Ambulatory Surgery Postoperative Initial Outpatient Prescription Pain Management Patterns and Trends, United States, 2021-2025

Robin Mathew[1], Saumitra Rege[1], Joshua N Liberman[2], Xiaoyun Yang[2], Lusine Navoyan[1], Jonathan D Darer[2], Daniel Budnitz[1], Charles Ruetsch[2], Alankar Gupta[1]
[1]Kenvue Brands LLC, Fort Washington, PA; [2]Health Analytics LLC, Ellicott City, MD

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Introduction

Postoperative opioid stewardship is a national priority, supported by recommendations for multimodal analgesia and reduced opioid exposure[1,2].

Data on whether these efforts have meaningfully changed prescribing after ambulatory surgery have been limited.

This retrospective study used U. S. medical and pharmacy claims to analyze analgesic prescription fills following 6 common ambulatory surgical procedures from 2021 to 2025.

Objective

To characterize temporal trends in postoperative opioid and non-opioid prescription fills, including average daily morphine milligram equivalents (MME), following selected ambulatory surgical procedures in the United States from 2021 to 2025.

Methods

Study Design: Retrospective cross-sectional study.

Data Source: Inovalon U.S. medical and pharmacy insurance claims.

Qualifying Ambulatory Surgical Procedures: laparoscopic cholecystectomy, laparoscopic hernia repair (cholecystectomy and hernia repair hereafter), knee arthroscopy, hysterectomy, bunionectomy, or tubal ligation.

Eligibility: Adults discharged home following a qualifying ambulatory surgical procedure during the Patient Identification Period. Only the first qualifying ambulatory surgical procedure during the Patient Identification Period was included.

Study Periods

Patient Identification Period: October 1, 2021, through June 16, 2025; Index: Date of qualifying ambulatory surgical procedure; Preoperative: -14 days to Index; Discharge: Index (day 0) to day 1); Follow Up: Days 2 to 14.

Year-over-year time periods: 2021/2022 (October 1, 2021 – June 30, 2022), 2022/2023 (July 1, 2022 – June 30, 3023); 2023/2024 (July 1, 2023 – June 30, 2024); 2024/2025 (July 1, 2024 – June 16, 2025)

Data Management and Analysis

Prescription analgesic fills were categorized as opioid-containing (including opioid only and opioid/non-opioid combinations) and non-opioid only, inclusive of numerous classes with analgesic properties (e.g., NSAIDs, acetaminophen, gabapentin, others).

Preoperative and Discharge analgesic fills ("initial") were assumed to be for outpatient pain management following discharge.

Annual trends of initial opioid intensity using morphine milligram equivalents (MME) were assessed by ordinary least squares regression and non-opioid use were analyzed using Cochran-Armitage test for trend.

The protocol received an exempt determination from Advarra IRB.

Results

Figure 1. Study Population by Surgical Procedure

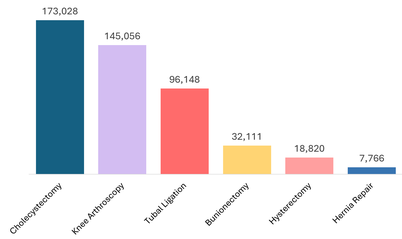


Figure 2. Initial Opioid Fill Rates by Procedure

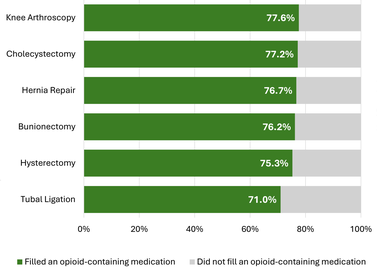
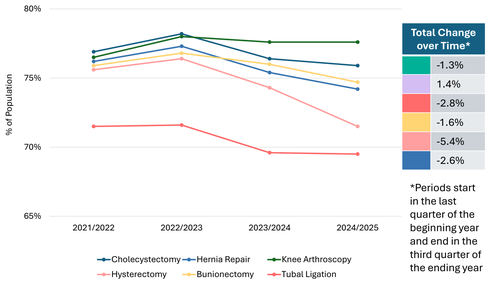
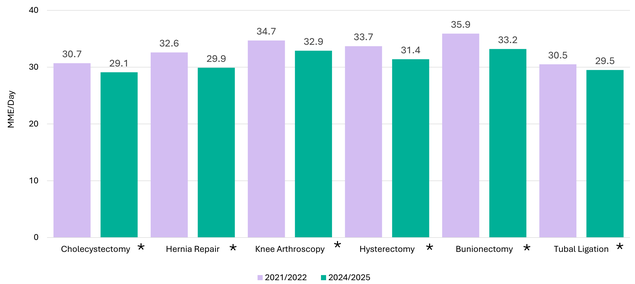


