HIMSS

**Davies Award of Excellence Case Study**
Program Year **2023**

# *Multimodal Pain Management - Successful Approach to System Initiatives by Targeting Different Aspects of Opioid Reduction*

## Intermountain Health


Primary Contact Information:
**Farukh Usmani, MD, MSHSM**
Medical Director, Digital Technology Services
Farukh.Usmani@imail.org

Clinical Project Lead:
**Ryan Cardon, Pharm.D.**
Surgical Services/MSK/Digestive Health Portfolio Manager
Ryan.Cardon@imail.org

**Will Shakespeare, MD**
Medical Director Senior-Surgical Operations
Will.Shakespeare@imail.org

Informatics and IT Project Lead:
**Farukh Usmani, MD, MSHSM**
Medical Director, Digital Technology Services, Intermountain Health
Farukh.Usmani@imail.org

Ernest Chan
Senior Data Analyst-Statistical
Ernest.Chan@imail.org


## *Executive Summary*


Data regarding the safe use of opioids in clinical practice has evolved with time. Messaging from pharmaceutical companies in the 1990's and 2000's led healthcare systems to overuse opioids by over emphasizing safety and minimizing the true risk of dependence and addiction.[1] Between 2017 to 2021, Intermountain Health completed over 1,156,986 surgical procedures. With surgery being among the top reasons for opioid initiation and 6% of opioid naïve patients developing dependence and the disease of addiction, a culture shift and changes to clinical practice were needed.[2] In 2018, Intermountain Health began implementing opioid stewardship initiatives aimed at decreasing opioid prescribing, increase caregiver opioid awareness with education, standardizing the use of multimodal pain modalities, and using data-driven reporting tools to drive and maintain practice changes.

**Care Process Quality**

- Developed provider education material focused on opioid stewardship including safe opioid use, role of multimodal pain medications, and procedure specific opioid prescribing.
- Developed provider educational material focused on opioid stewardship and tapering.
- Held multiple provider, service line, and Clinical Programs education meetings focused on high prescribing providers.
- Launched Project ECHO (a video-based learning network with expert panel) to provide monthly pain management education to caregivers and providers.
- Set system goals to reduce high-dose opioids greater than 90 morphine milligram equivalents (MME) and created robust action plans.
- Created an electronic health record (EHR; iCentra) opioid alert and risk algorithm for providers to predict the risk of an opioid overdose in the next six months
- Created an online Hospital Resource Guide focused on The Joint Commission (TJC) Pain Assessment and Management standards
- Integrated the State Prescription Drug Monitoring Program (PDMP) into the iCentra workflow
- Implemented hospital pain teams to address opioid stewardship and TJC pain standards.
- Implemented a Buprenorphine Clinical Guideline for surgery patients.
- Developed reports and dashboards to identify interventions, track outcomes, and progress.
- Introduced non-opioid alternatives into workflows including multimodal order sets and nerve blocks to improve patient outcomes and reduce opioid use
- Reduced nursing assessment and documentation for scheduled multimodal medications
- Implemented a new pain assessment tool to bridge the gap between subjective and objective aspects of assessing acute pain
- Improved adherence to the nursing opioid reassessment rate (Pain Management Intervention) from 42% to 72%

**Quality Outcomes:**

(PACU, SDS, Inpatient: 2018-2019 compared to 2021 -2022)

- **MME Sum reduction of 22.7%.** 40.99 MME Sum CI[42.3, 39.7] compared to 31.67 MME Sum CI[32.5, 30.9](P < 0.001)
- **Pain Scores Max/day reduction of 7.8%.** 3.59: CI[3.59, 3.58] compared to 3.31: CI[3.32, 3.30](P < 0.001)
- **Length of stay reduction of 19.8%** 22.5 Hrs. CI[25.5, 17.98] compared to 18.05 Hrs. CI[20.48, 15.61] no statistical difference.
- **Postoperative nausea and vomiting (PONV) total doses:**
    - PACU, SDS, Inpatient: 0.42 CI[0.43, 0.4160] compared to 0.38 CI[0.38, 0.37] (P < 0.001).
    - Inpatient: 0.6107 CI[0.6199, 0.6061] compared to 0.5126 CI[0.5205, 0.5047] (P < 0.001).
    - SDS phase II: 0.07179 CI[0.07291, 0.07067] compared to 0.04282 CI[0.07396, 0.07168] no statistical difference.
- **Inpatient Nurse assessment and documentation:** 114,000 nonessential medication assessments eliminated yearly, productivity savings of $550,188.23

Ambulatory

- **System percent of opioid prescriptions ≥ 90 MME reduction of 44.27% and a surgical reduction of 59.3%.** System, 9.22% [Jan-Sept 2020] compared to 5.42% [March 2022 – March 2023], and a surgical reduction from 13.97% down to 5.68% ($P < 0.001$)
- **System Naloxone prescription/opioid prescribed increase of 75.3% and a surgical increase of 86.9%.** System 4.48% [Jan – Sept 2020] to 18.15% [Sept 2022 – March 2023], and a surgical increase from 1.97% to 15.06% ($P < 0.001$).
- **System PDMP average weekly check pre and post EMR integration increase of 10.85%.** 4,339 checks [Week 21, 2021 – Week 37, 2021] compared to 4,810 checks [Wk. 39, 2021 – Wk. 4, 2022] ($P < 0.005$)
- **System average opioid tablets/prescription reduction of 52.4% and a surgical reduction of 51.1%.** System, 2017, 19.55 tablets/prescription compared to 9.3 in 2022 and a surgical reduction from 28.29 tablets/prescription down to 13.83.
- **System total yearly opioid prescription reduction of 46.8% and a surgical postoperative reduction of 48%.** System, 4,276,491 prescriptions in 2017 decreased to 2,274,179 in 2022 and a surgical reduction of 3,979,270 prescriptions down to 2,066,945.

  **New chronic opioid patients after surgery reduction of 54.34%.** 2018 – February 2019, rate of 4.06% compared to 1.84%, August 2021 – August 2022. ($P < 0.01$) (Figure 1)

Patient Experience

- **Press Ganey: System Pain Data Surgical Units. How well pain was addressed?** 2018 (N, 8950) All PG data base rank of 48 compared to 2022 (N,7124) All PG data base rank of 70

**Lessons Learned:**

- System alignment on initiatives to support practice changes and resilience is critical for success.
- A multidisciplinary set of teams targeting different aspects of opioid reduction greatly enhance a successful approach to system initiatives
- Reporting enables tracking progress and identification of impactful interventions which can drive and maintain practice changes.
- System data supporting the clinical application of opioid sparing modalities can drive significant outcomes in our patients
- Provider specific data can be a powerful tool for quality improvement
- Continuous education on appropriate use of opioids supports practice changes and improved outcomes
- Continuous education on using tools developed in the EHR is critical for provider adoption and impact changes to practice
- A multidisciplinary approach including clinical content, EHR design, education, and adoption support are all critical to implementation of an opioid sparing alternative to pain management
- Outcome's data can take time to develop so resilience in process management and continuous improvement are important
- Implementation of changes to postoperative order set over a short time period might better focus resources for education and adoption
- Co-development of machine learning or AI with the reporting dashboards could increase identification of impactful opioid sparing combinations
- Identifying oral opioids not containing acetaminophen as preferred opioids can help mitigate risk of exceeding acetaminophen max daily dosing

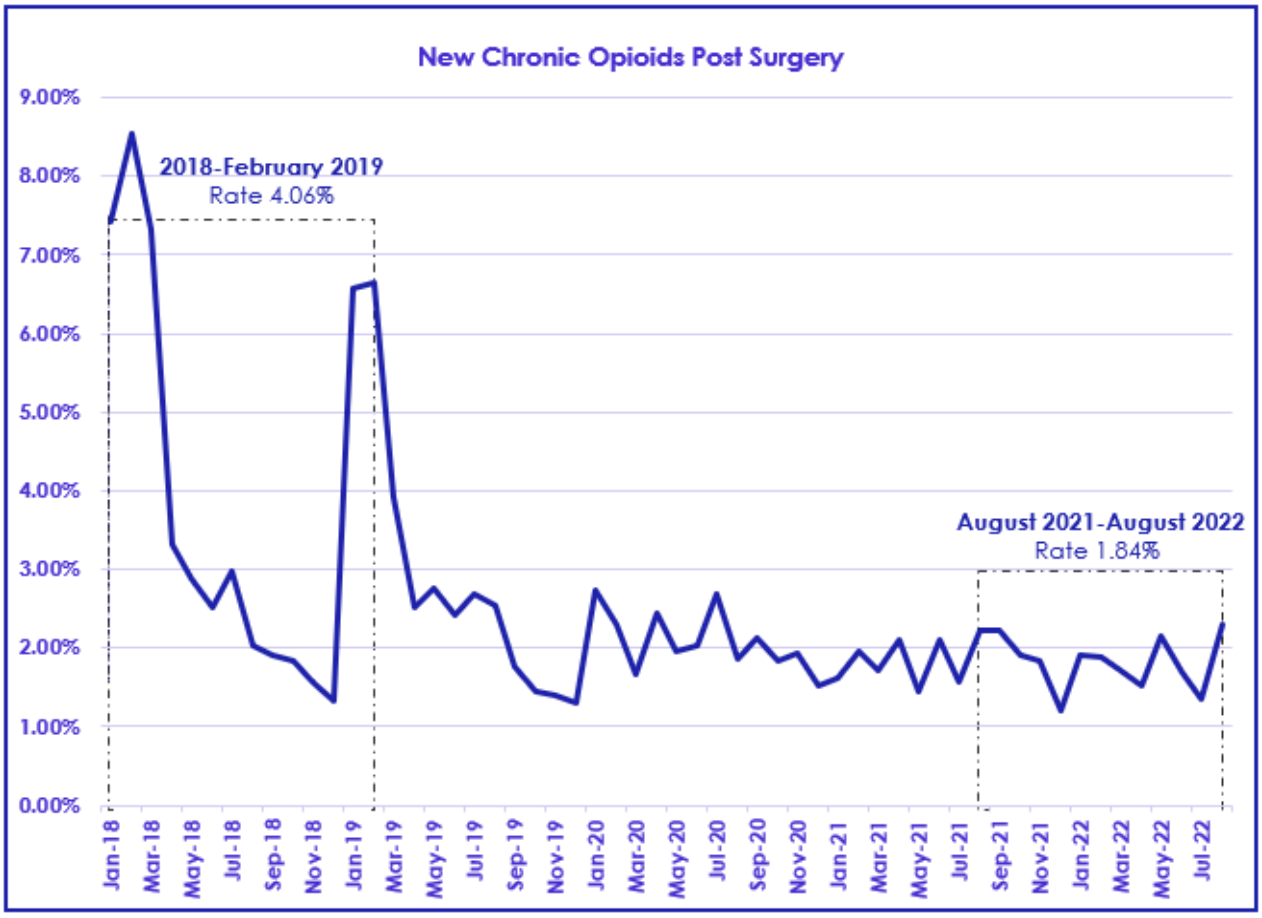



**Figure 1 – New Chronic Opioid Patients 2018 – August 2022. SelectHealth insurance data.**
February 2018, 8.53% of patients were still taking opioids 3 months after their procedure. Between 2018 and February 2019, the new chronic opioid use rate was 4.06%. With opioid stewardship efforts this rate dropped significantly to 1.84% compared to August 2021 through August 2022.

