

ICSI Opioid Postoperative Prescribing Toolkit

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ICSI Postoperative Opioid Prescribing Improvement Initiative

A collaborative Minnesota healthcare success story

Over the course of the past three years ICSI has convened a group of Minnesota surgeons eager to develop a more patient-centered, procedure-specific approach to postoperative opioid prescriptions. One goal was to reduce the risk for addiction among postoperative patients while still providing effective pain management by creating recommendations that could a) reduce the variation among surgeons prescribing for identical procedures and b) provide evidence-based guidance for improving postoperative opioid prescribing practices across many different surgical procedures.

The Postoperative Opioid Prescribing initiative includes a workgroup of surgeons who gathered monthly to create new recommendations regarding the dosage and amount of opioids prescribed after surgical procedures. Recommendations were made based on the procedure, patient history, current evidence-based research and other proven practices. Changes were suggested and subsequently implemented with a specific focus on improving patient care while reaching new, lower benchmarks for opioid prescriptions.

Results

The initiative has shown that by focusing on improvements one procedure at a time, significant progress can be made toward safer opioid prescribing. In fact, data from healthcare claims across the state of Minnesota demonstrates that this work has contributed immensely to safer prescribing practices including:

- › A state-wide 43% decrease in the average postoperative discharge opioid dose between 2016 and 2019.
- › During a four-month cohort effort significant decreases in MME prescribed for orthopedics (-45%), podiatry (-33%) and spine (-52%) surgeries.

Along with reducing the risk of addiction, patient experiences were improved by reducing pain and adverse effects of the medication.

The following document contains the recommendations developed by the workgroup and which aided them in achieving these results. More detail on specific results for specific procedures can be found in the ICSI Postoperative Opioid Prescribing Improvement Story.

This initiative proves that when healthcare providers collaborate and share best practices, the health of not only our patients, but also our communities can be improved dramatically.

About ICSI

The Institute for Clinical Systems Improvement has been a trusted influencer in healthcare for over 25 years. As ICSI, healthcare leaders work together to find solutions to healthcare's toughest challenges, initiating positive change and improving health outcomes. ICSI is an independent, objective non-profit organization with one clear goal – improving health together. ICSI has supported healthcare improvement with evidence-based guidelines and implementation science, for collective impact in our region.

ICSI convened the MN Health Collaborative partners who worked together to create and adopt the following postoperative opioid prescribing practices to manage pain safely and effectively:

- › Educate patients about pain and opioids
- › Explore non-opioid solutions first
- › Prescribe the lowest opioid dose possible

MN Health Collaborative members are changing the community of practice, designing practical, evidence-based and innovative approaches to shared problems. The Collaborative recommendations provide procedure-specific, patient-centric guidance to help prevent over-prescribing of opioids while still effectively managing pain.

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How to Use this Toolkit:

The ICSI Postoperative Toolkit, based on improvement and implementation science, is focused specifically on the initial postoperative discharge and post-acute phase of opioid prescribing. It does not cover pain management while inpatient or in recovery. The toolkit can be used by the surgical team to improve safe opioid prescribing. It is designed as a companion document to the ICSI Opioid Prescribing Improvement Guide, 2020, available at www.icsi.org/opioid.

The ICSI Opioid Prescribing Improvement Guide is designed to help individual prescribers build safer opioid prescribing habits and help organizations build systems that support opioid prescribing practices. The overall goal is to decrease harms from acute and long-term opioid use, including overdose and death. The ICSI Opioid Prescribing Improvement Guide can be used by prescribers to demonstrate and document their quality improvement work. Please refer to this guide for a more in-depth assessment of your practice and improvement suggestions.

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Introduction

Changing current postoperative prescription standards is a critical step to ensure that patients do not receive more pills than necessary for pain management.

Overprescribing opioids may lead to side effects and potential dependence for some individuals. Surplus opioid medications also increase the risk of these drugs being diverted from intended use and distributed illegally within the community.

To combat these potential problems, surgeons within the MN Health Collaborative, convened by ICSI, took action together to balance reductions in the amount of opioid pain medication prescribed while maintaining a patient-centered approach to pain management.

Developed in part as an answer to the lack of evidence-based guidelines for postoperative opioid use, the approach used by the Collaborative surgeons is based on available literature, expert consensus and community data relevant to the effort.

