Pennsylvania New Jersey Surgical Opioid Stewardship Collaborative

Executive Data Report
August 2024

Health Care Improvement Foundation

About HCIF

The Health Care Improvement Foundation (HCIF) is an independent nonprofit organization, based in Philadelphia, dedicated to the vision of healthier communities through equitable, accessible, and quality health care. Increasingly, health care requires cooperation and collaboration among many partners. HCIF brings together hospitals, health systems, community-based organizations, payors, and a variety of other partners to overcome silos in working towards high quality care that fulfills the needs of patients, families, and communities in achieving optimal health.

Learn more, visit our websites:

- Health Care Improvement Foundation: https://hcifonline.org/
- PENNJ-SOS: https://hcifonline.org/program/pennsylvania-new-jersey-surgical-opioid-stewardship/

Program Overview

The Pennsylvania New Jersey Surgical Opioid Stewardship (PENNJ-SOS) program was a multi-year collaborative of surgeons and surgical teams dedicated to developing and implementing strategies to prevent opioid use disorder while effectively managing post-operative pain. With funding from the Cencora Foundation (formerly Amerisource Bergen Foundation), PENNJ-SOS was launched in 2018, mirroring two other regional collaboratives - University of Michigan's Overdose Prevention Engagement Network (OPEN) and the Illinois Surgical Quality Improvement Collaborative (ISQIC), to address the alarming increase in overdose deaths – at that time, Pennsylvania and New Jersey were ranked by the CDC with the fourth and seventh highest rates of overdose deaths in the country [i].

Led by a Steering Committee comprised of surgeons, nurses, and quality and patient safety experts, PENNJ-SOS was one of the few programs of its kind in the nation to focus on surgical opioid stewardship across multiple states and hospital systems, inclusive of multidisciplinary surgical teams.

Additionally, Steering Committee members served as leaders on the Pennsylvania National Surgical Quality Improvement Program Consortium (PANC), a voluntary association of 14 medical centers across both Pennsylvania and New Jersey, led by surgeons, clinical trainees and nursing students, surgical clinical reviewers (SCRs), and quality improvement team members. PANC focuses on sharing data and best practices, identifying quality improvement opportunities, initiating quality improvement programs and measuring performance aimed at enhancing surgical patient outcomes. Prior to collaborating with PENNJ-SOS, PANC had begun directing attention towards the opioid crisis, and its connection to surgery. By leveraging existing collaboration among surgical departments at participating medical centers, PENNJ-SOS united these organizations around the common goal of sustainable and safe surgical opioid stewardship.

Steering Committee

- Scott W. Cowan, MD, FACS: Jefferson Health
- Kelly Gemmill, BA, RN: WellSpan Health
- Kristin Noonan, MD: Jefferson Health, Jefferson Abington Hospital
- Matthew Philp, MD: Temple Health, Lewis Katz School of Medicine at Temple University
- Henry A. Pitt, MD: Rutgers Cancer Institute of New Jersey, Robert Wood Johnson University Hospital
- Christine Schleider, BSN, CNOR: Jefferson Health, Thomas Jefferson University

References
[i] https://www.cdc.gov/nchs/pressroom/sosmap/drug_poisoning_mortality/drug_poisoning.htm

Program Components

PENNJ-SOS featured several key program components described below.

Patient & Provider Education

PENNJ-SOS produced and disseminated educational materials for both patients and providers. According to baseline survey results in 2019, nearly 1/3 of participating hospitals did not have opioid specific educational materials for patients and families, and approximately 20% did not have opioid-specific educational materials for surgeons and advanced providers. To fill this gap, the program developed educational resources through a multi-media approach:

- Podcast: Produced a seven-part podcast series entitled “Opioid Conversations with Surgeons” featuring interviews and interactive discussions with patients, surgeons, surgical nurses and surgical residents.
- Webinars: Hosted 8 educational webinars (featuring topics such as technological innovations in opioid prescribing practices, health literacy in surgery and opioid stewardship, opioid alternatives and multi-modal pain management, and the intersection of social determinants of health and surgical outcomes). Engaged a number of nationally recognized surgeons and subject matter experts, exposing collaborative teams to the latest evidence and promising innovations in surgical care.
- Surgery-specific patient education video with narration and captions in English and Spanish
- Patient-facing print materials developed in collaboration with two patient and family advisory councils (Temple University Hospital and Fox Chase Cancer Center), covering key topics related to patient’s surgical experience such as managing pain after surgery, questions to ask your surgeon about surgery and medication, information about taking opioids and how to safely get rid of unused medication. Materials were translated into seven languages, based on input from PANC members as the most common languages spoken by their patient populations (Arabic, Chinese, English, Korean, Russian. Spanish, and Vietnamese).
- Provider-facing education toolkit specific to opioid surgical stewardship, addressing preoperative expectation setting, screening and assessment, intraoperative and postoperative utilization of non-opioid alternatives, adoption of procedure-specific opioid prescribing guidelines, discharge management, and disposal resources.
- Quarterly PANC meetings which served as collaborative opportunities to share data and best practices, identify and initiate quality improvement programs, and measure performance aimed at enhancing surgical patient outcomes.

Program Components - Continued

Measurement & Monitoring

To evaluate quality improvement activities and outcomes, PENNJ-SOS developed nine custom data fields, which were added to the American College of Surgeons' National Surgical Quality Improvement Program (NSQIP) database for hospitals participating in this program. These measured key surgical quality and opioid stewardship variables across 12 surgical procedures. Data were collected over a four-year time period (September 2019-August 2023). During this time, 15 hospitals, across both Pennsylvania and New Jersey, collected data, with eight hospitals reporting throughout the full time period.