## *Define the Clinical Problem and Pre-Implementation Performance*

Aaron, a native American from the Navajo tribe, was a father of a young son and family to all that knew him. After a severe injury to his back cliff jumping, he met with specialists to manage his recovery. In the process of managing his pain he became dependent on opioids and later developed opioid use disorder. His provider would later stop prescribing opioids and he started purchasing opioids on the street. Due to the high cost, he would switch to using a cheaper alternative, heroin. As he progressed through the disease of addiction, he started into the cycle of recovery and relapse and ultimately died in an overdose. Aaron's story is a tragedy and a common struggle in the United States of America.

Surgery is a gateway to chronic opioid use and is among the top reasons for opioid initiation.[1] Six percent of opioid naïve patients develop opioid dependence and opioid use disorder[2], thus a culture shift and changes to clinical practice were needed. Intermountain began a process to improve these outcomes by implementing opioid stewardship programs focused on creating a network of informed caregivers to help combat the crisis in alignment with The Joint Commission Pain and Assessment Standards.[3]

In the ambulatory setting, the primary outcomes were to decrease high dose morphine milligram equivalent (MME)opioid prescribing and to increase naloxone prescription rates. Additionally, surgical services adopted an opioid sparing initiative in their approach to surgery which introduced opioid sparing surgery protocols and expanded opioids sparing modalities in

managing pain for surgical patients. The primary outcomes were to reduce inpatient length of stay (LOS Hrs.), MMEs to manage pain, max pain scores, post-operative nausea, and vomiting (PONV), reduce postoperative opioid prescription volumes and quantities, and to reduce the rate of new chronic opioid dependency in our patients.

In January of 2020, the system percentage of high dose opioid prescriptions (≥ 90 MME/prescription) was 9% and surgery, 16.2%. Naloxone prescriptions to patients with high MME prescriptions system wide was 2.83%, and for surgical patients 1.26%. 2021 baseline goals high dose MME prescribing system wide was set at 7.9% and a naloxone prescribing stretch goal of 25%. New chronic opioid patients have been a watch metric since implementation.

There are not current standards for measurement of MME sum, MME/hr., max pain score, or PONV in post-surgical patients so the data were used for internal quality improvement. All surgical patients' system wide were included in the review. Baseline goals for the introduction of multimodal pain we limited to implementation as there was not robust data on expected outcomes. Between 2018-2019 the inpatient average MME Sum for all surgical patients was 40.99 MMEs, PONV of 0.42 total doses, max daily pain score of 3.59 and a LOS (Hrs.) of 21.74 Hrs. New chronic opioid use after surgery, defined as opioid naive patients continuing to fill prescriptions after 3 months, was 8.53% in February of 2019 with a yearly average of 3.64%.

## *Design and Implementation Model Practices and Governance*

The scope of this work was to capture the entire patient experience, preoperative, intraoperative, home, with opioid sparing modalities imbedded in the workflows. (Figure 2)

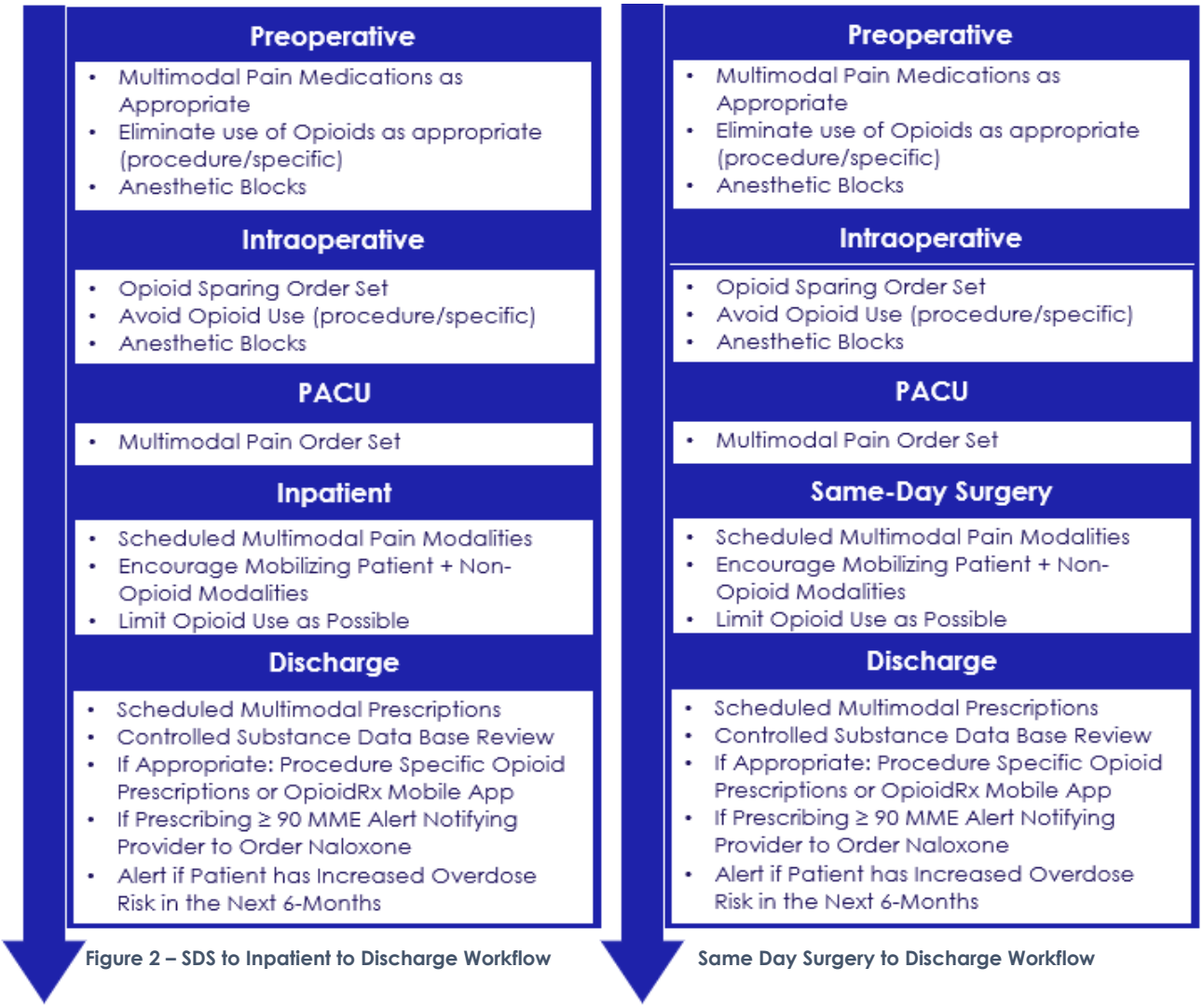



**Figure 2 – SDS to Inpatient to Discharge Workflow** **Same Day Surgery to Discharge Workflow**

Additionally, with the opioid crisis underway our pain services leadership team began looking at strategies to reduce home opioid prescriptions, increase access to naloxone, and increase education and pain management expertise systemwide.(Figure 3) The first milestone was Intermountain Health's opioid stewardship initiative. One focus was creating hospital based opioid stewardship teams and continuous educations streams to ensure caregivers are informed about opioid stewardship initiatives and practices. This involved local hospital teams and education campaigns targeting both caregivers and patients. An educational initiative was launched called 'Project ECHO' to provide monthly pain management education to caregivers to support these education campaigns. Initiatives were set to reduce High MME prescribing , greater than or equal to 90 MME, and the increase naloxone prescribing to patients with high MME prescriptions or at risk for opioid overdose. A team including pain services leadership, informatics, shared services, primary care, musculoskeletal, and decisions supports teams were engaged in alerts design. Considerations in the development of this alert included the MME threshold for alerting providers which was initially set at greater than or equal to 90 MME but was later reduced later to a threshold of 50 MME. Additional considerations in alert design included considerations of alert fatigue, clear and direct verbiage, special populations, prescribing guidelines, and surfacing naloxone as a click an sign orderable.

To reduce opioid prescribing in the surgical space, a patient survey was developed and sent by email post-operatively. The survey was used to create a postoperative survey opioid dashboard which captured the opioid prescribed, quantity, dose, frequency, tablets consumed, and the patient's opioid exposure preoperatively. Data gathered between January 2018 through 2018 resulted in 154,180 surveys sent, with response rate of 21.3%, and findings showed that patients were taking half the tablets prescribed and that we could reduce prescribing significantly with the results from the survey. Surgical leadership in partnership with technology teams and pharmacy services decided to focus on tablets prescribed in place of total prescriptions with the available data. The data showed that many procedures that commonly resulted in opioid prescriptions that patients did not consume the medication and did not report pain following their procedure. Data from the patient surveys was built into the EHR with procedure specific prescriptions and incorporated into surgeon clinic and discharge workflows. Procedures not requiring opioids had procedure folders built with scheduled multimodal pain medications as prescriptions to guide providers on educating patients either to fill the medications or purchase the medications over the counter.