We believe this work will provide a clearer determination of the varying pain management needs required by different surgical procedures. This effort will help support a significant need to develop more patient-centered prescribing practices where opioids are needed for pain management.

The goal of these prescribing recommendations is to provide postoperative pain management that is procedure-specific and more effectively tailored to the individual patient's need.

Background and Principles

The ICSI Collaborative recommendations provide guidance for patient-centered opioid prescription practices, as risky long-term opioid use often begins with treatment of acute postoperative pain (*Alam, 2012; Bicket, 2017; Hill, 2017; Hooten, 2015, Shah, 2017*). Recommendations are informed by the following principles:

- › Pain is complex, and appropriate pain management is important. When there is tissue damage related to a surgical procedure, pain is normal and helping to manage it is critical to patient recovery. One study showed that 39% of patients experience severe to extreme pain at some point during their postsurgical recovery period (*Liang, 2015*). Clinicians should work to consistently communicate realistic expectations with patients regarding pain management and engage them in creating shared postoperative goals.
- › Opioids are often not the best answer for managing pain. Non-opioid therapies are often effective for managing pain and clinicians should first consider all non-opioid options. An NIH study reports that the majority of patients (72%) report preferring non-narcotic drugs for pain control (*Liang, 2015*). In addition, reduction in post discharge opioid prescribing practices does not increase refill rates (*Osmundson, 2017*).
- › A “one-size-fits-all” approach is not sufficient. Patient needs are different, and clinician judgment is critical in assessing and effectively managing pain. A one-size-fits-all approach creates a risk of over- or under-prescribing. In addition, this approach may not sufficiently curtail the quantity of opioids given postoperatively (*Bateman, 2017; Bates, 2011*).

The ICSI Collaborative recommendations for initial postoperative opioid prescribing include a maximum morphine milligram equivalent (MME) dose for individual procedures across many specialties, targeting those procedures where a high volume of opioids are prescribed.

Surgical departments who tested these principles have been successful at prescribing at or below benchmark doses. Benchmark community standards are derived from health plan data (see [Appendix A](#) and [Appendix B](#)).

Recommendations: Postoperative Opioid Prescribing

1. Educate patients about pain and opioids

Patients should be informed before the procedure about their anticipated healing time, including that pain is normal, and an expected part of the recovery process. Support consistent messaging by everyone who educates the patient/family about pain management, safe opioid use and disposal.

2. Explore non-opioid solutions first

When making the determination for postoperative acute pain management for the patient:

- › Consider the anticipated intensity of pain associated with the patient’s condition, patient access to clinical follow-up, and the extent to which non-opioid analgesics may be utilized for pain management.
- › Optimize peri-procedural regional analgesia/anesthesia techniques to reduce the need for opioid use postoperatively where possible.
- › Use scheduled multimodal analgesia (e.g., NSAIDs and acetaminophen) when possible.
 - This approach may provide superior pain relief and decrease the need for supplemental opioid use compared to a unimodal analgesia approach.
 - Patients may only require non-pharmacologic (e.g., ice, therapy, massage, bracing, splinting) modalities.
 - Consult with the patient’s primary provider or a relevant medical specialist, if needed, before prescribing acetaminophen and/or NSAIDs to patients with a history of liver disease, kidney disease, coronary artery disease, peptic ulcer disease, or other medical conditions that might be provoked or exacerbated by these medications.

3. Prescribe the lowest dose, short-acting opioid possible, while considering individual patient needs.

- › Clearly communicate to the patient how to use their opioids.
 - Be specific about when to use opioids (e.g., use for moderate or severe pain).
 - Instruct them how to decrease dose and increase length of time between doses as healing progresses.
 - Avoid general PRN (“take as needed”) language wherever possible.
- › Prescribers should query the Prescription Drug Monitoring Program before prescribing if results are not documented in the preoperative exam.

