self-harm	28 (0.3)	1 (0.1)	27 (0.3)	0.572
Disruptive	247 (2.2)	19 (2.8)	228 (2.2)	0.301
Personality	45 (0.4)	2 (0.3)	43 (0.4)	0.637
Psychosis	43 (0.4)	6 (0.9)	37 (0.4)	0.032*
Other	417 (3.7)	37 (5.4)	380 (3.6)	0.017*
Alcohol or substance abuse disorders	120 (1.1)	10 (1.5)	110 (1.0)	0.312
Pain disorders				
Arthritis	7404 (65.8)	519 (75.2)	6885 (65.2)	<0.001*
Back	7632 (67.8)	485 (70.3)	7147 (67.6)	0.148
Neck	5888 (52.3)	397 (57.5)	5491 (52.0)	0.005*
Other pain conditions	4794 (42.6)	374 (54.2)	4420 (41.8)	<0.001*
Total opioid dose of prescriptions within the surgical window, median (IQR), OME	225 (180)	300 (200)	225 (187.5)	<0.001*
Abbreviations: SD, standard deviation; IQR, interquartile range; OME, oral morphine equivalency				

Abbreviations: SD, standard deviation; IQR, interquartile range; OME, oral morphine equivalency

Table 2.

Dosing and number of prescriptions during perioperative period and persistent use period, by persistent use.

	Overall	Persistent Use	No Persistent Use
Initial surgical period			
Number of Rx, mean (SD)	1.3 (0.60)	1.5 (0.80)	1.3 (0.59)
Total pre-operative opioid dose, median (IQR)	225 (180)	300 (200)	225 (187.5)
Persistent use period			
Number of Rx, mean (SD)	NA	1.36 (0.97)	NA
Total OME, median (IQR)		150 (400)	

Abbreviations: SD, standard deviation; IQR, interquartile range; OME, oral morphine equivalency

Table 3.

Regression model for persistent opioid use.

	Odds Ratio	P-value	[95% Conf. Interval]	
Age (ref group: 18–29)				
30–39	1.08	0.56	0.84	1.39
40–49	1.01	0.95	0.78	1.30
50–59	1.30	0.051	1.00	1.69
60–64	1.15	0.47	0.78	1.70
Gender (ref group: Female)				
Male	1.19	0.67	0.55	2.57
Unknown	10.87	0.012*	1.71	69.22
Education (ref group: College degree or more)				
Less than high school	0.98	0.97	0.22	4.27
High school diploma	1.13	0.37	0.86	1.48
Less than bachelor degree	0.98	0.86	0.78	1.23
Unknown	1.36	0.23	0.82	2.27
Household Income (ref group: <\$40K)				
\$40K-\$49K	0.86	0.44	0.58	1.27
\$50K-\$59K	0.54	0.006*	0.35	0.84
\$60K-\$74K	0.74	0.09	0.52	1.04
\$75K-\$99K	0.60	0.003*	0.43	0.82
\$100K+	0.62	0.001*	0.47	0.82
Unknown	0.72	0.017*	0.55	0.94
Division (ref group: East North Central)				
East South Central	1.46	0.06	0.99	2.16
Middle Atlantic	0.86	0.49	0.56	1.32
Mountain	1.48	0.025*	1.05	2.08
New England	0.98	0.94	0.60	1.59
Pacific	0.79	0.28	0.50	1.22
South Atlantic	1.24	0.09	0.97	1.59
West North Central	0.85	0.31	0.63	1.16
West South Central	1.49	0.008*	1.11	1.99
Surgical Procedure (ref group: Breast Reduction)				
Abdominoplasty/panniculectomy	1.43	0.051	1.00	2.04
Brachioplasty	1.25	0.83	0.16	9.80
Mastopexy	1.03	0.85	0.74	1.44
Thighplasty	3.66	0.019*	1.24	10.84
Length of stay	1.00	0.86	0.97	1.04
Charlson Comorbidity Index	1.11	<0.001*	1.05	1.17
History of tobacco use	1.22	0.049*	1.00	1.49

	Odds Ratio	P-value	[95% Conf. Interval]	
Mental health disorders				
Adjustment	1.31	0.06	0.99	1.73
Anxiety	1.41	0.001*	1.16	1.73
Mood	1.27	0.014*	1.05	1.54
Psychosis	1.61	0.30	0.66	3.93
Other psychiatric	1.07	0.72	0.74	1.53
Pain				
Arthritis	1.30	0.006*	1.08	1.58
Neck	1.23	0.015*	1.04	1.46
Other pain	1.36	<0.001*	1.16	1.60
Total opioid dose (OME) during surgical window of 337.5 mg or greater (75% or greater)	1.54	<0.001*	1.30	1.81
>1 procedure per encounter/hospitalization	0.59	0.17	0.28	1.24
_cons	0.03	0.000	0.02	0.05

Abbreviations: SD, standard deviation; IQR, interquartile range; OME, oral morphine equivalency

Table 4.

Regression model for high-risk prescribing.

	Odds Ratio	P-value	[95% Conf. Interval]	
Surgical Procedure (ref group: Breast Reduction)				
Abdominoplasty/panniculectomy	1.92	<0.001*	1.50	2.47
Brachioplasty	0.46	0.46	0.06	3.52
Mastopexy	0.93	0.59	0.72	1.20
Thighplasty	2.04	0.18	0.73	5.73
Psychiatric/Pain Diagnoses				
Anxiety	1.19	0.029*	1.02	1.39
Neck pain	1.25	<0.001*	1.11	1.41

Abbreviations: SD, standard deviation; IQR, interquartile range; OME, oral morphine equivalency