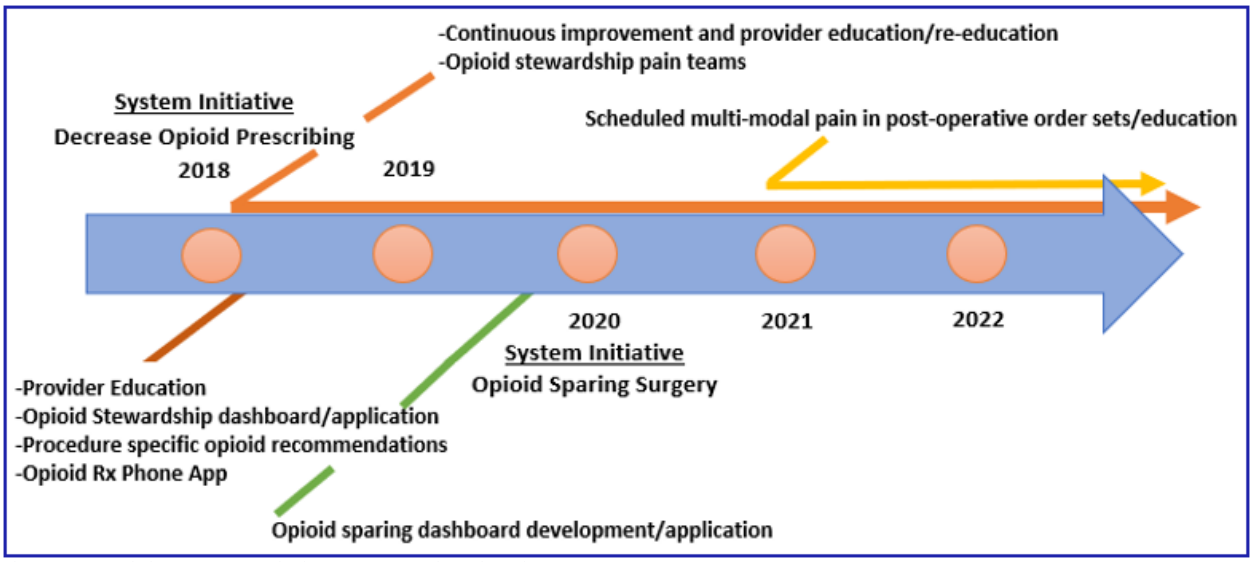



**Figure 3-** Opioid stewardship implementation timeline

Evaluating the post-surgical survey dashboard, the data showed the patients prescribed higher MME/dose prescriptions took the same quantity of tablets as those prescribed lower MME/dose medications with comparable pain outcomes. Many of the surgeons practicing at Intermountain Health facilities are affiliate providers practicing at sites not using the same EHR. To extend the use of the opioid survey data, Intermountain Health developed a mobile app, OpioidRx, for 'Data on the Go' which allows providers to filter procedure specific opioid recommendations by surgical specialty, +/- procedure group, and procedure to see surgery specific opioid requirements for both opioid naïve and exposed patients when practicing outside our hospital system.

In February of 2020, anesthesia in collaboration with our pain services leadership teams introduced a system initiative called 'opioid sparing surgery' which included multimodal pain management starting at the point that patient entered the perioperative process. Pain management was considered in all phases of care including preoperative, intraoperative, post-operative care unit (PACU), and post-operative, which included both inpatients and patients going home through same-day surgery. A team including nursing and anesthesia leads from the pain services teams in collaboration of surgical informatics developed multimodal pain order sets for the preoperative, intraoperative, PACU, and postoperative phases of care. Considerations in the design of these orders sets included the patient population, ease of ordering, medications to precheck by default, guidelines, just in time information with appropriate exclusion criteria for both provider and nursing,

MME per dose guidance for opioid orders, as well as guidance on preferred opioid orders. In mid-2019, a group of data analytics experts, anesthesia leadership, and surgical informatic specialists started the development an invaluable tool for determining and tracking highly impactful interventions encapsulated in the opioid sparing surgery initiative. The tool allowed us to evaluate proactively where improvements could be made and easily track the impact of those interventions. The analytics, with built in statical analysis, became an invaluable tool for driving interventions with provider and local patient data, a magic bullet for transforming operational initiatives into meaningful impact.

| *Enterprise opioid stewardship initiatives* | |
|---|---|
| **System Initiatives** | **Purpose** |
| Opioid Sparing Surgery Initiative | - Decrease opioid use for managing surgical pain.<br>- Increase use of opioid free/opioid sparing surgical practices<br>- Increased regional anesthesia procedures for perioperative patients by 36% from 2018-2021<br>- Add non-opioid pain interventions in pre/postoperative order sets |
| Opioid Stewardship Initiative | - Increase awareness for risks of opioids and opioid tapering.<br>- Increase caregiver awareness/education for safe opioid use<br>- Decrease high-dose opioid prescribing.<br>- Project ECHO: monthly caregiver pain management education<br>- Increase naloxone prescribing.<br>- Develop and implement Surgical Buprenorphine Clinical Guideline |
| *Technology developed to support enterprise initiatives* | |
| **Technological Tools** | **Purpose** |
| Post-surgical survey dashboard | - Define procedure specific postoperative opioid prescription requirements.<br>- Develop post-surgical prescription strategy.<br>▪ Develop EHR procedure specific opioid prescriptions.<br>▪ Develop OpioidRx Mobile App<br>Track progress in reducing opioid prescriptions |
| Opioid sparing dashboard | - Define impact of specific opioid sparing interventions<br>▪ Medication/combination, procedure, provider, and location level data<br>- Track progress of implemented strategies |
| New chronic opioid patients | - Dashboard to track progress of implemented strategies |
| Prescribed opioids, MME, naloxone prescriptions, and co-prescribing of opioids & benzodiazepines dashboard | - Dashboard to track:<br>▪ Opioid prescribing<br>▪ Co-prescribing of opioids and benzodiazepines<br>▪ Naloxone prescribing<br>▪ Multimodal pain medication compliance<br>▪ MME prescribing<br>- Track progress of implemented strategies |
| EHR:<br>Controlled substance database access | - Initiative to support providers with checking patients-controlled substance prescriptions history in Utah's controlled substance database |
| EHR Alert:<br>Opioid's prescriptions ≥ 50 MME | - Alert notifying providers to order naloxone when patients have a combined opioid prescription(s) ≥ 50 MME |
| EHR Alert:<br>6-month opioid overdose risk | - Alert notifying providers when patients are at increased risk for overdose |
| EHR:<br>Multimodal pain inpatient orders | - Scheduled non-opioid pain medications built into surgeon postoperative order sets to increase usage of multimodal medications.<br>- Oral opioids grouped by MME/Dose to increase provider awareness of increased MME exposure by medication |
| EHR: Anesthesia intraoperative opioid sparing order set | - Standardize intraprocedural medications to increase use of opioid sparing surgery protocols |
| EHR: | - Reduce non-essential nurse tasking of pain assessments and documentation for scheduled multimodal pain medications |

| | |
|---|---|
| Exclude multimodal pain assessments & documentation | |

## *Clinical Transformation enabled through Information and Technology*

Surgical and Pain Services Leadership partnered in an opioid stewardship and opioid sparing surgery initiatives to reduce prescribing and opioid use in the perioperative space with the introduction of opioid reduction efforts and sparing surgery, increasing the use of opioid sparing modalities in all stages of care. This in turn, with the continued efforts of our opioid stewardship teams began creating changes in culture and in the overall approach to pain management. With these initiatives in place, clinical changes to practice were made using data driven metrics, supported by dashboards for tracking opioid use reduction including the post-surgical opioid survey, high MME prescribing, naloxone prescribing, and opioid sparing data reporting tools developed from data stored in our electronic data warehouse. Opioid stewardship led initiatives driving forward reductions in high MME and naloxone prescribing both system wide and in the surgical space, and anesthesia leadership led changes to clinical practice in the preoperative and intraoperative phases of care using the system data gathered from the opioid sparing dashboards. Preoperative orders were customized with the help of pain leadership teams and specialty leads. Analysis of reporting led to recognition of highly impactful regional anesthetic techniques for specific surgical cases which were implemented system wide with significant reduction in perioperative opioid requirements resulting in a decrease in MME sum, max pain per day, PONV and LOS (Hrs.). (Figure 4)

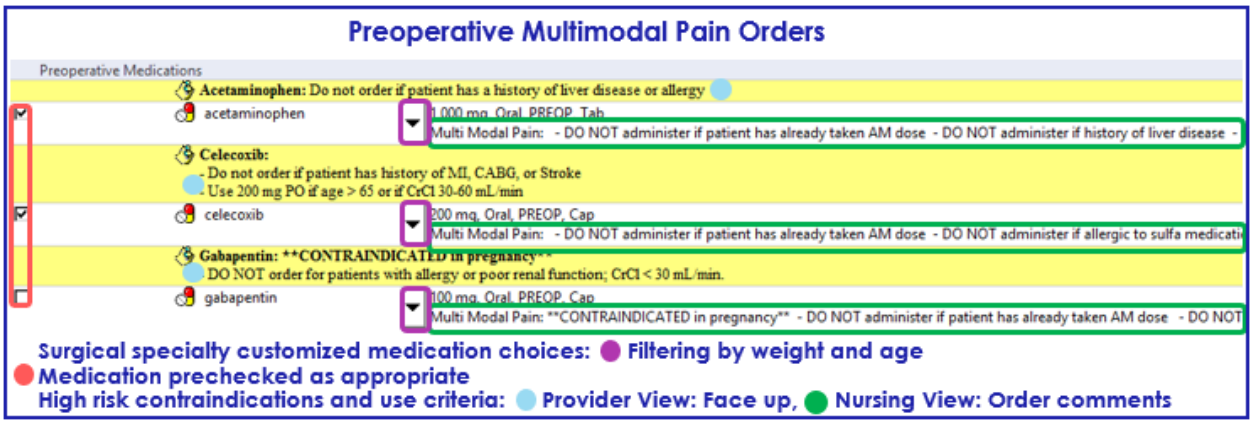



**Figure 4 – Preoperative multimodal pain orders**

An opioid sparing macro was developed in the anesthesia module, used as order sets during the intraoperative phase of care, to guide providers in using non-opioid medications. Additionally, low-dose ketamine and lidocaine infusion order sets were introduced into the EHR as additional tools for managing pain complicated by patient comorbidities and/or surgical procedure.

