

# Postoperative Prescribing Practices Following Gynecologic Surgery

Rachel J. Craven, MS; Madeline K. Moureau, BS; Heidi W. Brown, MD, MAS; Emily M. Buttigieg, MD

## ABSTRACT

**Background:** Opioids prescribed for postoperative pain have exceeded patient need in the United States, playing a significant role in the opioid epidemic. In the preintervention phase of this project (September 2018 – March 2019), a chart review and patient survey revealed that patients were prescribed double the number of opioids they consumed following gynecologic surgery.

**Objective:** To ascertain whether an educational intervention recommending opiate prescriptions based on postoperative opioid use decreases gynecologic surgeons' opiate prescriptions.

**Methods:** An educational intervention implemented in January 2021 communicated the discrepancy between patient need and medications prescribed and made prescribing recommendations for common gynecologic procedures. A postintervention (February 2021 – April 2021) retrospective chart review ascertained postoperative opioid prescribing practices. Residents were surveyed about their prescribing practices in June 2021. Descriptive statistics compared each phase.

**Results:** For laparoscopic hysterectomy, the median morphine milligram equivalent (MME) was 150 (IQR 112.5-166.9) for preintervention and 150 (IQR 112.5-150) postintervention. For vaginal hysterectomy, median MME declined from 150 (IQR 112.5-225) to 112.5 (IQR 112.5-150). For laparoscopic surgery without hysterectomy, the median MME was 75 for both preintervention (IQR 75-120) and postintervention (IQR 60-80). For vaginal surgery without hysterectomy median MME went from 75 (IQR 75-142.5) to 54 (IQR 22.5-112.5). Median MME for hysteroscopy and dilation and curettage was 0 for both phases. When surveyed, residents reported prescribing lower amounts than actual prescribing practices.

**Conclusions:** Despite education informing gynecologic surgeons that their opioid prescribing exceeded patient need, prescribing practices did not change. The difference between actual and resident-reported prescribing practices warrants further investigation.

## BACKGROUND

Now in its third decade, the opioid epidemic continues to be a major public health crisis. Since 1999, there have been more than 600 000 opioid overdose deaths in the United States, with more than 1 death every 13 minutes on average.<sup>1,2</sup> Though synthetic opioids play an increasingly large role, prescription opioids were still involved in approximately 24% of all fatal overdoses in 2020.<sup>3</sup> Thus, it is imperative that health institutions and clinicians improve narcotic prescribing practices to balance adequate pain control with responsible opioid stewardship.

Postoperative pain management has been identified as an area for improvement in surgical specialties. Between 67% and 92% of patients have unused opioids after surgery, which creates possible opportunities for misuse or diversion.<sup>4</sup> Within gynecological surgery, it has been reported that surgeons provide approximately twice the number of opioids used by most patients following hysterectomies.<sup>5,6</sup>

We adapted and implemented a survey-intervene-survey study design previously shown to be effective in general surgery.<sup>7,8</sup> We assessed and compared narcotic prescriptions and patient consumption following common gynecologic surgeries and generated prescribing recommendations to align with actual patient use. An educational intervention communicated these recommendations to clinicians. We then reassessed prescribing patterns postintervention to ascertain the impact of the intervention.

• • •

**Author Affiliations:** University of Wisconsin School of Medicine and Public Health, Madison, Wisconsin (Craven, Moureau, Brown); Montefiore Medical Center/Albert Einstein College of Medicine, Bronx, New York (Buttigieg).