In 2021, a variable tracking preoperative anti-depressant prescriptions was added to the database to expand on the program's understanding of prescribing practices and patient outcomes. In 2024, the American College of Surgeons adopted new opioid-related variables into their national database following the lead of Michigan's OPEN, ISQIC and PENNJ-SOS.

To monitor performance, hospitals received individual benchmarking reports on an annual basis. Results and outcomes from this data collection can be found on pages 7-15.

Summary of Data Findings

Demographics

Among 18,325 surgeries, the mean patient age was 57.4 years; 54% were women; 67% were White; 23% were Black; and 8% were Hispanic. The most common surgeries were colectomies and ventral hernia repairs (15.7% and 15.9%, respectively). Full demographics can be found in the table on page 9.

Preoperative Opioid Prescriptions

Over the four-year period in which data were gathered, the percent of patients taking opioids preoperatively decreased from 18.9% to 9.8% (Figure 1), representing a 48% decrease and was clinically significant ($p<0.001$). This decrease was observed across 10 of the 11 types of surgeries. It should be noted that 15% of patients had a documented preoperative diagnosis compatible with opioid use, such as a diagnosis of fibromyalgia, chronic pain syndrome and substance use disorder. Also, the overall mean preoperative daily morphine milligram equivalent (MME) remained relatively unchanged, from 11 to 12 (Figure 2). MMEs are values that represent the potency of an opioid dose relative to morphine. MME is intended to help clinicians make safe, appropriate decisions concerning changes to opioid regimens.

Intraoperative Blocks

The utilization of intraoperative blocks increased from 20.4% to 24.9% (Figure 3), representing a 22% increase and was clinically significant ($p<0.001$). An intraoperative block, also known as “nerve blocks”, is the injection of numbing medication (local anesthetic) near specific nerves to decrease pain in a certain part of a patient’s body during and after surgery. Blocks can decrease pain during and after surgery, resulting in decreased need for pain medication. This change was observed for eight surgery types (73% of surgery types) - appendectomy, cholecystectomy, colectomy, hysterectomy/myomectomy, inguinal hernia, nephrectomy, spine, and ventral hernia, and was clinically significant ($p<0.001$) for cholecystectomy, nephrectomy, and ventral hernia.

Intraoperative Opioids

The use of intraoperative opioids remained consistent, from 97.5% to 98.2% (Figure 4), with decreases observed in two surgery types (nephrectomy and total knee arthroplasty), while remaining stable in seven surgery types.

Multimodal Pain Management

The utilization of multimodal pain management remained relatively unchanged through this time period, from 69.9% to 68.6% (Figure 5). However, increased utilization was observed in six surgery types (55% of surgery types) (cholecystectomy, inguinal hernia, lower extremity, nephrectomy, total knee arthroplasty, and ventral hernia). Multimodal pain management refers to use of non-opioid pain relievers to reduce opioid-related side effects. This variable was selected when a multimodal (2 or more medications) approach to pain management was used in the perioperative phase of care (preoperative, intraoperative period, and/or postoperative).

Summary of Data Findings - Continued

Postoperative Opioid Prescriptions

Postoperative opioid prescriptions increased over this time period, from 72.0% to 78.3% (Figure 6), representing a 9% increase. However, decreases were observed in three surgery types (hysterectomy/myomectomy, lower extremity, and ventral hernia). Also, the overall mean daily morphine milligram equivalent (MME) decreased from 36 to 33, (Figure 7), representing a 8% decrease, with clinically significant ($p<0.001$) decreases observed in one surgery type - inguinal hernia.

Conclusion

Overall, there was some improvement at the procedure and aggregate level for some measures. One measure where there wasn't improvement at the aggregate level was with postoperative opioid prescriptions. As previously indicated, PANC member hospitals initiated efforts to reduce the use of surgically related opioids prior to the launch of PENNJ-SOS data collection in September 2019, which may explain why more improvement was not observed. One notable finding was the decrease in the percent of patients taking opioids preoperatively. Although PENNJ-SOS had no influence in this finding, it points to the national shifts in prescribing practices. Additionally, these results show that the commitment to surgical opioid stewardship was maintained throughout the four-year course of data collection, which included the COVID-19 pandemic.

These findings indicate continued need for surgical opioid stewardship as it relates to intra- and postoperative use of opioids. The adoption of opioid variables used in PENNJ-SOS (as well as the Michigan and Illinois surgical improvement programs) by the American College of Surgeon's NSQIP registry demonstrates the value of measurement on a national scale and should further bolster surgical opioid efforts and research.

The PENNJ-SOS program played a key role in combatting the opioid crisis, specifically by working together to impact over-utilization of perioperative opioids and to provide education for a diverse patient population about post-surgical pain management without the use of opioids.

Data Analysis

Methodology

Between 9/1/2019 and 8/31/23, data were gathered on preoperative opioid use, intraoperative opioids and blocks, opioid avoidance strategies and discharge opioid prescriptions across 12 surgeries. Data were grouped into eight 6-month periods. Only cases with non-missing values were included. Cochran Armitage Trend and Wald Tests were utilized with p values <0.001 considered significant. Inclusion criteria are defined in an operations manual to ensure high quality data collection. Initial analysis of PENNJ-SOS data was performed by the American College of Surgeons (ACS). Due to transitions with hospitals departing and joining the collaborative at different time periods, there is some variation in data collection over the course of 4 years.

Patient Demographics

Additional graphs can be found on page 10.