Pain services in partnership with the informatics teams, made modifications to the EHR targeting each provider's role in pain management throughout the care process. Scheduled multimodal pain medications were introduced into the surgeon preoperative order sets and eliminated the use of preoperative opioids as appropriate. Multimodal pain medications were customized by service line and patient type to optimize pain management outcomes and reduce complications due to comorbidities. Multimodal medications were imbedded into PACU orders sets and scheduled in the postoperative plans to continue the use of these opioid sparing modalities into the floor and home, capturing the entire patient's surgical experience. In addition to multimodal medications being added to our surgeon's postoperative order sets,

opioids were grouped together by MME/dose, with preferred opioids available in the form of range doses to reduce the risk of exceeding acetaminophen daily dose limits. (Figure 5)

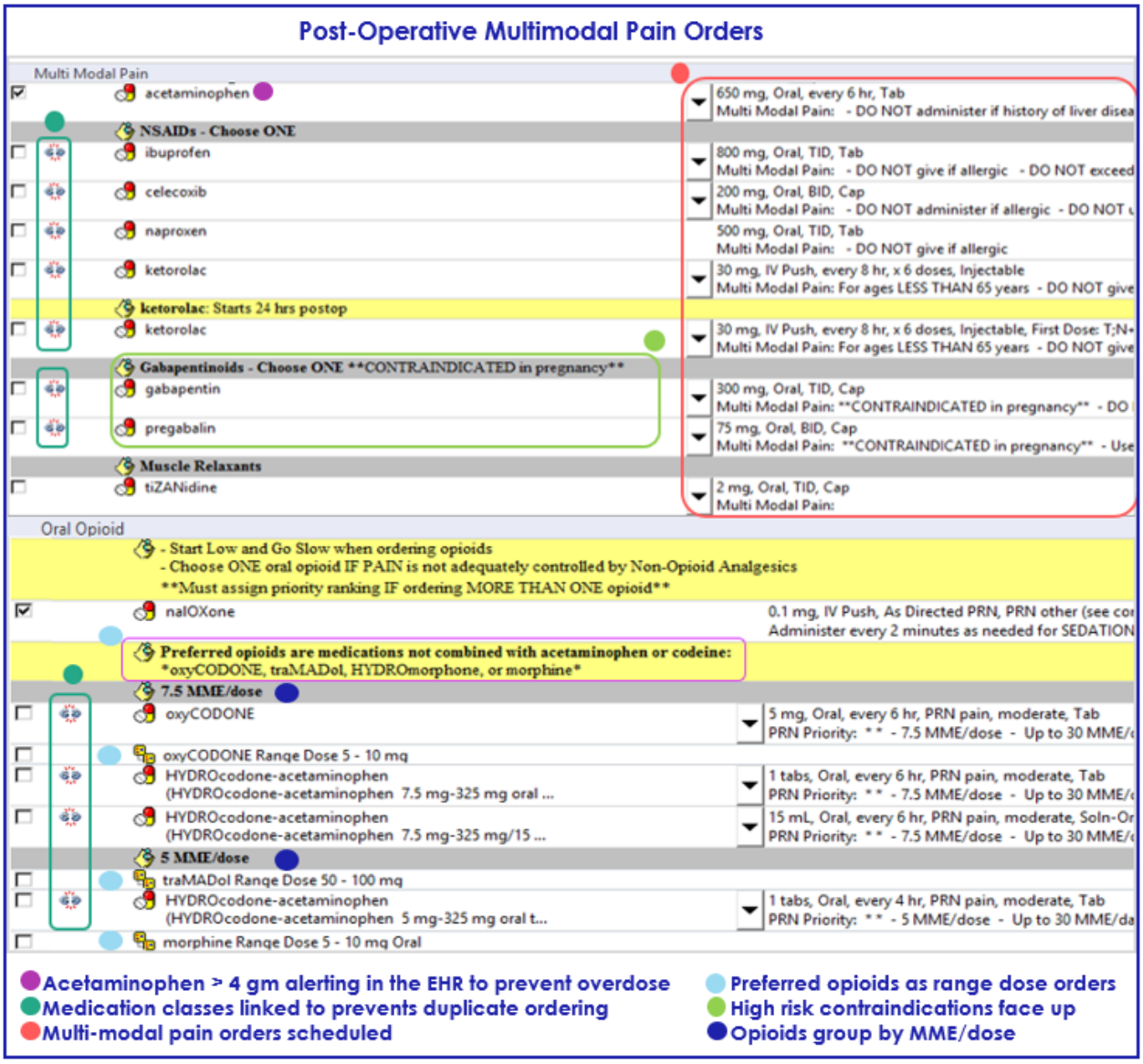



**Figure 5 –** Post-operative order set with multimodal pain medications scheduled. Opioid options grouped by MME/dose with preferred opioid orders available which were selected to prevent acetaminophen max daily dosing limits when co-ordered with combinations opioids containing acetaminophen.

Additionally, in the postoperative phase of care, surgical leadership from the various surgical practices were socialized to the recommendations for scheduled non opioid alternatives and engaged in decisions for medications used. Surgical specialties were implemented system wide into the EHR in a phased approach. As determined by specialty leadership some multimodal pain medications were prechecked by default with others made available to be decided by providers on a case-by-case basis. There were not fields within the order entry format for providers to indicate why recommendations were not followed but with high compliance at implementation and robust compliance tracking our system did not experience challenges with adoption. In some cases, we had various surgical specialty groups using a specific order set because of implementation of the EHR. To support the providers in the transition of resaving order sets, rules were developed directing providers to resave new postoperative plans as favorites over a 30-day period. Prescriptions built into the EHR were also rolled out by specialty groups to support adoption. Repeated messaging and education were both critical for success.

To define the appropriate opioid quantities to prescribe surgical clinical programs developed a patient survey in January 2017 to collect data on opioid prescribing and consumption. After data collection a team including clinical program leadership, surgeons, pharmacy, and surgical informatics began designing workflows to imbed opioid recommendations into workflows. Considerations in designing the workflow included access to survey data, adequate patient pain control, ease of ordering, limiting clinic phone calls for prescription refills, provider workflow and opioid disposal. Opioid prescriptions were built into the discharge workflows and grouped by procedure and included folders for both opioid naïve and opioid exposed prescriptions. (Figure 6)

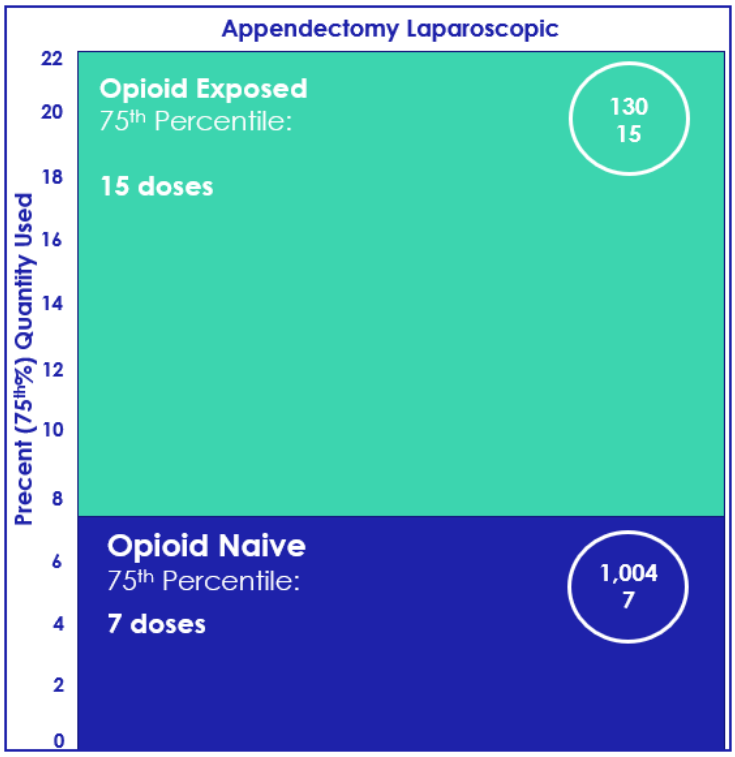



**Figure 6 –** Data displayed from the patient postoperative survey displaying recommendations for opioid naïve and exposed patients.

In the first iteration of design prescriptions quantities were developed using the median number of tablets from the survey data and sending two prescriptions. For a procedure having a median number to tablets of 8, the first prescriptions would start the day the prescription was written and

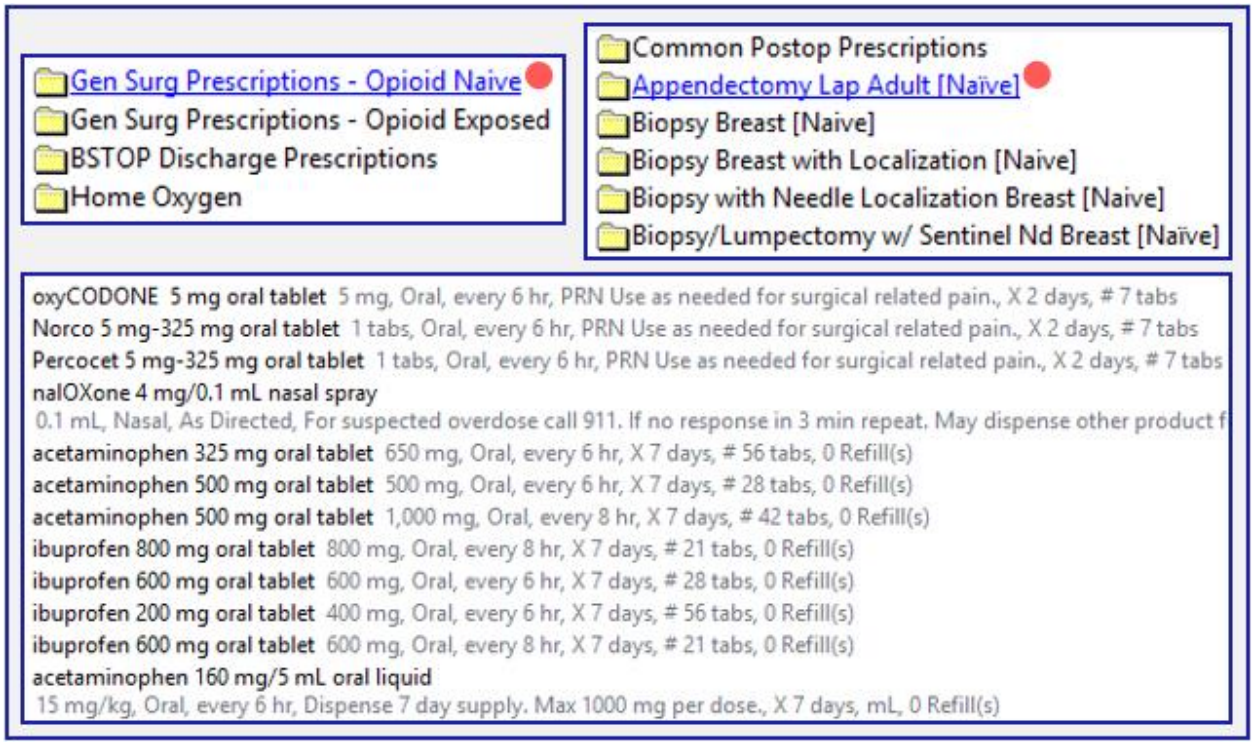



**Figure 7 –** Opioid prescription folders built out for both opioid naïve and opioid exposed folders. Preferred opioids, those not containing acetaminophen, were listed first. Multimodal pain orders were made available for easy prescribing or prompting conversations with patients for education and instruction. Naloxone was added to increase access and prescribing.

expire on day 2, and the second prescriptions would start on day 3 and expire on day 4. With additional data we determined prescribing a single prescription at the 75th percentile met the need of patients and providers. (Figure 7, Previous page) We focused on building prescriptions for the most frequent procedures and in 2018 began the development of a mobile APP called OpioidRx to allow further access to survey data outside the EHR. Clinical program goals were focused on 70% compliance to the top 5-10 procedure recommendations and once prescribing decreased additional goals were layered to with focus on reducing high MME prescribing greater than or equal to 90 MME. Fields for determining why providers deviated from prescription recommendations were not available. Individual surgical specialties set specific goals for their respective teams. Compliance was monitoring monthly by surgical specialty leadership and providers were identified through reporting for additional training and coaching.