- › Opioid doses should be individualized based on risk for adverse outcomes.
- › Geriatric patients should be assessed for risk of falls, cognitive decline, respiratory malfunction, and renal malfunction before receiving opioids.
 - If impairment or risk is detected in a geriatric patient, consider reducing the initial opioid dose by at least 50%. For more information see the [**ICSI Pain: Assessment, Non-Opioid Treatment Approaches and Opioid Management guideline, 2017.**](#)
- › Patients who are taking chronic and/or high-dose opioids preoperatively should receive an individualized postoperative pain management plan developed before surgery in coordination with their primary prescriber and a pain specialist, if needed.
 - For more detailed information on the use of opioids in this population see the [**ICSI Perioperative Guideline, 2019.**](#)
- › The surgeon should manage opioid prescriptions for acute postoperative pain and through the expected healing period.
 - Long-term opioid use often begins with treatment of acute pain. The likelihood of chronic opioid use increases with each additional day of opioid supplied beyond the third day, a second opioid prescription or refill, 700 morphine milligram equivalents (MME) or higher cumulative dose, patients started on a long-acting opioid or tramadol, and an initial 10 or 30-day supply (*Shah, 2017*).
 - During the postacute period, providers should be aware of any biopsychosocial issues that have developed that may inhibit recovery or a decrease in opioid use.
 - Second prescriptions or refills should be less total MME than the initial prescription, avoiding a cumulative dose of 700 MME or more.
 - Clarify that the patient fully understands how to take all of their pain medications.
 - If issues appear, more frequent follow-up may be required.
 - If the patient's need for opioids extends beyond the expected healing period, the surgeon should work with the patient's primary care provider and/or a pain specialist to transition the patient's care.

Implementation Process Recommendations

Develop your organizational approach

Determine your Benchmarks

The goal of this initiative is to safely reduce the quantity of opioids given to patients postoperatively. The ICSI Collaborative has developed procedure-specific benchmarks for maximum MME in the first prescription postoperatively ([See Appendix A](#)). We recognize that there are several benchmarking methods. We recommend that you select the method that best supports your patient's need for safe, effective pain relief. Options include:

- › Using the ICSI Collaborative procedure-specific benchmarks (based on procedure groupings), or
- › using tier-specific standards (based on procedure groupings), or
- › selecting an overall standard to be used for all procedures, or
- › a self-developed standard, based on your current work or research in progress.

Procedure Selection Criteria:

Organizations should select all or some of the procedures in their specialty for focused improvement. The number of procedures selected may depend on the organization's current capacity to build skills and structure to support the work. The procedure groupings in this document represent high volume (30 procedures or more per year) and include those with and without opioid prescriptions. The following methods have been used by organizations to determine their approach to procedure selection:

- › procedures with wide variation in prescribing practice
- › procedures with discharge prescriptions with the highest MMEs
- › procedures with the highest volume
- › procedures with the highest percent of opioid prescriptions

Implementation Techniques:

- › Engage leadership in the initiative, including a physician champion who will promote buy-in, awareness, and ongoing implementation. Engage an operational dyad who will partner in facilitating the changes needed to support the goals.



“We started with the department that had an engaged physician who was willing to champion the efforts. Then we added departments as we were able.”

- › Develop an internal improvement team to manage this work. Potential members include: Surgical and/or pain subject matter experts, hospitalists, Advance Practice Providers (APPs), patient educators, electronic medical record (EMR) experts, data analysts, process and workflow experts, pharmacists, anesthesiologists, nursing staff, recovery room staff, etc.



“I was worried about how much time this would take, but engaging all the help I could from my team, peers, and administration made it much easier.”

- › Determine who will measure and monitor your data. Compare your data to other organizations to understand your postoperative prescribing relative to your community.

- › Determine your approach to benchmarking and select your procedures (see above).
- › Understand where both your best practices and key gaps are (e.g., changing MME, better perioperative management, patient education, workflow changes, etc.), set your goals, and start with small tests of change.



If you do not have experience in QI and do not have QI support within your organization, consider referring to this simple tool. *Institute for Healthcare Improvement Quality Improvement Essentials Toolkit*. Boston, Massachusetts, USA.

<http://www.ihl.org/resources/Pages/Tools/Quality-Improvement-Essentials-Toolkit.aspx>

- › Verify that embedded EMR workflows support your desired goals (e.g., alerts, order sets, preferences, existing protocols/guidelines, and decision-support tools, etc.).



“Each of our community surgical partners used their own orders. We found all the orders for opioids and worked together to standardized them across the organization.”

- › Assure that physicians and staff understand and can use the new concepts and techniques.



“Our project surgical champion visited each department to train the surgeons on the new approach. There was increased engagement because they will be providing feedback about the benchmarks to assure there are no unintended consequences.”