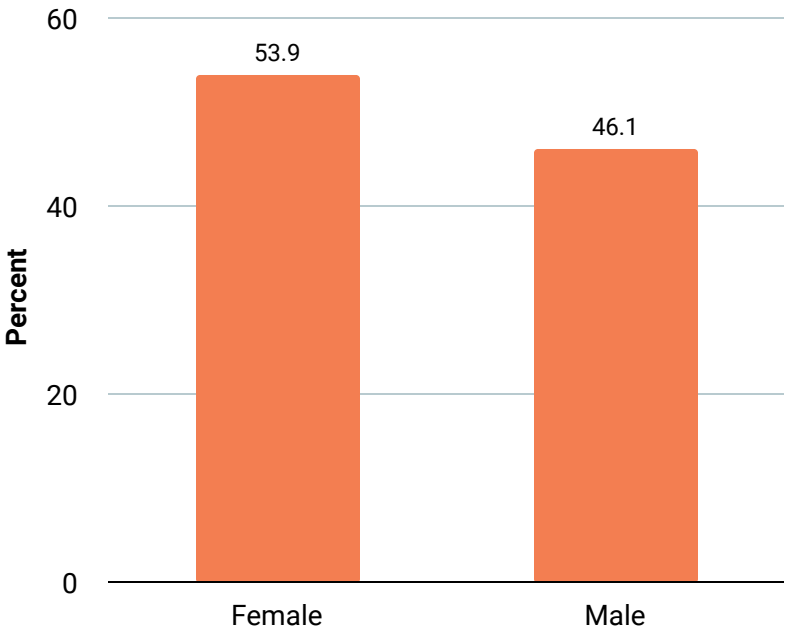
	Count	Percent
Sex		
Female	9,870	53.9%
Male	8,453	46.1%
Race		
White	12,238	66.8%
Black or African American	4,241	23.1%
Unknown/Not Reported	767	4.2%
Asian	558	3.1%
Another Race	448	2.5%
Race combinations with low frequency	31	0.2%
Native Hawaiian or Pacific Islander	16	0.1%
American Indian or Alaska Native	26	0.1%
Ethnicity		
Hispanic	1,445	7.9%
Non-Hispanic	16,391	89.5%