*Table 1 - Operational teams to develop technology to support enterprise initiatives*

| Operating Lanes: Leadership Teams | Goals/Governance/Content/Implementation |
|---|---|
| **Surgical Services**<br>- Surgical Clinical Programs<br>- Surgical Operations | Goals: Reduce opioid Prescribing<br>- Post-Surgical Survey Content<br>- Post-Surgical Survey dashboard design<br>- Define post-surgical prescription strategy.<br>- OpioidRx phone app design<br>Implementation/Education<br>- Education/Change management/Practice changes<br>- Dashboard review/practice change management. |
| | Goals: Opioid Sparing Surgery<br>- Opioid sparing dashboard design<br>- Goals: Multimodal Pain, MME/Hr. reduction, decreased LOS (Hrs.), decrease max pain scores, decrease PONV<br>Implementation/Education<br>- Change management/practice changes/education.<br>- Dashboard data review/practice change management |
| **Shared Clinical Services**<br>- Pain Management Services | Goals: Decrease opioid prescribing<br>- Reduce high-dose opioids greater than 90 MME.<br>- Increase naloxone prescriptions for high MME opioid prescriptions.<br>- Develop opioid data dashboard.<br>- Designed Opioid Equity dashboard.<br>Reporting<br>- Prescribed opioids, MME, naloxone prescriptions, and co-prescribing of opioids & benzodiazepines Dashboard, new Chronic Opioid Patients Dashboard<br>Implementation<br>- Dashboard review/practice change management.<br>- Education: Provider education material focused on opioid stewardship & tapering, high prescribing providers targeting education, project ECHO to provide a monthly pain management education series<br>- Hospital pain teams to address opioid stewardship, TJC Pain Management: Online Hospital Resource Guide, Surgical Buprenorphine Clinical Guideline Development<br>- EHR Controlled Substance Database access development, opioids prescriptions > 90MME alert. 6-month opioid overdose risk alert<br>- Governance: Multimodal Pain inpatient order content<br>- Change management/practice changes/education.<br>- Created Peripheral Nerve Injury Clinical Guideline |

| *Table 2 - Operational and technological teams and the developed technology* | |
|---|---|
| **Operating Lanes- Support Teams** | **Reporting/Content/Implementation** |
| **Enterprise Analytics**<br>- Surgical Services: Data Analytics<br>- Pain Services: Data Analytics | Report Configuration/Design<br>Surgical Services: Data Analytics<br>- Post-Surgical Opioids Goals dashboard design/development<br>- OpioidRx phone app content<br>- Opioid sparing dashboard design/development<br>Pain Services: Data Analytics<br>- Prescribed opioids, MME, naloxone prescriptions, and co-prescribing of opioids & benzodiazepines dashboard design/development<br>- New Chronic Opioid Patients Dashboard design/development |
| **Informatics**<br>- Informatics: Shared Clinical Services<br>- Informatics: Specialty Based Care<br>- Informatics: Change Control<br>- Informatics: Adoption & Support<br>- Olive Healthcare | Informatics: Shared Clinical Services<br>- Governance: Multimodal pain orders<br>- EHR Controlled Substance Database access development.<br>- EHR Alert Development: Opioid's prescriptions > 90MME<br>- EHR Alert Development: 6-month opioid overdose risk<br>- EHR Multimodal Pain inpatient orders maintenance<br>- EHR Change management/education development.<br>- EHR Eliminate nurse assessments and documentation for schedule multimodal medication.<br>Informatics: Specialty Based Care<br>- Post-Surgical Survey dashboard design<br>- EHR post-operative prescription order content/design/build<br>- OpioidRx phone app content development/provider education<br>- Opioid Sparing Dashboard Design<br>- EHR Multimodal Pain inpatient order content/design/build/education/maintenance<br>- Alert directing providers to resave the new postoperative powerplan with multimodal pain medications.<br>- EHR Change management/education development.<br>- Implementation: Education/support & training<br>Informatics: Change Control<br>- Governance: EHR change management<br>Informatics: Adoption & Support<br>- Implementation: Change coordination timing & planning<br>- Implementation: Education/support & training<br>Olive Healthcare<br>- OpioidRx phone app development/maintenance |

## *Improving Adherence to the Standard of Care*

To improve and support adherence to the standard of care we leverage our electronic data warehouse for data collection and our Electronic Clinical Quality Measure (eCQM). Using the analytic tools developed, the opioid stewardship leadership teams used the reporting dashboards to identify areas of improvement and then developed processes to implement findings. Pain services, with goals to reduce high dose opioids greater than or equal to 90 MME, used the opioid stewardship dashboards to identify high opioid prescribing specialties and/or providers and focused education efforts to improve prescribing habits and practices. Additionally, hospital pain teams were implemented across the system to support initiatives and caregivers were provided with tools such as high-risk overdose alerts and access to a hospital resource guide focused on The Joint Commission Pain Management standards and with the Prescription Drug Monitoring Program (PDMP) imbedded within the EHR, providers had accessible tools to properly evaluate current and past opioid use in their patients at the point of prescribing. With the opioid crisis already impacting our community's, initiatives to increase naloxone prescribing and dashboards for tracking frequency of naloxone prescriptions were implemented. This tool was used to track prescribing of naloxone and increase education efforts and alerting to encourage prescribing naloxone for patients at risk for overdose.

Anesthesia leadership developed a network of anesthesia leads for sites and used the opioid sparing dashboard, with data from our electronic data warehouse, to identify high impactful and efficient anesthesia techniques within the varying practices across the system to develop standards of practice to improve quality of patient care and improved outcomes. In one instance it took one of our sites with the highest use of opioids and highest pain scores to one of the lowest with exceptional pain management outcomes. Continuous education efforts were put into place through monthly anesthesia development meetings where findings from the opioid sparing dashboard were shared and the anesthesia site leadership teams reinforced adoption at the local level.

Governance and compliance to the opioid prescribing and multimodal pain standards were monitored by surgical clinical programs and the opioid stewardship leadership teams, respectfully. Leadership met monthly to review compliance standards and identified individuals or groups to provide targeted education and coaching. Outcomes were shared with hospital leadership to increase transparency and support of initiatives by local leadership to further drive outcomes to caregivers on the front line of care. At the core of all the work, the efforts of education and support from these local leadership teams reinforced compliance to practice changes. Opioid stewardship and opioid sparing reporting dashboards became key drivers in tracking real time progress to further the cycle of continuous improvement.

Overall adherence to the Opioid Stewardship Program to achieve optimal outcomes in reducing opioid prescribing and increasing multimodal pain is referenced in the graphs and data under the 'Accountability and Driving Resilient Care Redesign' section.

## *Improving Patient Outcomes*

The implementation of opioid sparing modalities into clinical practice had large impacts system wide. MME sum measured between 2018-2019 show surgical patients needing 40.99 MMEs CI (42.3, 39.7) compared to 2021-2022 31.37 MMEs (CI (32.5, 30.9) a 22.5% MME Sum reduction ($P < 0.001$). Pain score max/day measured between 2018-2019 resulted in a value of 3.59 CI (3.59, 3.58) compared to 2021-2022 with a value 3.31 CI (3.32, 3.33) indicating a 7.8% reduction in max pain scores ($P < 0.001$). (Figure 8)

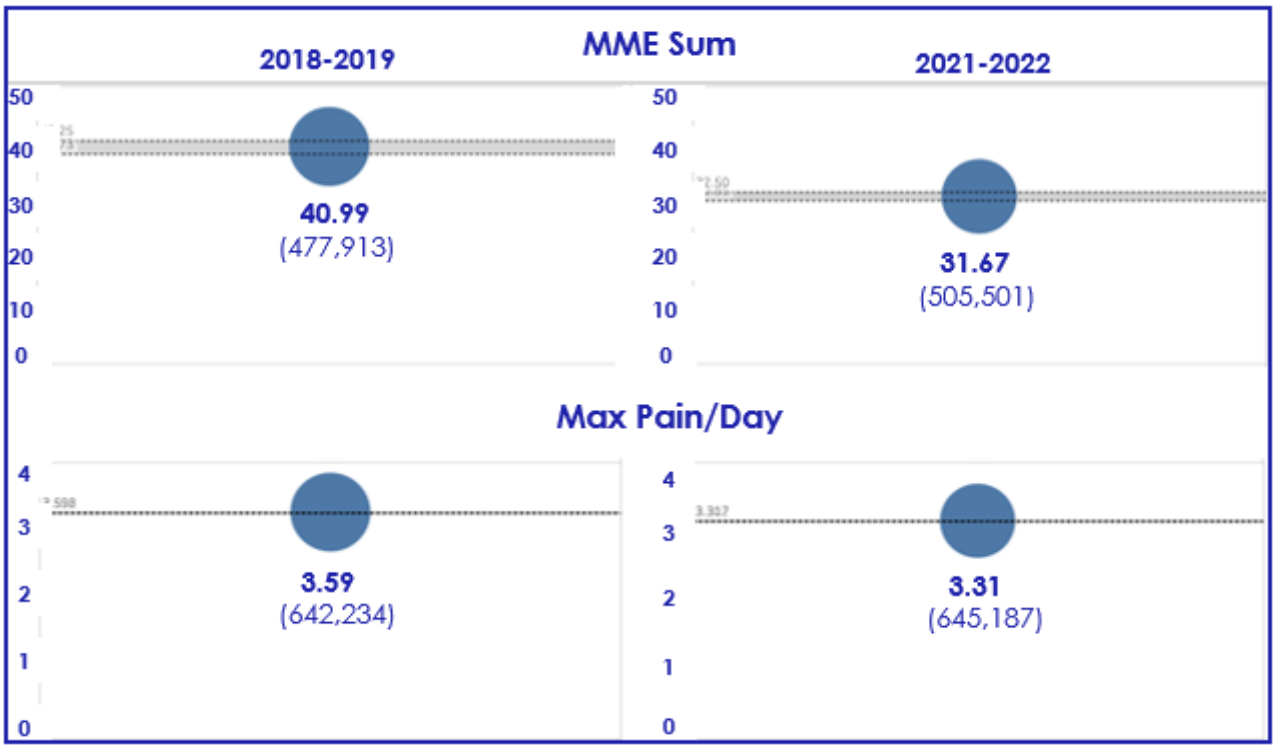



**Figure 8 - MME Sum (avg) and max pain/day (avg): All Surgical Patients**
2018-2019 compared to 2021-2022 showing a 22.5% reduction in the MME sum needed to manage pain and a 7.8% reduction in max pain/day.