**Corresponding Author:** Emily M. Buttigieg, MD, Comprehensive Health Care Center, 315 E 161st St, Bronx, NY 10451; phone 734.250.5023; email ebuttigieg@montefiore.org; ORCID ID 0000-0002-9541-4120

## METHODS

### Preintervention

Our Institutional Review Board deemed this quality improvement study exempt. Preintervention data were collected from patients undergoing benign gynecologic surgery at our large academic institution during a 3-month period prior to the COVID-19 pandemic. Patient discharge instructions included information about this quality improvement project, how to dispose of unused opioids, and how to opt out of participation. Patients who did not opt out were sent invitations via text message 7 and 14 days postoperatively to complete brief electronic surveys about postoperative pain medication use and satisfaction. Patients were asked about the number of tablets taken for both opioid and nonopioid pain medications. Satisfaction or dissatisfaction with pain control was queried using a 5-point Likert scale from 1 (very dissatisfied) to 5 (very satisfied). For those patients who responded to the survey, data were abstracted from the electronic health record regarding demographics, surgical details, and medications prescribed for postoperative pain.

Procedures were categorized into 6 groups: (1) hysterectomy (laparoscopic or robotic), (2) hysterectomy (vaginal), (3) laparoscopic or robotic gynecologic procedure without hysterectomy, (4) vaginal surgery without hysterectomy, (5) hysteroscopy (operative or diagnostic), (6) suction dilation and curettage (D&C). Surgeries that did not fall into one of these categories were excluded.

Opioid prescriptions and patient consumption data were converted to median morphine milligram equivalents (MME) to allow for comparisons across different opioid medications. Descriptive analyses characterized patient satisfaction with pain control and identified median MME and interquartile ranges prescribed for each procedure. Extreme outliers ( $n=2$ ), defined as falling outside the highest and lowest quartiles plus 1.5 times the interquartile range, were excluded. MMEs prescribed and consumed were compared, and prescribing recommendations that aligned with patient consumption for each surgery category were ascertained.

### Intervention

Similar to the methods used by Hill et al in their general surgery intervention, we identified the MME value that would meet the needs of 80% of patients undergoing each of the 6 types of surgery and calculated the corresponding number of tablets of oxycodone or hydrocodone.<sup>7,8</sup>

The educational intervention for prescribers was a 15-minute live presentation delivered virtually during two protected educational times for the Department of Obstetrics and Gynecology: (1) Grand Rounds attended by faculty, staff, and trainees; and (2) mandatory resident didactic time.

Descriptive data from the preintervention phase, including differences between our opioid prescribing practices and patient consumption, as well as recommendations based on patient need, were included in the educational intervention. The slides and link

**Table 1.** Sample Description Stratified by Intervention Phase

Variable	Preintervention (N=146) % (n)	Postintervention (N=500) % (n)	P value
Age (years) <sup>a</sup>	39 (32–49)	41 (34–51)	0.360
Body mass index (kg/m <sup>2</sup> ) <sup>a</sup>	28 (24–34)	29 (24–35)	0.837
Race and ethnicity			
Hispanic, multiracial, or other	1 (1)	5 (26)	0.011
Asian or Pacific Islander	3 (2) (4)	5 (24)	
Black or African American	4 (6)	6 (32)	
Non-Hispanic White	92 (93) (135)	84 (418)	
Surgery category			
Hysterectomy: laparoscopic/robotic	14 (20)	12 (61)	<0.001
Hysterectomy: vaginal	9 (13)	4 (21)	
Laparoscopic/robotic surgery	25 (37)	19 (97)	
Vaginal surgery	16 (23)	8 (41)	
Hysteroscopy (diagnostic or operative)	27 (40)	42 (210)	
Suction dilation and curettage	9 (14)	14 (70)	

Abbreviations: kg, kilogram; m, meters.

<sup>a</sup>Data are median (IQR).

to the Grand Rounds recorded presentation also were disseminated to the department via email following the live presentations.

### Postintervention

The same data abstracted from the electronic health record during the preintervention phase were abstracted for the 3 months following the intervention. No patient-reported data were collected.

To ascertain the impact of our intervention on prescribing practices, descriptive analyses compared the preintervention and postintervention samples using *t* testing for continuous variables that were normally distributed, Mann-Whitney U testing for other continuous variables, and chi-square testing for categorical variables. Mann-Whitney U testing compared MMEs prescribed preintervention and postintervention. A *P* value less than 0.05 indicated statistical significance, using SPSS Statistics 26.