Mean Patient Age	Youngest	Oldest
57	18	90

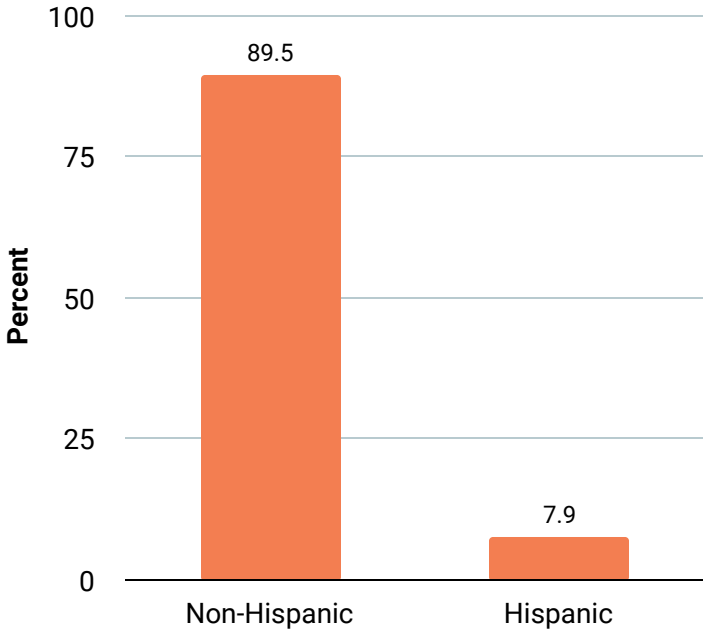
Data Analysis

Patient Demographics

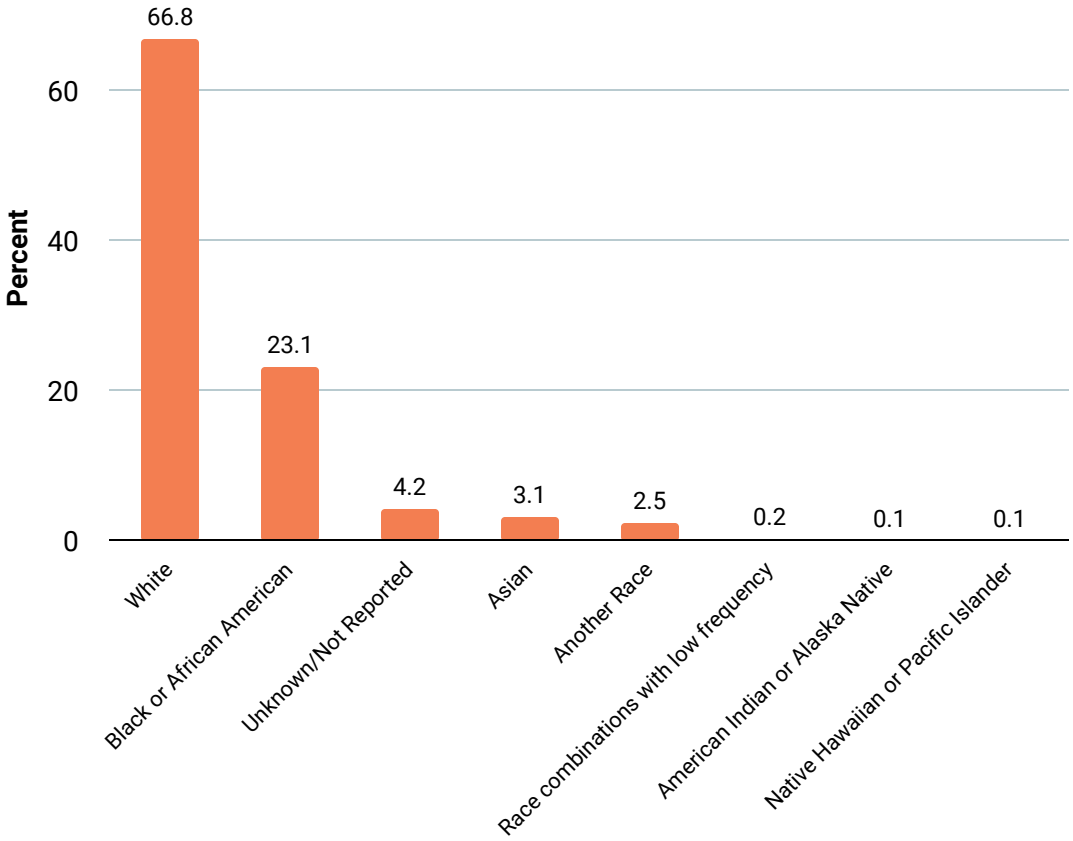
Sex



Ethnicity



Race



Data Analysis

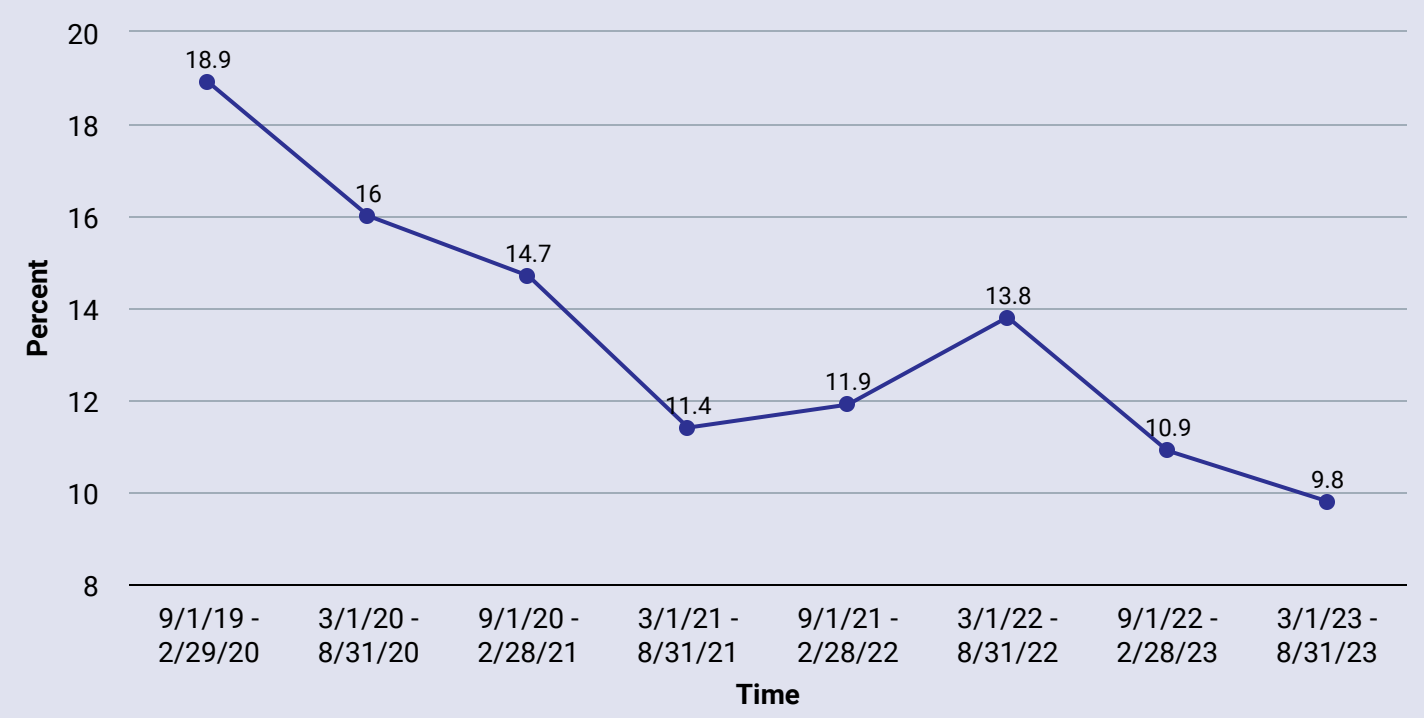
Case Volume

Surgery	Count	Percent
General Procedures		
Ventral Hernia Repair	2,917	15.9%
Colectomy	2,876	15.7%
Cholecystectomy	1,738	9.5%
Inguinal Hernia Repair	1,526	8.3%
Appendectomy	1,176	6.4%
Pancreatectomy*	595	3.3%
Gynecology		
Hysterectomy/Myomectomy	1,822	9.9%
Orthopedics		
Total Knee Arthroplasty	1,060	5.8%
Total Hip Arthroplasty	1,070	5.8%
Neurosurgery		
Spine	1,993	10.9%
Urology		
Nephrectomy	1,018	5.6%
Vascular		
Lower Extremity Bypass	534	2.9%
Total	**18,325**	

*All procedures, other than pancreatectomies, were tracked across all four years; pancreatectomies were tracked starting September 2020 and are excluded from the data analysis.