- › Verify that anyone writing your discharge prescriptions (hospitalists, APPs) is aware of your goals and changed protocols.
- › Assure that patient education materials about pain management and opioids support best practice and train all staff to use consistent messaging.



One resource for patient education about pain management and appropriate opioid use postoperatively can be found at the American College of Surgeons

https://www.facs.org/-/media/files/education/patient-ed/safe_pain_control_adult.ashx

- › Offer support to providers who routinely prescribe outside of the recommendations (e.g., mentoring, training tools, etc.).



“When we compared our prescribing to other organizations in the Collaborative one procedure was extremely high. We discovered that it was one surgeon’s practice that caused this and we could work with him/her to improve safe prescribing.”

- › Assess your progress and either adopt (accept), adapt (modify and re-test), or abandon the changes made and move to the next opportunity to improve.

Measurement

Claims Data

Appendix B includes the data specifications that were used to create the Benchmarks using health plan claims data. These are specific to claims data and are useful to recreate local benchmarks similar to what Minnesota is doing.

Quality Improvement Measurement

Quality improvement (QI) tests of change are beneficial in early implementation of recommendations or new processes to discover whether the changes are leading to the expected improvement. These tests help determine which are the key elements of the change that should be replicated across settings, and which are elements that need adaptation based on local resources, staff, and patient population needs. Collecting QI data within your organization is useful in understanding small or limited tests of change, and sharing information from tests of change allows comparability to increase the rapidity of learning across all involved providers.

Suggested Data Elements from the EMR

Data Element	Definition
Measurement Period	Quarterly (start with the quarter before you begin).
Organization	Based on what the implementation team selects.
Surgical Procedure Grouping	Surgical procedure grouping name that matches the name of surgical procedure grouping in Appendix A .
Number of surgical procedures	Total number of surgical procedures in the grouping during the measurement period.
Number of opioid prescriptions	Total number of postoperative opioid prescriptions at discharge by surgical procedure grouping during the measurement period. <ul style="list-style-type: none">• Include tramadol and tapentadol• If a patient receives multiple opioid prescriptions at discharge, count as one prescription
Mean MME	Average total MME in the surgical procedure grouping with an opioid prescription(s) at discharge. <ul style="list-style-type: none">• Include tramadol and tapentadol• Multiple opioid prescriptions given at discharge need to be combined (i.e., MME for multiple prescriptions will be added together) Do not include zero (“0”) MMEs in average total MME.

EMR Data Collection Specifications

The following table provides more detailed definitions of data elements needed to operationalize postoperative opioid prescribing data collection.

Data Element	Definition(s)
Measurement Period	Quarterly (at least).
Organization	Based on what the implementation team selects.
Eligible Setting	<ol style="list-style-type: none"> 1. Inpatient surgical department/facility 2. Outpatient surgical department/facility
Eligible Population	All patients undergoing surgery regardless of opioid status (i.e., include both opioid naïve and chronic opioid patients).
Eligible Population Age Groups	<ul style="list-style-type: none"> • Adults > = 18 years at discharge • Adolescents between 12 and 17 years at discharge (if applicable) • Children < 12 years at discharge (if applicable) <p>Separate out population reporting if reporting by multiple populations.</p> <p><i>May use by time of admission instead of discharge if that is how the system is set up.</i></p>
Eligible Prescribers	<ul style="list-style-type: none"> • Medical Doctor (MD) • Doctor of Osteopathy (DO) • Bachelor of Medicine, Bachelor of Surgery (MBBS) • Physician Assistant (PA) • Nurse Practitioner (NP) • Advanced Practice Registered Nurse (APRN) • Certified Nurse Midwife (CNM) • Doctor of Dental Surgery (DDS)
Exclusions	<ul style="list-style-type: none"> • Trauma and polytrauma • Patients who were in palliative care or hospice care at any time during the measurement period • Instances where an individual had more than a single surgical procedure within a 14-day window • Opioids without an MME conversion multiplier • Opioid addiction treatment drugs (methadone, buprenorphine and naltrexone)