Postoperative nausea and vomiting (total doses) decreased from 0.42 total doses CI(0.43,0.42) to 0.38 total doses CI (0.38,0.37) comparing 2018-2019 to 2021-2022 ($P<0.001$). Length of stay measured between 2018-2019 showed a LOS (Hrs.) of 22.5 hours CI (25.5, 17.98) compared to 2021-2022 LOS (Hrs.) of 18.05 hours CI (20.48, 15.61), a 16.97% non-statistically significant reduction in LOS (Hrs.). (Figure 9, Next page)

Surgical opioid prescriptions totaled 3,979,270 in 2017 and reduced yearly to 1,988,079 in 2022, a 48% reduction. System wide, we saw a reduction of 46.8%, 4,276,491 in 2017 down to 2,274,179 in 2022. Opioid prescriptions built into the EHR with lower MME/dose medications from data supplied through the post-surgical survey dashboard which showed that regardless of the MME/dose prescribed that pain outcomes and the quantity of tablets needed to manage post-surgical pain were comparable. The quantity of tablets prescribed per opioid prescription decreased from 28.29 in 2017 to 13.83 in 2022, a 48% reduction, comparing 2017 - 2022. System wide opioid tablets per prescription was 19.55 in 2017 and reduced to 9.3 in 2022, a 52.4% reduction. (Figure 10, Next page)

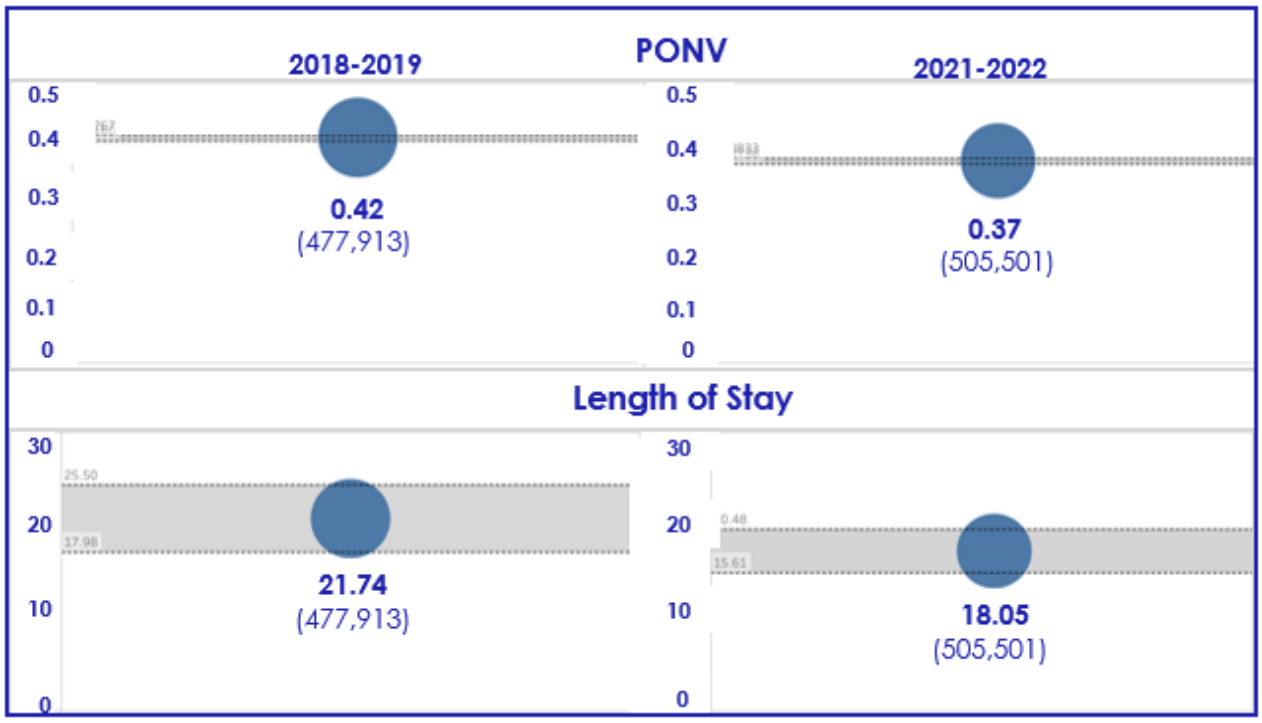



**Figure 9 – PONV Total Doses and Length of Stay hrs. (avg): All Surgical Patients**
2018-2019 compared to 2021-2022 showing a 11.9% reduction in the total doses required to manage PONV (P<0.001)
2018-2019 compared to 2021-2022 showing a 16.97% reduction in length of stay (Not statistically significant)

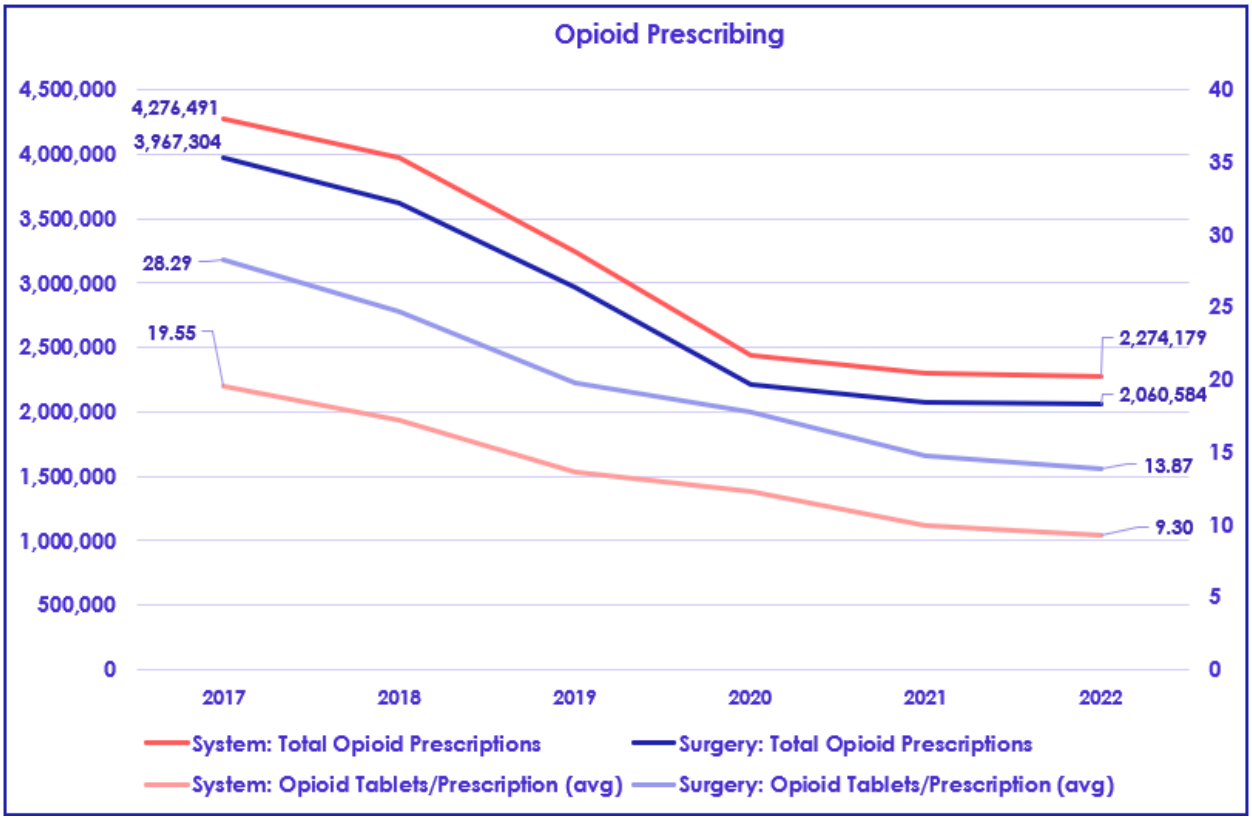



***Figure 10 – Opioid prescribing volumes 2017 – 2022***
System and surgical opioid prescriptions 2017 to 2022 with a reduction of 46.8% and 48% respectfully.
System and surgical opioid tablet quantities per prescription with a reduction of 52.4 % and 51.1%, comparing 2017 to 2022.

Scheduling non opioid pain medications also came with increased nurse tasking for pain assessments. The nursing and pharmacy informatics teams found that by excluding acetaminophen, ibuprofen, and ketorolac nursing assessments and documentation from nursing workflows would prevent 114,000 non-essential pain assessments yearly and a productivity time savings of 9,500 hours. The total investment was $1,856.27 resulting in productivity savings of $550,188.23 with a first-year return of investment of 29,539.45% and a 5-year net present value of $2,320,268.