Based on findings, a follow-up brief electronic survey queried obstetrics and gynecology resident physicians about the number of opioids, if any, they would prescribe for specific surgical categories.

## RESULTS

During the preintervention phase, responses were received for 20.5% (172/840) of electronic surveys sent to patients. Electronic health records were reviewed for those 172 procedures preintervention, of which 151 (88%) were eligible for inclusion. During the postintervention phase, charts were reviewed for 602 patients undergoing gynecologic procedures, of which 514 (85%) were eligible for inclusion. After outliers and nonsensical survey responses were removed, 146 records were included in preintervention analysis and 500 were included in postintervention analysis. Median

**Table 2.** Opioids Prescribed Versus Consumed, Refills Required, and Patient-Reported Satisfaction With Pain Control

Surgery Category (N = 146)	MME Prescribed Median (IQR)	MME Consumed Median (IQR)	Difference	P value	Refill Required % (n)	Satisfied With Pain % (n)
Hysterectomy: Laparoscopic/Robotic (n=20)	150 (112.5–166.9)	53.75 (15–138.8)	96.25	0.006	10 (2)	80 (16)
Hysterectomy: Vaginal (n=13)	150 (112.5–225)	37.5 (0–75)	112.5	0.010	15 (2)	77 (10)
Laparoscopic/Robotic surgery (n=37)	75 (75–120)	45 (0–105)	30	<0.001	8 (3)	89 (33)
Vaginal Surgery (n=22)	75 (75–142.5)	7.5 (0–71.3)	67.5	<0.001	14 (3)	91 (20)
Hysteroscopy (n=40)	0 (0–0)	0 (0–0)	0	0.734	0 (0)	98 (39)
Suction Dilation and Curettage (n=14)	0 (0–0)	0 (0–0)	0	0.380	0 (0)	86 (12)

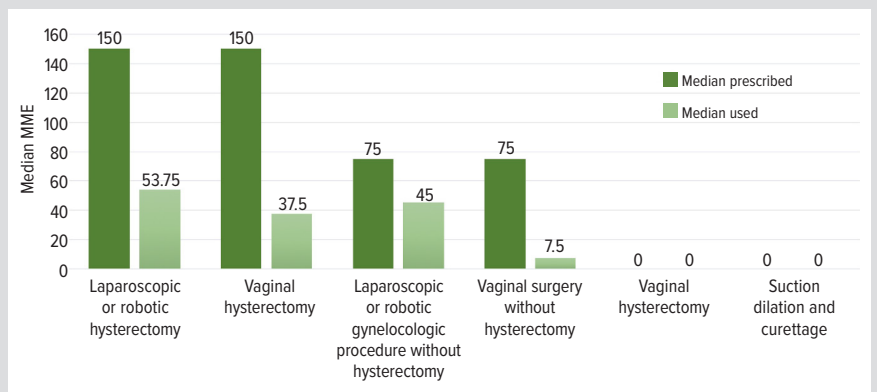
MME: morphine milligram equivalents.

age (39–41 years old) and body mass index (28–29 kg/m<sup>2</sup>) were similar in both samples (Table 1). The most common surgical categories in both samples were hysteroscopy and laparoscopy without hysterectomy. The preintervention sample had significantly more patients who identified as non-Hispanic White and a higher proportion of patients who underwent a vaginal hysterectomy, hysteroscopy, or vaginal surgery without hysterectomy (Table 1).

For the preintervention analysis, the largest quantities of opioids were prescribed for hysterectomy procedures and the smallest for suction D&C or hysteroscopy procedures. The median MME prescribed for both laparoscopic/robotic hysterectomy and vaginal hysterectomy was 150, which is equivalent to 30 tabs containing 5 mg hydrocodone, 20 tabs containing 5 mg oxycodone, or 19 tabs containing 2 mg hydromorphone. Opioids prescribed significantly exceeded opioids consumed for all surgical categories except suction D&C and hysteroscopy (Table 2), with unused opioids ranging from 30 MMEs (4 tabs of oxycodone 5 mg) for laparoscopic or robotic surgery without hysterectomy to 112.5 MMEs (15 tabs of oxycodone 5 mg) for vaginal hysterectomy. The largest differences between MMEs prescribed and consumed were for laparoscopic/robotic hysterectomy and vaginal hysterectomy (Figure 1).