Data Element	Definition(s)
Surgical Procedure Grouping	<p>Note: It may help to select surgical procedures from Appendix A.</p> <p>Identify what your organization’s method is for grouping procedures.</p> <p>The benchmark data in Appendix A uses Procedure Episode Groups (PEGs). (Claims data set used PEGs based on an Optum proprietary grouper.)</p> <p>When you share data, we suggest that the procedure grouping name matches the procedure grouping name in Appendix A.</p>
Opioid Prescription	<p>Initial opioid prescription(s) at postoperative discharge.</p> <ul style="list-style-type: none"> • Include tramadol and tapentadol • Multiple opioid prescriptions given at postoperative discharge need to be combined (count as one)
Total Morphine Milligram Equivalent (MME) per procedure grouping	<p>For each surgical procedure grouping, count the total MME of first opioid prescription at discharge.</p> <ul style="list-style-type: none"> • Include tramadol and tapentadol • Multiple opioid prescriptions given at discharge need to be combined (i.e., MME for multiple prescriptions will be added together) <p>Do not include zero (“0”) MMEs in average total MME.</p>

Other measurement tips:

- › See the ICSI Opioid Prescribing Improvement Guide (www.icsi.org/opioid) for more measurement suggestions.
- › Don’t forget the potential unintended consequences. Consider asking patients and team members what they have seen as a result of the changes. For instance, patients calling or seeking care related to pain before their first postop visit (e.g., ED, urgent Care, prescription refill, calls, etc.).



“Our organization does extensive follow-up with patients asking about function, quality of life, and pain postoperatively. We also ask how many opioid pills they used and the date they took the last one, as well as what they did with their remaining pills. This helps us identify unintended consequences and refine our MME benchmarks.”

Measurement Resources:

1. MME Calculator for reference (follow up with pharmacist to ensure accuracy):
of pills x mg dose per pill = total mg
total mg x MME Conversion Factor = Total MME
2. Link to CMS Conversion Factors: <https://www.cms.gov/Medicare/Prescription-Drug-Coverage/PrescriptionDrugCovContra/Downloads/Opioid-Morphine-EQ-Conversion-Factors-Aug-2017.pdf>
3. Link to HEDIS Medications List: <http://www.ncqa.org/hedis-quality-measurement/hedis-measures/hedis-2018/hedis-2018-ndc-license/hedis-2018-final-ndc-lists> *The list may be updated frequently and NDC codes may change.*
4. Link to CDC Medication list (may be updated frequently): <https://www.cdc.gov/drugoverdose/resources/data.html>
5. For more information about calculating MME, see the ICSI Opioid Prescribing Improvement Guide at www.icsi.org/opioid

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Appendices

- A. [Postoperative Opioid Prescribing Procedure-Specific Opioid MME Benchmarks](#)
- B. [Postoperative Opioid Prescribing Claims Data Methodology](#)

Appendix A

Postoperative Opioid Prescribing Procedure-Specific Opioid Morphine Milligram Equivalents (MME) Benchmarks

The following tables represent the procedure-specific benchmarks that have been created by using Minnesota health plan claims data from 2019. The methodology that has been tested and revised resulted in the decision to aim for the 25th percentile of MME as the maximum initial opioid prescription (Rx) post-operatively. This means that 25% of patients who received an opioid were prescribed this MME or less. The work group determined that this number best represents a reasonable dose and should be considered along with a patient’s individual condition and level of pain. Please also see the health plan data specifications (**Appendix B**) for detailed information.

Definitions

- › **Surgical Grouping and Procedure:** The benchmarks for common procedures are sorted below by department using procedure grouper software. While this document is primarily focused on adults, we included adolescent (ages 12-17) and pediatric (<12) procedure information where it was available because many surgeons treat all ages.
- › **# Procedures:** Actual number of procedures performed (must be at least 30/year to be included).
- › **# Rx:** The number of patients receiving an opioid prescription for these procedures, regardless of preoperative opioid status (naïve or chronic use).
- › **% Rx:** The percentage of patients who received an opioid prescription for this procedure group. The asterisk (*) by some numbers indicates that <10% of patients received a prescription, in which case the benchmark was changed to zero “no routine opioids.”
- › **Benchmark (2019 25th Percentile MME) MAX:** These benchmarks are based on the 25th percentile MME from 2019 health plan data. (25% of patients who received an opioid received that MME or less for a given procedure.)
- › **2019 Mean MME:** The current mean of the opioid prescriptions given for this procedure grouping on discharge. This data includes both naïve and long-term opioid users.