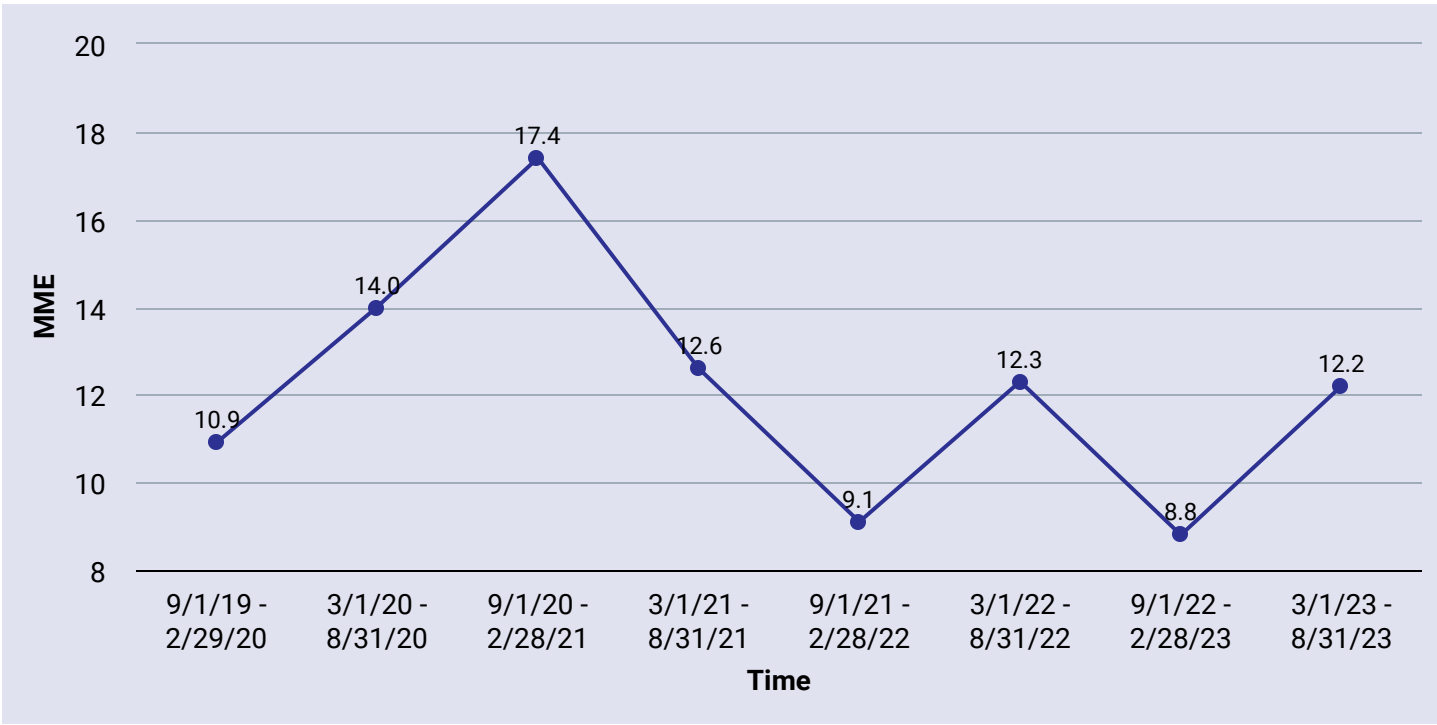
Results

Figure 1: Patients with a Preoperative Opioid Prescription (within 6 months of surgery)



Trend P-value: p<0.001, statistically significant

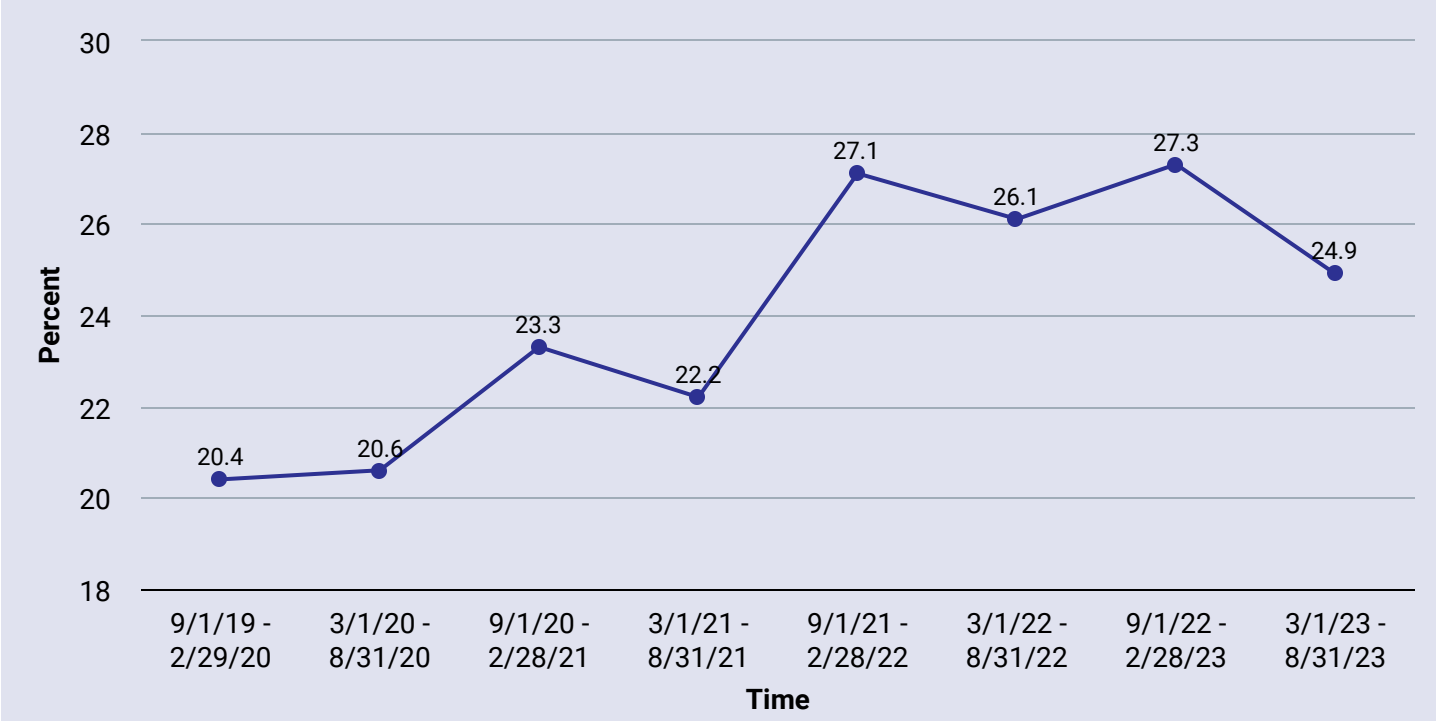
Figure 2: Preoperative Daily Dose Opioid MME