Opioid stewardship initiatives and goals to reduce high prescribing by alerting providers when exceeding ≥ 90 MME, limiting high MME for acute pain prescriptions orders to 7-day supply, and including the prescription drug monitoring program into the EHR decreased high MME prescriptions totaling ≥ 90 MME on the patient profile. The system decreased high MME prescribing from 9.22% of prescriptions (Jan-Sept 2020) down to 5.42% (March 2022 – March 2023), a reduction of 41.2% (P<0.001). Surgery saw significant reductions as well reducing high MME prescriptions from 13.97% of prescriptions (Jan-Sept 2020) down to 5.68% (March 2022 – March 2023), a reduction of 59.3% (P<0.001). (Figure 11)

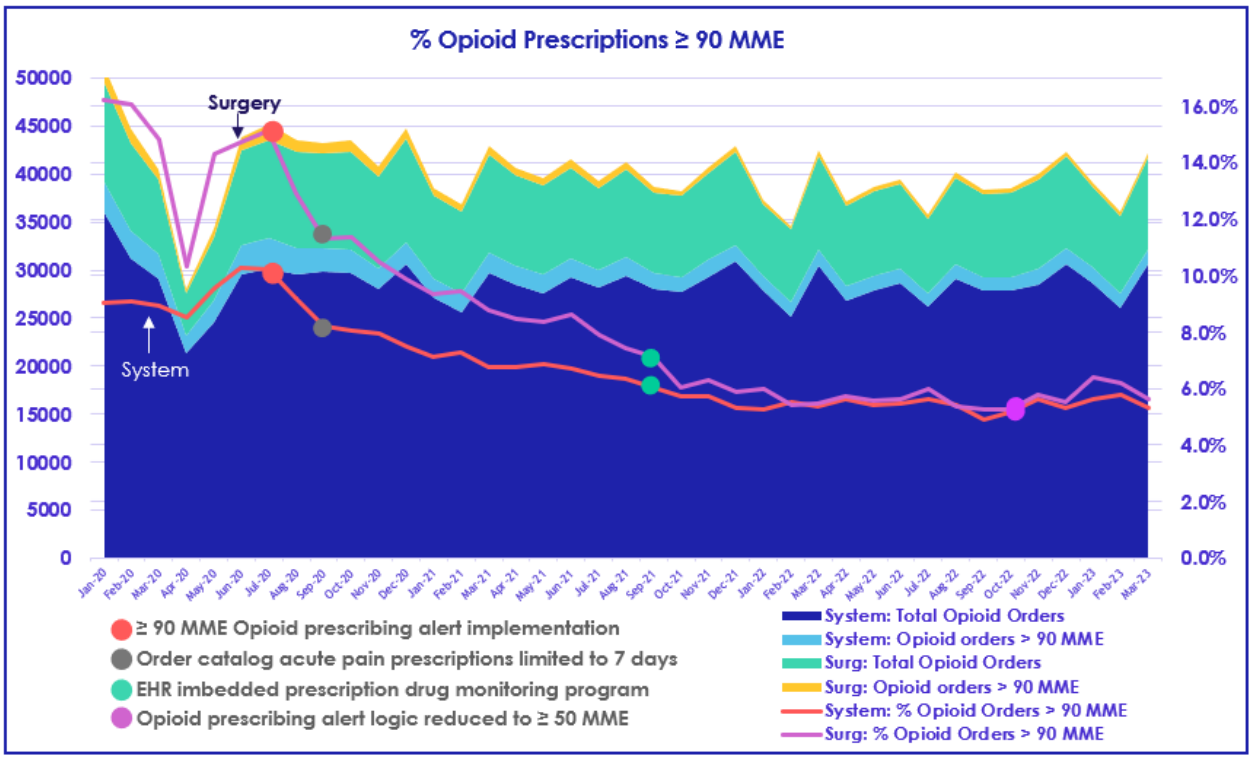



**Figure 11 – *High MME Opioid Prescribing***
Opioid prescriptions ≥ 90 MME/prescriptions between January 2020 through March 2023. Comparing Jan - Sept 2020 to March 2022 – March 2023 the system saw a statistically significant 41.2% reduction and surgery a 59.3 % reduction of high MME opioid prescribing.

The opioid stewardships efforts to increase naloxone prescribing in patients with opioid prescriptions was accomplished with alerting in the EHR and by easing access to prescriptions by placing naloxone prescriptions orders into the postoperative procedure specific opioid folders. High MME opioid alerting was initially designed to alert when prescriptions totaled greater than or equal to 90 MME. The MME threshold was later reduced to prescriptions greater than or equal to 50 MME to better capture patients at increased risk for over sedation. These modifications to the EHR increased system naloxone prescribing by 75.3%. System prescribing increased from

4.48%, (January – September 2020) to 18.15%, (June 2022 – April 2023) (P<0.001). Surgical naloxone prescribing increased from 1.97%, (January – September 2020) to 15.06%, (June 2022 – April 2023), an 86.9% increase. (Figure 12)

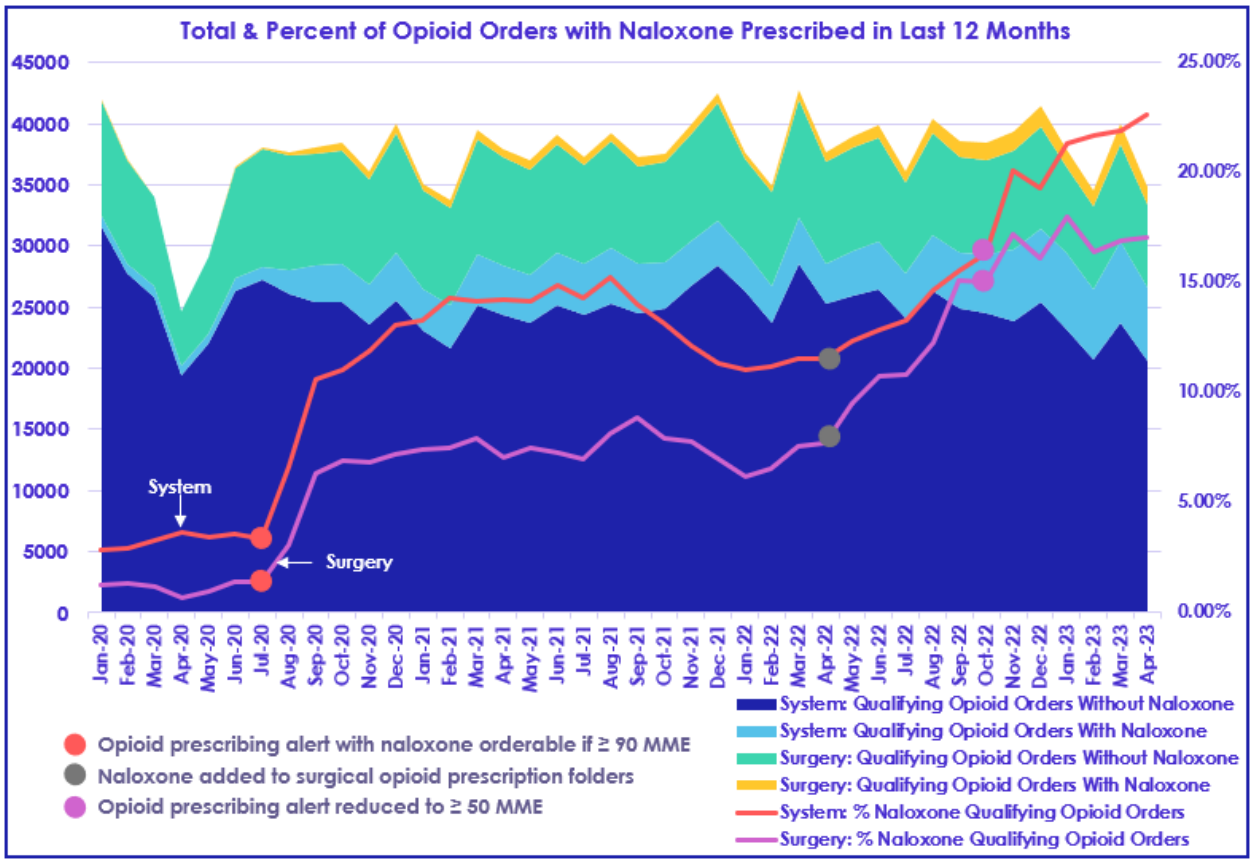



**Figure 12 – Naloxone Prescribing for High MME Opioid Prescriptions**
Naloxone prescribing for qualifying high MME prescriptions between January 2020 through April 2023. Comparing Jan - Sept 2020 to June 2022 – April 2023 the system saw a statistically significant 75.3% increase and surgery an 86.9% increase of naloxone prescribing for patients with of high MME opioid prescriptions.

The rate of new chronic opioid use, defined as opioid naïve patients that continued filling opioids > 3 months after their procedure and excluded cancer and end of life patients. The new chronic opioid use rate in February 2018 was at a system high at 8.53% (261 patients/3,060 procedures. The overall rate, January 20189 through February 2019, was 4.03% (1,706 patients/40,214 procedures). This rate has since decreased to 1.84% (376 patients/20,481 procedures) between August 2021 through August 2022, a statistically significant reduction of 54.34% (P< 0.01).

These data show that a safer approach to pain management, supported with technology, can lead to decreased opioid exposure with improved pain control, decreased LOS (Hrs.), reduced opioid prescribing, and lower development of chronic opioid use in the perioperative space. Patient reporting of "How well pain was address" through Press Ganey (PG) showed Intermountain Health all PG data base rank improving from 48 in 2017 (N, 8950), to an all-PG data base rank of 70 in 2022 (N,7124).