SURGICAL GROUPING: Cardiology Procedure Description	Benchmark (2019 25th Percentile MME) MAX	2019 Mean MME	# procedures	# Rx	% Rx
Ablations	0	121	354	9*	3%
Catheter (Diagnostic)	0	245	515	7*	1%
Catheter (With Drug Stents)	0	505	221	3*	1%
Catheter (With Stents)	0	243	80	4*	5%
Coronary Bypass Surgery	100	186	47	30	64%
Implantable Device Defibrillator	75	98	53	13	25%
Implantable Device Pacemaker	38	115	53	11	21%
Surgical Valve Repair	75	141	45	25	56%

* < 10% of patient received Rx, benchmark changed to no routine opioids

SURGICAL GROUPING: Maxillofacial/Dental Procedure Description**	MME Maximum Benchmark **
Simple Third Molar extraction/ Dentoalveolar surgery	No routine opioids
Complex Dentoalveolar surgery	90

** Based on literature and expert opinion. (Moore, 2013, Weiland, 2015)

SURGICAL GROUPING: General/ Gastroenterology/Hepatobiliary Procedure Description	Benchmark (2019 25th Percentile MME) MAX	2019 Mean MME	# procedures	# Rx	% Rx
Appendectomy	75	103	138	105	76%
Colonoscopy, Diagnostic	0	427	13582	134*	1%
Dilation of Esophagus	0	0	39	0*	0%
Endoscopic Retrograde Cholangiopancreatography with Treatment	75	243	135	32	24%
Esophagoplasty/Fundoplasty	68	122	98	72	73%
Gall Bladder	75	111	848	732	86%
GI Restrictive Procedure (Bypass)	59	97	47	26	55%
GI Restrictive Procedure (Sleeve)	53	106	192	109	57%
Hernia Repair, Inguinal	75	107	661	573	87%
Lower Gastrointestinal Endoscopy with Treatment	0	400	9004	80*	1%
Lower GI Removal	98	148	171	109	64%
Lumpectomy	50	80	252	208	83%
Mammoplasty	75	133	186	148	80%
Mastectomy	100	158	215	169	79%
Repair, Incisional or Ventral Hernia	100	137	197	159	81%
Repair, Umbilical Hernia	75	113	293	247	84%
Thyroidectomy	50	91	132	99	75%
Upper Gastrointestinal Endoscopy with Treatment	0	336	1154	24*	2%
Upper GI Removal	100	212	37	23	62%

* < 10% of patient received Rx, benchmark changed to no routine opioids

SURGICAL GROUPING: Adolescent General Procedure Description	Benchmark (2019 25th Percentile MME) MAX	2019 Mean MME	# procedures	# Rx	% Rx
Colonoscopy, Diagnostic	0	0	86	0	0%

SURGICAL GROUPING: Pediatric General Procedure Description	Benchmark (2019 25th Percentile MME) MAX	2019 Mean MME	# procedures	# Rx	% Rx
Hernia Repair, Inguinal	8	14	61	10	16%
Repair, Umbilical Hernia	8	21	40	5	13%

SURGICAL GROUPING: Otolaryngology Procedure Description	Benchmark (2019 25th Percentile MME) MAX	2019 Mean MME	# procedures	# Rx	% Rx
Ear Tubes	0	685	274	6*	2%
Laryngoscopy with Treatment	45	75	77	29	38%
Myringotomy	0	0	88	0*	0%
Nasal Ablation	50	86	96	15	16%
Nasal Endoscopy with Treatment	60	114	286	221	77%
Nasal Vestibule Repair	138	150	46	32	70%
Rhinoplasty	100	157	43	33	77%
Septoplasty	75	134	442	386	87%
Tonsils and Adenoids	225	306	335	314	94%
Turbinate Excision	60	115	147	117	80%
Tympanoplasty	50	103	93	81	87%

* < 10% of patient received Rx, benchmark changed to no routine opioids

SURGICAL GROUPING: Adolescent Otolaryngology Procedure Description	Benchmark (2019 25th Percentile MME) MAX	2019 Mean MME	# procedures	# Rx	% Rx
Tonsils and Adenoids	150	210	114	89	78%