Trend P-value: Not statistically significant (NS)

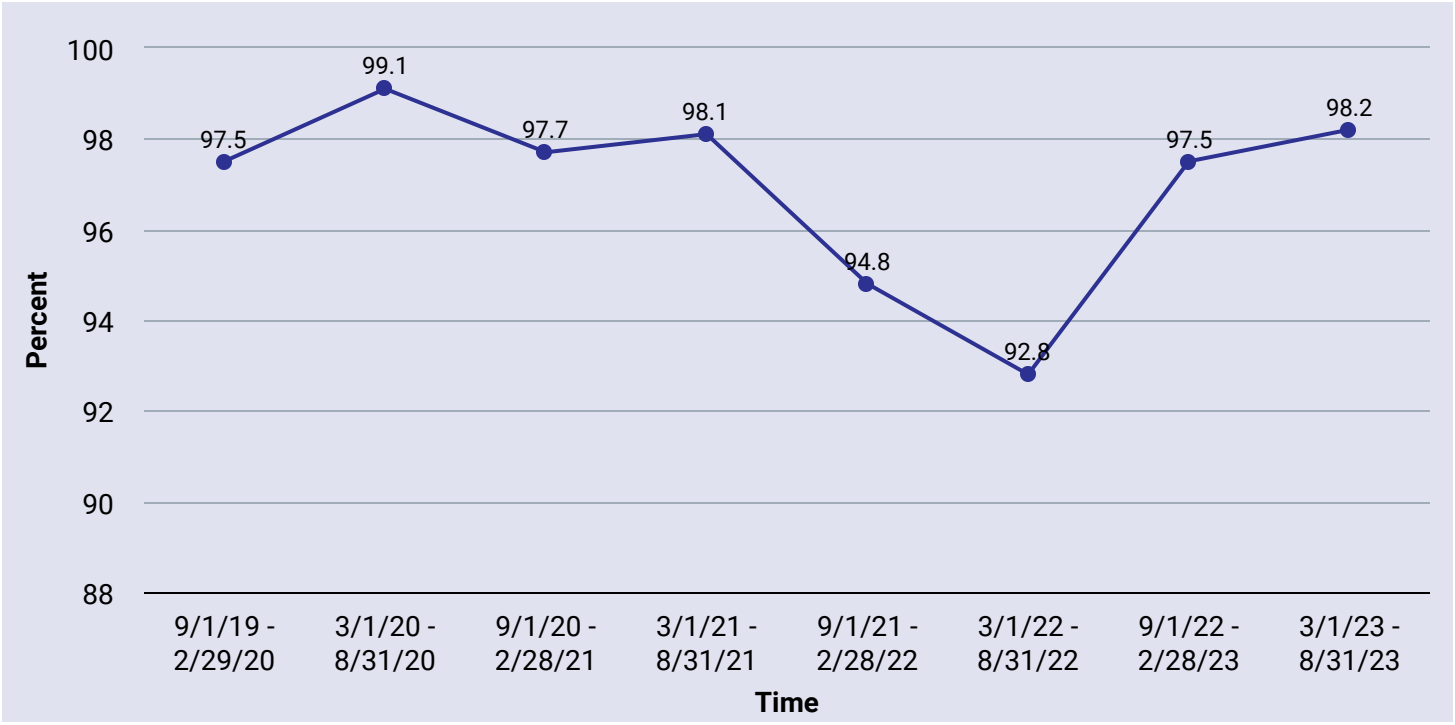
Results

Figure 3: Surgeries which Utilized Intraoperative Blocks



Trend P-value: p<0.001 aggregate & cholecystectomy, nephrectomy, and ventral hernia