During the preintervention phase, there were 5 opioid prescriptions among 40 hysteroscopy procedures (12.5%) for 37.5 to 50 MMEs, of which 3 patients (60%) took between 7.5 and 15 MMEs

**Figure 1.** Preintervention Median Number of Opioids Prescribed vs Used by Patients



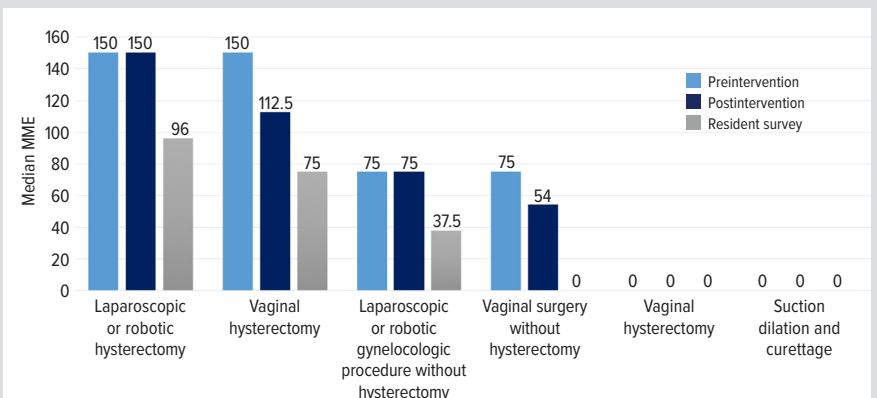
Abbreviation: MME, morphine milligram equivalents.

**Table 3.** Opioids Prescribed Preintervention and Postintervention in Morphine Milligram Equivalents

Surgery Category	Preintervention	Postintervention	Difference	P value
Hysterectomy: laparoscopic/robotic	150 (112.5–166.9)	150 (112.5–150)	0	0.405
Hysterectomy: vaginal	150 (112.5–225)	112.5 (112.5–150)	-37.5	0.059
Laparoscopic/robotic surgery	75 (75–120)	75 (60–80)	0	0.001
Vaginal surgery	75 (75–142.5)	54 (22.5–112.5)	-21	0.020
Hysteroscopy	0 (0–0)	0 (0–0)	0	N/A
Suction dilation and curettage	0 (0–0)	0 (0–0)	0	N/A

Data are reported as median (IQR).

**Figure 2.** Median Morphine Milligram Equivalents Prescribed Preintervention, Postintervention, and Reported on Resident Survey



of their given prescription. For suction D&C, there were 2 opioid prescriptions (37.5 and 75 MMEs) and 1 patient consumed 30 MMEs. Overall, 12% of patients undergoing surgery for which opioids are commonly prescribed required a refill (10/92, excluding hysteroscopy and D&C). Patient-reported satisfaction with pain control was high overall (89%) and ranged from 77% following a vaginal hysterectomy to 98% following hysteroscopy (Table 2).

During the 3 months postintervention, median MMEs prescribed were similar to preintervention levels for all surgical categories. There was a statistically significant decline in prescribing for vaginal surgery without hysterectomy and laparoscopic or robotic surgery without hysterectomy (Table 3, Figure 2). Though the median MME was similar preintervention and postintervention for laparoscopic or robotic surgery without hysterectomy, the spread in the IQR was detected as statistically significant due to the use of the Mann-Whitney U test. During this postintervention phase, there were 9 non-zero opioid prescriptions among 210 hysteroscopy procedures (4%), ranging from 30 MMEs to 225 MMEs. For suction D&C, there were 5 opioid prescriptions out of 70 procedures (7%), ranging from 37.5 MMEs to 150 MMEs.