SURGICAL GROUPING: Pediatric Otolaryngology Procedure Description	Benchmark (2019 25th Percentile MME) MAX	2019 Mean MME	# procedures	# Rx	% Rx
Ear Tubes (General Anesth)	0	36	1253	1*	0%
Nasal Foreign Body Removal	0	0	30	0*	0%
Tonsils and Adenoids	50	90	1059	375	35%
Tympanic Membrane Repair	0	105	52	1*	2%

* < 10% of patient received Rx, benchmark changed to no routine opioids

SURGICAL GROUPING: Gynecology Procedure Description	Benchmark (2019 25th Percentile MME) MAX	2019 Mean MME	# procedures	# Rx	% Rx
Cesarean Section, Delivery Only	75	129	337	220	65%
Cesarean Section, Global	90	142	1356	917	68%
Colpopexy	75	98	30	21	70%
Colporrhaphy	75	103	41	28	68%
Conization Of Cervix	40	74	224	30	13%
Excision of Ovary/Ovarian Duct	75	108	233	200	86%
Hysteroscopy With Treatment	38	69	495	252	51%
Incision and Drainage Of Bartholin's Gland Abscess	0	81	50	3*	6%
Laser Coagulation	30	69	39	24	62%
Ligation of Fallopian Tube	75	119	65	42	65%
Removal of Ovary/Ovarian Duct	75	110	305	252	83%
Stress Incontinence Repair	40	75	122	96	79%
Supracervical Hysterectomy	75	123	86	67	78%
Total Abdominal Hysterectomy	75	133	96	70	73%
Vaginal Hysterectomy	98	135	819	678	83%
Vaginal Delivery**	0				

* < 10% of patient received Rx, benchmark changed to no routine opioids

** Benchmark derived from literature and expert opinion. (Prabhu, 2018)

SURGICAL GROUPING: Urology Procedure Description	Benchmark (2019 25th Percentile MME) MAX	2019 Mean MME	# procedures	# Rx	% Rx
Cystourethroscopy with Treatment	50	196	795	412	52%
Laparoscopic Nephrectomy	90	128	41	35	85%
Laparoscopic Prostatectomy	75	104	139	115	83%
Laser Coagulation	30	69	39	24	62%
Lithotripsy	50	88	154	104	68%
Stress Incontinence Repair	40	75	122	96	79%
Transurethral Resection of Bladder Neck	50	103	65	37	57%
Vasectomy	45	70	1383	342	25%

SURGICAL GROUPING: Neurological/Orthopedic Procedure Description	Benchmark (2019 25th Percentile MME) MAX	2019 Mean MME	# procedures	# Rx	% Rx
Spine Surgery (Cervical Fusion)	200	284	206	155	75%
Spine Surgery (Cervical Spine Laminectomy)	200	236	61	50	82%
Spine Surgery (Lumbar Fusion)	250	330	218	142	65%
Spine Surgery (Lumbar Herniated Disc, Decompression)	200	263	552	435	79%

SURGICAL GROUPING: Orthopedic Procedure Description	Benchmark (2019 25th Percentile MME) MAX	2019 Mean MME	# procedures	# Rx	% Rx
Carpal Tunnel Surgery - Arthroscopic	50	75	168	118	70%
Carpal Tunnel Surgery - Open	50	83	787	512	65%
Joint Replacements (Hip)	210	279	763	604	79%
Joint Replacements (Knee)	263	327	1120	908	81%
Joint Replacements (Knee Revision)	225	292	55	45	82%
Bilateral Knee Replacement Surgery	225	321	38	31	82%
Other Knee Arthroscopy with Treatment	100	173	376	324	86%
Other Open Surgery of The Knee	225	292	189	156	83%
Scopes (Knee Ligament Repair)	200	249	329	306	93%
Scopes (Knee Meniscectomy)	100	138	1103	948	86%
Scopes (Rotator Cuff)	225	274	611	544	89%
Scopes (Shoulder)	160	237	446	404	91%
Therapeutic Arthroscopy of the Hip	150	252	168	154	92%
Total Shoulder Replacement	225	296	114	86	75%