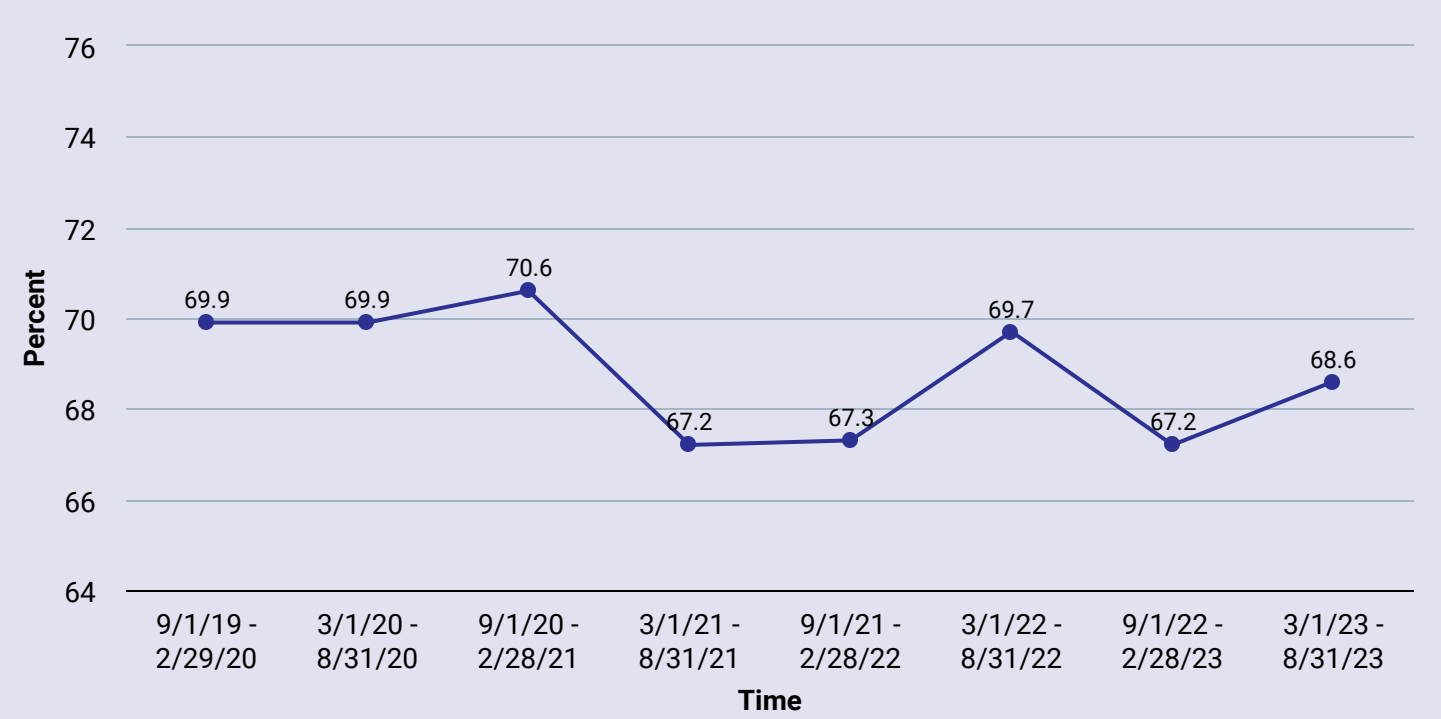
Figure 4: Surgeries which Utilized Intraoperative Opioids