Based on an observed pattern in our data that prescribing practices varied in correlation with resident rotation changes, we sought to ascertain additional information from residents specifically. In June 2021, 21 out of 27 (77.8%) obstetrics and gynecology residents from all 4 postgraduate years responded to the electronic survey regarding prescribing practices. The median opioid prescription residents reported they would prescribe was 96 (IQR 75–112.5) for laparoscopic or robotic hysterectomy, 75 (IQR 75–112.5) for vaginal hysterectomy, and 37.5 (IQR 37.5–75) for laparoscopic surgery. The median actual opioid prescription for both the preintervention phase (September 2018–March 2019) and postintervention phase (February 2021 – April 2021) was greater than what residents reported they would prescribe, except for hysteroscopy and D&C. Residents responded that they would not prescribe any opioids following a hysteroscopy or D&C. Overall prescribing amounts reported by residents were even lower than the recommendations from the educational intervention (Figure 2).

## DISCUSSION

In this quality improvement study, we found significantly higher amounts of opioids prescribed than patients consumed for the 4 categories of gynecologic surgery (laparoscopic hysterectomy, vaginal hysterectomy, laparoscopy without hysterectomy, and vaginal surgery without hysterectomy) where opioids are routinely prescribed. Opioid prescribing was low overall for hysteroscopy and D&C and aligned with patient need. The vast majority of patients were satisfied with their pain control following all surgeries.

Following the educational intervention, we saw significant reductions in opioids prescribed for laparoscopy without hysterectomy

and vaginal surgery without hysterectomy but not for laparoscopic or vaginal hysterectomies. Although the increased operative time, tissue dissection, and overall surgical complexity of a hysterectomy likely contributes to the increased need for opioids following these procedures, compared to similar routes not involving a hysterectomy, these results differ from a study conducted by Hill et al. In Hill et al's prior work, their educational intervention demonstrating misalignment between prescribing practices and patient need and recommending ideal opioid prescription rates significantly changed prescribing practices for all types of procedures. This difference may be due to our educational intervention not having surgeons distribute a survey form to patients at the time opioids were prescribed, whereas Hill et al had surgeons distribute a 1-page survey when prescribing opiates to patients, which may have served as a reminder to the surgeon of both the study being conducted and the recommended number of opiates to prescribe.

Interestingly, in our subsequent electronic survey of residents, they reported they would prescribe opioid amounts that were even lower than those recommended in the educational intervention and lower than the actual amounts prescribed. This difference warrants further investigation to better understand the factors that influence clinician prescribing.

Of note, the initial prescribing recommendations presented with the January 2021 educational intervention were set to meet 80% of patient need, as calculated based on preintervention patient survey response. These values may exceed emerging best practices in opioid prescribing and were later revised downward.<sup>9,10</sup> For example, based on the preintervention data, the 80th percentile of patient need for vaginal hysterectomy was approximately 120 MME or 16 tablets of oxycodone 5 mg. In comparison, evidence-based guidelines from Michigan's Opioid Prescribing and Engagement Network recommends no more than 10 tablets of oxycodone 5 mg for hysterectomies of any kind, and the Philadelphia Department of Public Health guidelines advise 5 of 5 mg oxycodone with a range of zero to 10 pills.<sup>9,10</sup>

An important factor that influenced our quality improvement initiative was the transition of almost all gynecologic surgery to outpatient as a result of the COVID-19 pandemic. The preintervention phase of this project took place prior to the pandemic when many patients undergoing hysterectomies stayed overnight postoperatively. During the postintervention phase, most patients went home the same day as their hysterectomy, which may have increased the MMEs prescribed by surgeons.