SURGICAL GROUPING: Adolescent Orthopedic Procedure Description	Benchmark (2019 25th Percentile MME) MAX	2019 Mean MME	# procedures	# Rx	% Rx
Other Knee Arthroscopy with Treatment	90	137	60	54	90%
Other Open Surgery of the Knee	200	237	43	41	95%
Scopes (Knee Ligament Repair)	200	234	108	103	95%
Scopes (Knee Meniscectomy)	75	109	36	30	83%
Scopes (Shoulder)	150	218	30	30	100%

SURGICAL GROUPING: Orthopedic/Podiatry Procedure Description	Benchmark (2019 25th Percentile MME) MAX	2019 Mean MME	# procedures	# Rx	% Rx
Ankle Ligament Repair	150	185	123	115	93%
Arthrodesis, Midfoot	150	217	135	123	91%
Arthroscopy of Ankle With Major Repair	125	181	39	31	79%
Bunionectomy	150	188	374	331	89%
Repair Hammer Toe	100	175	143	115	80%
Repair of Achilles Tendon	150	196	176	157	89%

SURGICAL GROUPING: Ophthalmology Procedure Description	Benchmark (2019 25th Percentile MME) MAX	2019 Mean MME	# procedures	# Rx	% Rx
Cataract Removal	0	272	1449	11*	1%
Closure of the Lacrimal Punctum	0	150	105	1*	1%
Destruction of Retina	0	0	54	0*	0%
Discission of Secondary Membranous Cataract	0	655	491	2*	0%
Intravitreal Injection of a Pharmacologic Agent	0	343	3170	32*	1%
Iridotomy/Iridectomy	0	0	105	0*	0%
Keratoplasty	50	63	35	4	11%
Prophylaxis of Retinal Detachment	0	250	129	1*	1%
Removal of Foreign Body, External Eye	0	47	181	4*	2%
Repair of Blepharoptosis	25	79	104	47	45%
Repair of Brow Ptosis	50	83	32	17	53%
Repair of Retinal Detachment	0	74	133	10*	8%
Strabismus Revision	50	76	49	27	55%
Trabeculoplasty by Laser Surgery	0	0	70	0*	0%

* < 10% of patient received Rx, benchmark changed to no routine opioids

SURGICAL GROUPING: Pediatric Ophthalmology Procedure Description	Benchmark (2019 25th Percentile MME) MAX	2019 Mean MME	# procedures	# Rx	% Rx
Strabismus Revision	24	61	82	8	10%

Benchmark References

1. Moore PA, Hersh EV. Combining ibuprofen and acetaminophen for acute pain management after third-molar extractions: translating clinical research to dental practice. *JADA* 2013;144: 898-908.
2. Prabhu M, Garry EM, Hernandez-Diaz S, et al. Frequency of opioid dispensing after vaginal delivery. *Obstet Gynecol* 2018;132:459-65.
3. Weiland BM, Wach AG, Kanar BP, et al. Use of opioid pain relievers following extraction of third molars. *Compend Contin Educ Dent* 2015;36:107-11.

Appendix B

Postoperative Opioid Prescribing Claims Data Methodology

The ICSI Collaborative claims data for postoperative opioid prescribing by procedure has been provided by one or more Minnesota health plan.

Definitions

- › Procedure Episode Groups (PEGs): Optum proprietary grouper that uses surgical procedures as units of analysis, or similar software
- › Prescription patterns measured based on total prescription at discharge Morphine Milligram Equivalent (MME) based on filled Rx
- › Adults = members \geq 18 year old at discharge
- › Adolescents = members between 12 and 17 years at discharge
- › Children = members < 12 years at discharge

Methodology

- › Identify inpatient and outpatient surgical procedures (date and type of procedure)
 - Dates of service range between 01/01/2019 through 12/31/2019.
- › Retrieve all opioid prescriptions following the surgical procedure discharge date up to 45 days, including tramadol and tapentadol
 - Consider first prescription(s) with filled date within seven days of post-operative discharge date
 - Include all patients regardless of preoperative opioid status (naïve and chronic use)
 - Prescriptions filled on the same day will be grouped
 - » Add MMEs for multiple medications
- › Percentiles based on MMEs

Exclusions

- › Trauma and polytrauma
- › Opioid addiction treatment drugs
- › Hospice members (hospice benefit for procedure)
- › Low volume procedures (< 30 within measurement period) excluded
- › All data for members with carve-out for pharmacy benefits are excluded
- › Instances where an individual had more than a single surgical procedure within a 14-day window were excluded