Trend P-value: NS

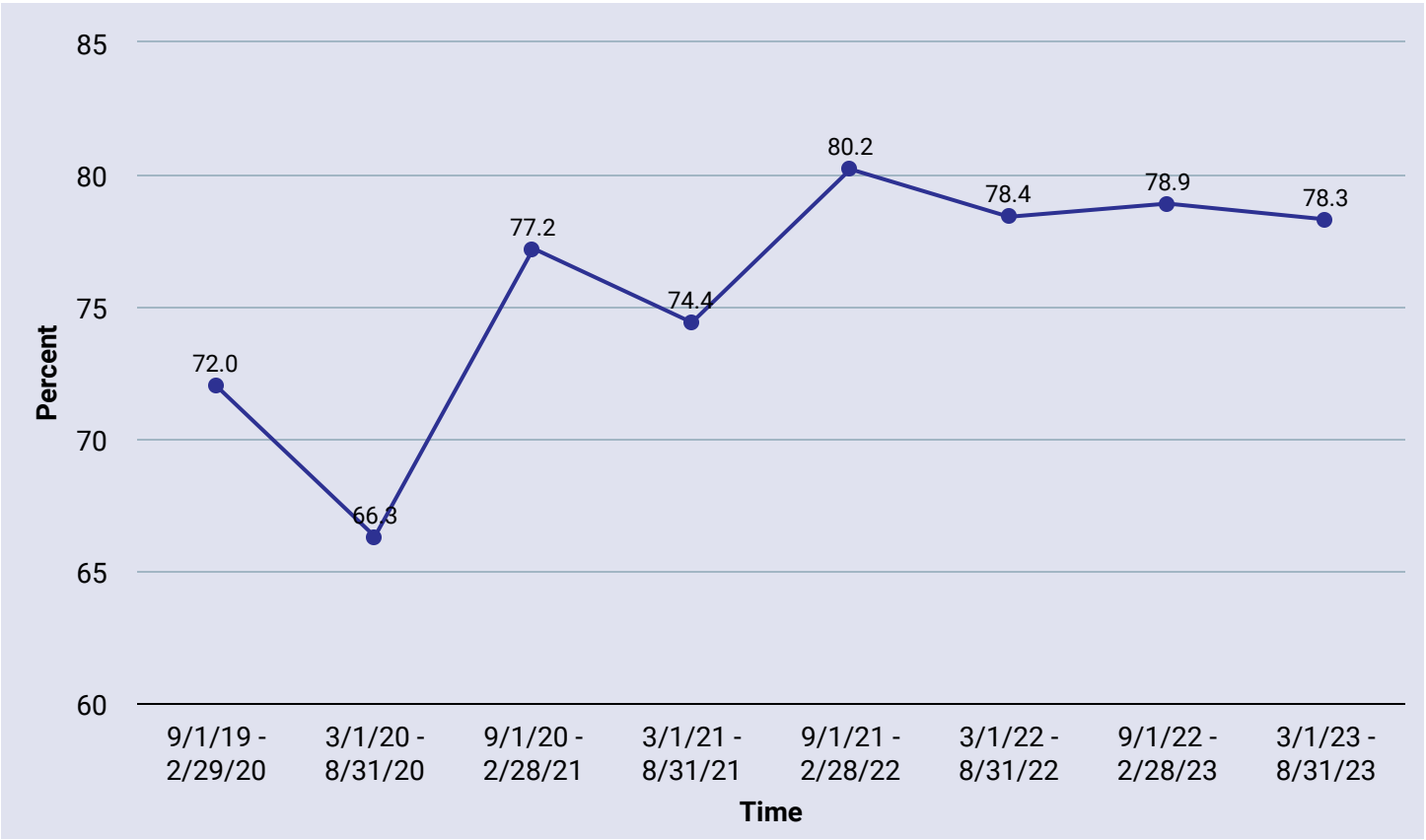
Results

Figure 5: Surgeries which Utilized Multi-Modal Pain Management



Trend P-value: NS

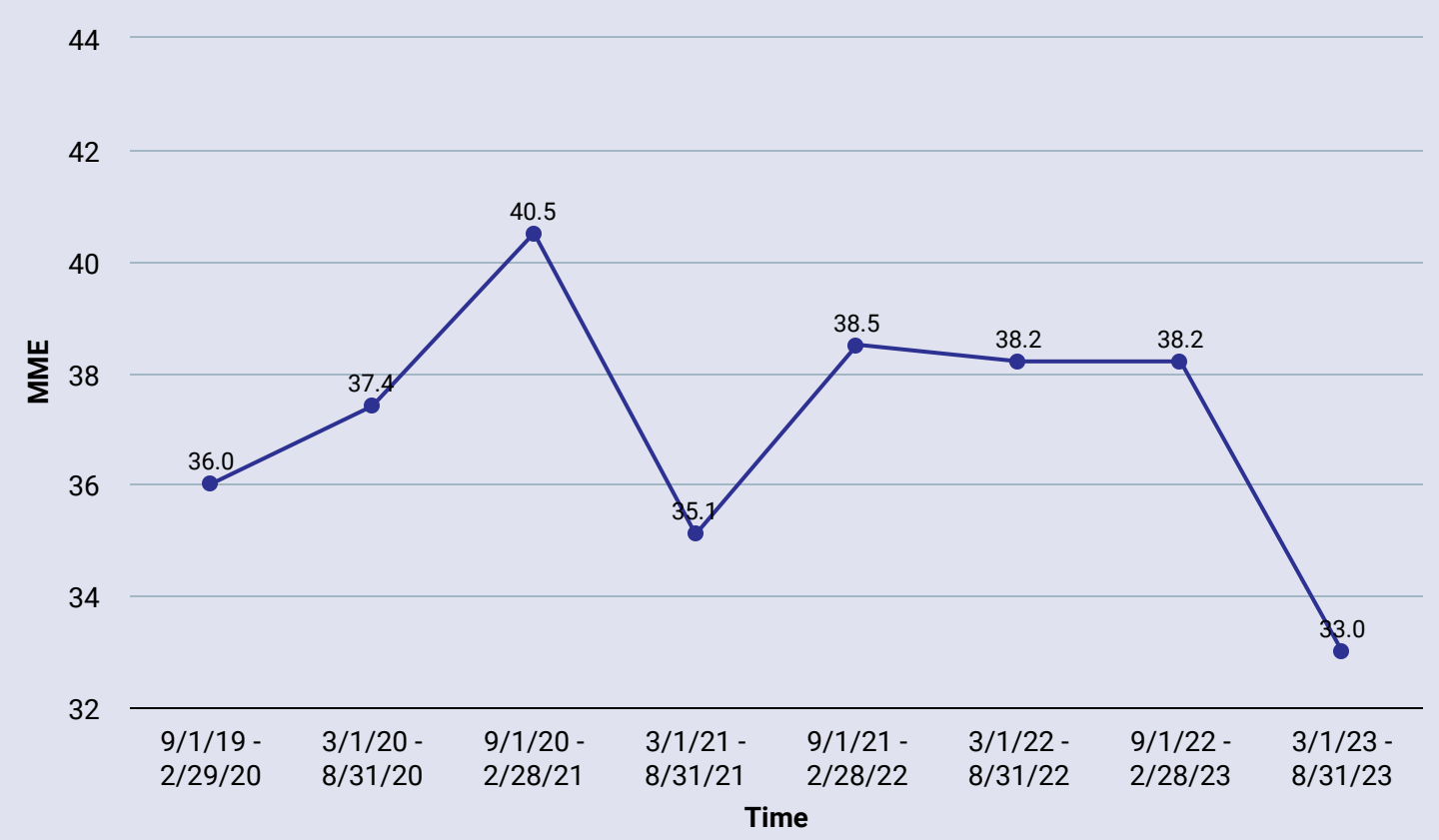
Figure 6: Patients who Received Opioid Prescription at Discharge



Trend P-value: NS

Results

Figure 7: Postoperative Daily Dose Opioid MME



Trend P-value: NS for aggregate surgeries; p<0.001 inguinal hernia

Acknowledgements

Special thanks to the following:

- PENNJ-SOS Steering Committee
- American College of Surgeons and the National Surgical Quality Improvement Program
- Cencora Impact Foundation
- Participating hospitals and health systems
- Data support from Sourav Podder, MD and Scott Koeneman, PhD of Thomas Jefferson University
- Dana Filippoli, MBE, MBE
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  - Pamela Braun, BSN, MSN
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