Limitations of our study include the low response rate of the patient survey and the overall small number of surgeries included in the preintervention phase. Voluntary participation could create response bias and alter our outcomes, as responders might be more likely to be those at the extremes of high or low opioid use, but using patient responses enabled us to tailor recommendations

for our patient population. Strengths of this study include the evaluation of opioid prescribing patterns for several major types of gynecological surgery beyond hysterectomies alone, as has been previously studied.<sup>5,6</sup>

We expected larger decreases in MMEs prescribed following our educational intervention, highlighting an opportunity for improvement within our institution and also reflecting a nationwide challenge. In subsequent work, we plan to identify factors that influence prescribing, evaluate the use of nonopioid pain control strategies and their impact on opioid use and patient satisfaction, incorporate data into an Enhanced Recovery After Surgery protocol, and develop and implement more robust interventions to limit opioid prescriptions to align with best practices.

**Funding/Support:** Rachel Craven's work on this project was funded by the Department of Ob/Gyn Start Up funds awarded to Heidi Brown (Department of Obstetrics and Gynecology Start Up Funds, University of Wisconsin School of Medicine and Public Health).

**Financial Disclosures:** None declared.

---

## REFERENCES

1. Centers for Disease Control and Prevention. Annual surveillance report of drug-related risks and outcomes — United States surveillance special report, 2019. November 1, 2019. Accessed February 2021. <https://www.cdc.gov/drugoverdose/pdf/pubs/2019-cdc-drug-surveillance-report.pdf>
2. Centers for Disease Control and Prevention. Understanding drug overdoses and death. Updated May 8, 2023. Accessed February 20, 2021. <https://www.cdc.gov/drugoverdose/epidemic/index.html>
3. National Institute on Drug Abuse. Drug overdose death. Updated June 30, 2023. Accessed October 10, 2022. <https://nida.nih.gov/research-topics/trends-statistics/overdose-death-rates>
4. Bicket MC, Long JJ, Pronovost PJ, Alexander GC, Wu CL. Prescription opioid analgesics commonly unused after surgery: a systematic review. *JAMA Surg.* 2017;152(11):1066-1071. doi:10.1001/jamasurg.2017.0831
5. Griffith KC, Clark NV, Zuckerman AL, Ferzandi TR, Wright KN. Opioid prescription and patient use after gynecologic procedures: a survey of patients and providers. *J Minim Invasive Gynecol.* 2018;25(4):684-688. doi:10.1016/j.jmig.2017.11.005
6. As-Sanie S, Till SR, Mowers EL, et al. Opioid prescribing patterns, patient use, and postoperative pain after hysterectomy for benign indications. *Obstet Gynecol.* 2017;130(6):1261-1268. doi:10.1097/AOG.0000000000002344
7. Hill MV, McMahon ML, Stucke RS, Barth RJ Jr. Wide variation and excessive dosage of opioid prescriptions for common general surgical procedures. *Ann Surg.* 2017;265(4):709-714. doi:10.1097/SLA.0000000000001993
8. Hill MV, Stucke RS, McMahon ML, Beeman JL, Barth RJ Jr. An educational intervention decreases opioid prescribing after general surgical operations. *Ann Surg.* 2018;267(3):468-472. doi:10.1097/SLA.0000000000002198
9. OPEN: Opioid Prescribing Engagement Network. Adult prescribing recommendations. 2022. Accessed January 27, 2023. <https://michigan-open.org/wp-content/uploads/2022/02/All-Adult-Prescribing-Recs.pdf>
10. Department of Public Health, City of Philadelphia. Opioid prescribing guidelines for OB/GYNS. 2020. Accessed February 9, 2023. [https://www.phila.gov/media/20200612125439/OpioidPrescribingGuidelines-OBGYNS\\_FinalSinglePage.pdf](https://www.phila.gov/media/20200612125439/OpioidPrescribingGuidelines-OBGYNS_FinalSinglePage.pdf)

advancing the art & science of medicine in the midwest

**WMJ**

*WMJ* (ISSN 1098-1861) is published through a collaboration between The Medical College of Wisconsin and The University of Wisconsin School of Medicine and Public Health. The mission of *WMJ* is to provide an opportunity to publish original research, case reports, review articles, and essays about current medical and public health issues.

© 2024 Board of Regents of the University of Wisconsin System and The Medical College of Wisconsin, Inc.

**Visit [www.wmjonline.org](http://www.wmjonline.org) to learn more.**