Figure 3. Percent Receiving an Opioid during Initial Period, 2021-2025



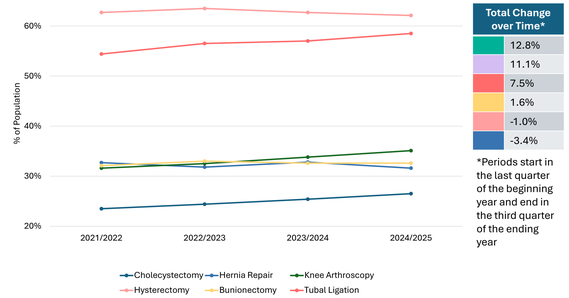
*Periods start in the last quarter of the beginning year and end in the third quarter of the ending year

Figure 4. Mean Opioid Intensity (MME/Day): 2021 through 2025



*p<0.05 for comparisons of MME in 2021 vs 2025 for all surgical procedures.

Figure 5. Percent Receiving a Non-Opioid during Initial Period, 2021-2025



*Periods start in the last quarter of the beginning year and end in the third quarter of the ending year

Among the 472,929 eligible individuals, most (51.5%) were insured commercially, followed by Medicaid (42.3%), Medicare Advantage (4.6%), and other (1.6%). The most common procedure was laparoscopic cholecystectomy (173,028) followed by knee arthroscopy (145,056) (Figure 1). During initial period, opioid-containing and non-opioid medications were filled by 75.9% and 36.0% of the total surgical population, with 6.5% filling only a non-opioid medication. The highest opioid fill rate was among knee arthroscopy (77.6%) followed by cholecystectomy (77.2%), hernia repair (76.7%) (Figure 2). The most common opioid-containing medications filled during the Initial period were hydrocodone/acetaminophen (47.1%), oxycodone (21.3%), and oxycodone/APAP (17.2%). The most common non-opioid only medications were ibuprofen (51.1%), gabapentin (13.0%), and acetaminophen (10.6%).

Across the study period, year-over-year fill rates for opioid-containing medications declined in the laparoscopic cholecystectomy (76.8% to 75.9%), hysterectomy (75.5% to 71.9%), and tubal ligation (71.6% to 69.5%) groups and increased in the knee arthroscopy group (76.5% to 77.6%) (all $p<0.05$) (Figure 3). Mean MME/day declined significantly across all surgical procedures (from 33 to 31; $p<0.05$), with statistically significant reductions in each surgical groups (Figure 4). Across the study period, year-over-year fill rates for non-opioid only medications increased following laparoscopic cholecystectomy (12.8%), knee arthroscopy (11.1%), and tubal ligation (7.5%) (all $p<0.05$) (Figure 5).

Conclusions

Opioid-containing prescription fill rates remained high and changed only modestly over study period, while mean prescribed MME/day showed statistically significant declines for each of the six surgical procedures.

Non-opioid only fills showed statistically significant increases for laparoscopic cholecystectomy, knee arthroscopy and tubal ligation.

Further research is warranted to evaluate the use of OTC non-opioid analgesics, other components of multimodal pain relief, and patient- and provider- reported outcomes in ambulatory surgical pain management.

Limitations

Over-the-counter analgesics are not captured; prescription nonopioid-only filling is not equivalent to nonopioid-only treatment, and the use of OTC Acetaminophen and NSAIDs are not included in these analyses based on prescription fills.

Administrative pharmacy claims measure filled prescriptions, not patient use, adequacy of pain relief, patient satisfaction, leftover medication, or clinical appropriateness.

The nonopioid prescription group includes pharmacologically and clinically heterogeneous classes.

Analyses are unadjusted for case mix, payer, geography, provider, and health system type, which may limit generalizability.

Analysis included only the first surgical procedure in the study period and does not include any potential subsequent procedures.

References

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2. Buonora, M. J., Heckmann, R., Starrels, J. L., Ahadpour, M., Hevesi, S. A., Ross, J. S., & Jeffery, M. M. (2026). Short-Term and Long-Term Opioid Prescribing by Specialty, 2010 to 2024. *JAMA Network Open*, 9(7), e2622016.

Disclosures

R Mathew, S Rege, L Navoyan, D Budnitz, and A Gupta are employees of Kenvue Brands LLC.
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