## *Accountability and Driving Resilient Care Redesign*

Intermountain Health Pain Services started opioid stewardship initiatives in 2018. In February of 2020, surgical leadership announced opioid-sparing efforts with a system symposium to raise awareness of the opioid epidemic and the superior outcomes that are achievable with opioid-sparing surgical techniques. With both initiatives, reporting was developed as a tool to drive system standardization and continuous improvement. These efforts started because it was the right thing for the patient and to mitigate the public health burden of the opioid epidemic. Surgical clinical programs established goals to decrease opioid prescribing by setting compliance goals to the top 5-10 procedures. Compliance standards of 70% compliance to prescribing the procedure specific recommendations as defined by the opioid survey data. Specialties reported compliance outcomes of 70-78% in prescribing procedure specific opioid tablet volumes. Once opioid prescribing decreased, additional goals were layered on top of previous goals to further reduce opioid prescribing to less than 90 MME. Specialty leadership and the opioid stewardship team collaborated on educating providers and monthly compliance monitoring leading to all specialties exceeding entry, target, and stretch metrics. Providers needing support and coaching were identified through

| ≥ 90 MME Prescribing | 2020 Baseline | Entry | Target | Stretch | Outcome |
|---|---|---|---|---|---|
| Cardiovascular & Thoracic Surgery | 9.2% | 8.28% | 8.03% | 7.77% | 5.91% |
| General Surgery | 7.73% | 7.1% | 6.85% | 6.6% | 5.67% |
| Obstetrics and Gynecology | 4.76% | 4.1% | 3.85% | 3.6% | 2.73% |
| Otolaryngology | 9.05% | 7.41% | 7.16% | 6.91% | 5.45% |
| Podiatry Surgery | 5.64% | 4.61% | 4.35% | 4.1% | 2.23% |
| Orthopedic Surgery | 24.77% | 18.98% | 17.09% | 16.59% | 10.82% |
| Spine Surgery | 40.61% | 31.55% | 30.67% | 29% | 20.19% |

**Figure 13 – Opioid Prescribing Goals Specific to Service Lines.**
Baselines ranged from 5.64% to 40.61% of opioid prescribing exceeding ≥ 90 MME. All specialties exceeded their stretch goals as saw reductions as high as 56%.

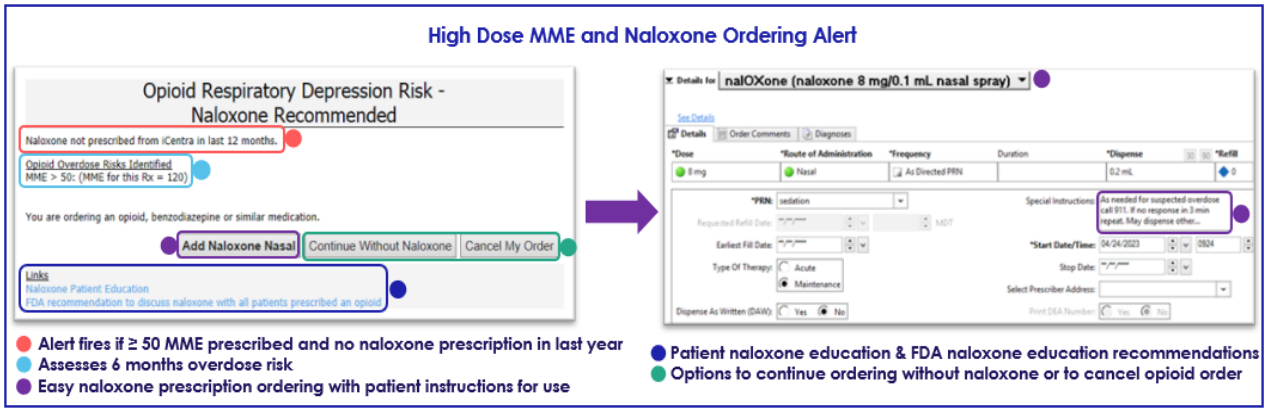



**Figure 14 – High MME prescribing and Naloxone EHR Alert.**
With alerting and education on the increased risk of overdose with high MME opioid prescribing, naloxone prescribing increased system wide by 75.3% and in the surgical specialties by 86.9%.

developed dashboards and leadership teams worked with individuals or groups to improve practice and drive outcomes. (Figure 13)

A collaborative education process was set up called Project ECHO which focused on opioid related education including titrating opioids in dependent patients and treating addiction. To support addiction treatment efforts, a buprenorphine clinical guideline for surgical patients was established. An alert was developed to identify patients at risk for overdose which guided providers on prescribing naloxone. Naloxone prescriptions were also placed in the procedure specific opioid folders to encourage prescribing. (Figure 14, Previous page))

In the perioperative space impactful interventions were identifiable by using the opioid sparing dashboard which provided real time data making application of interventions timely and efficient. The tool also allowed individual provider leads to modify their personal order sets prior to implementing changes to their service lines to enable them to compare their outcomes to their colleagues which acted as a tool for motivating adoption of the new model of care to mitigate hesitation in making global changes to workflows. One such example in the neurosurgical space, the leader had scheduled multimodal pain medications added to their postoperative orders for non-craniotomy cases and data was gathered. The data was then displayed to show benefits to patient care. In this case example there was a statistically significant decrease from 3.66 MME/Hr. to 2.608 MME/Hr., a 28.74% reduction. Length of stay also decreased from 92.9 hours to 32.8 hours, although this decrease was not statistically significant, it is a dramatic improvement to patient care and outcomes with no increase in max pain scores. (Figure 15)

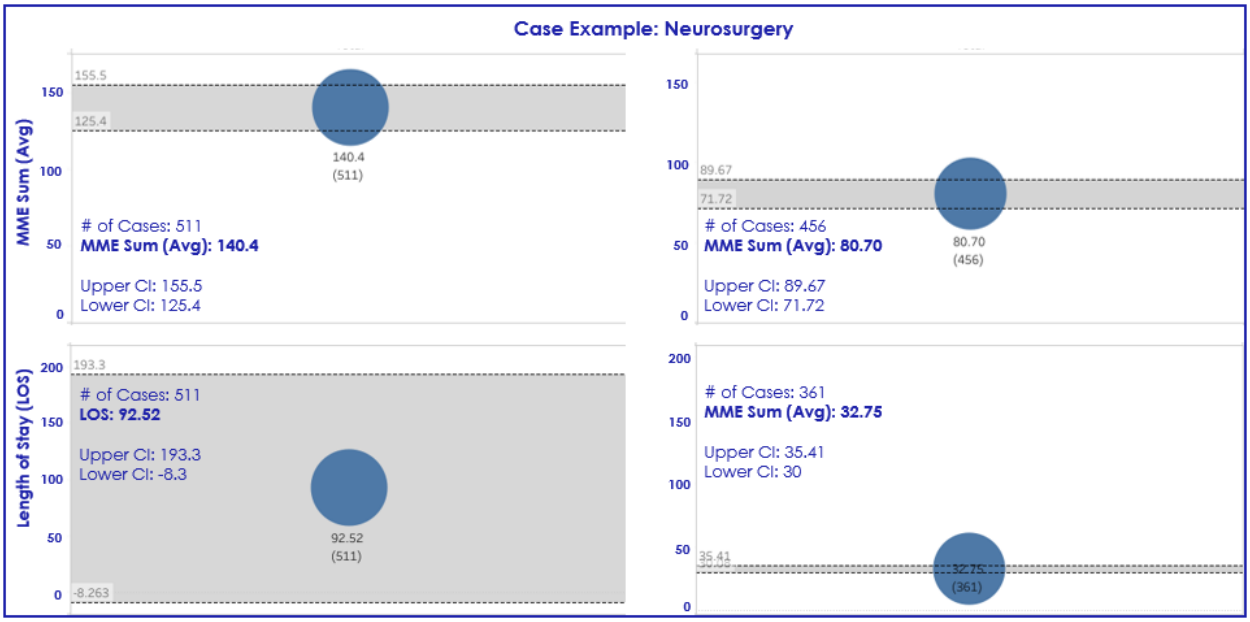
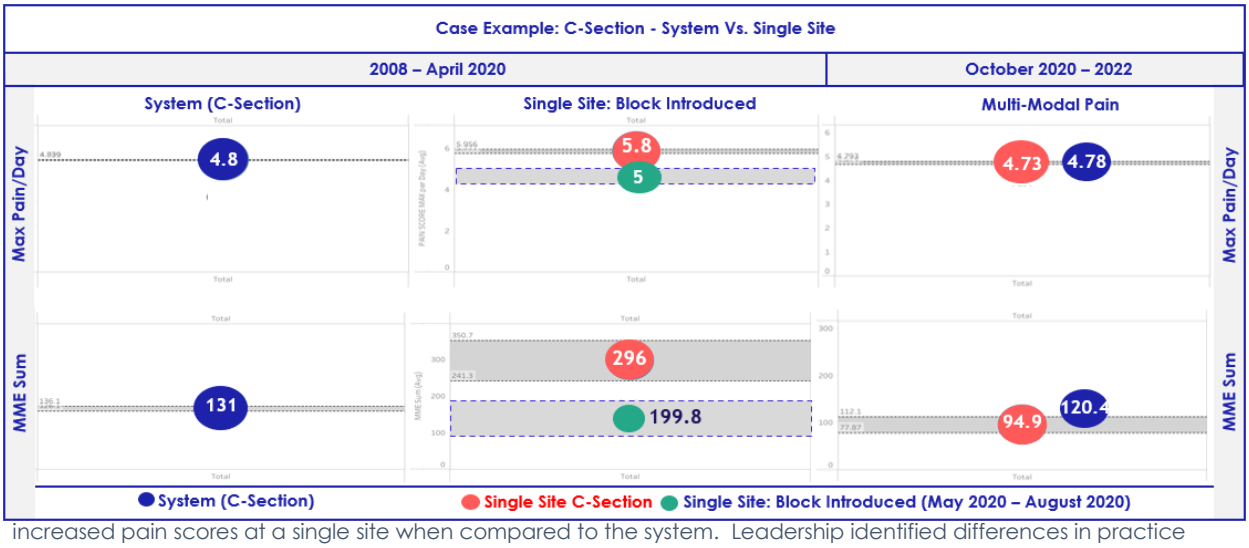



**Figure 15 – Neurosurgery case example**. Scheduled multimodal pain medications added to a single providers postoperative orders led to significant decreases in MME/Hr. and LOS (Hrs.). Data once collected can be used as a tool for motivating and leading change across providers to encourage adoption and increased efficiencies in the postoperative phases of care.

In early 2020 one of our hospitals had MME requirements significantly higher than the system and less than optimal pain management outcomes. Using the opioid sparing dashboard, it was identified that most sites throughout the system were using neuraxial (intrathecal or epidural) morphine. A hospital in the system was not using this approach due to perceived side effects of the medication. After reviewing system outcomes, neuraxial morphine was implemented which improved their pain scores to one of the top performers in the system with statistically significant decreases in both MME/hr. requirements and length of stay. Postoperative order sets also had multimodal

medications scheduled and opioids listed in groupings of increasing MME/dose to support the pain stewardship initiatives. The reporting allows for easy visualization over




increased pain scores at a single site when compared to the system. Leadership identified differences in practice compared to sites with improved MME sum and max pain score metrics. By introducing a *neuraxial morphine* block the site was able to decrease max pain scores from 5.8 to 5 and MME sum from 296 down to 199.8. After the introduction of multimodal pain, the site was able to further decrease both the MME sum and max pain/day metrics.

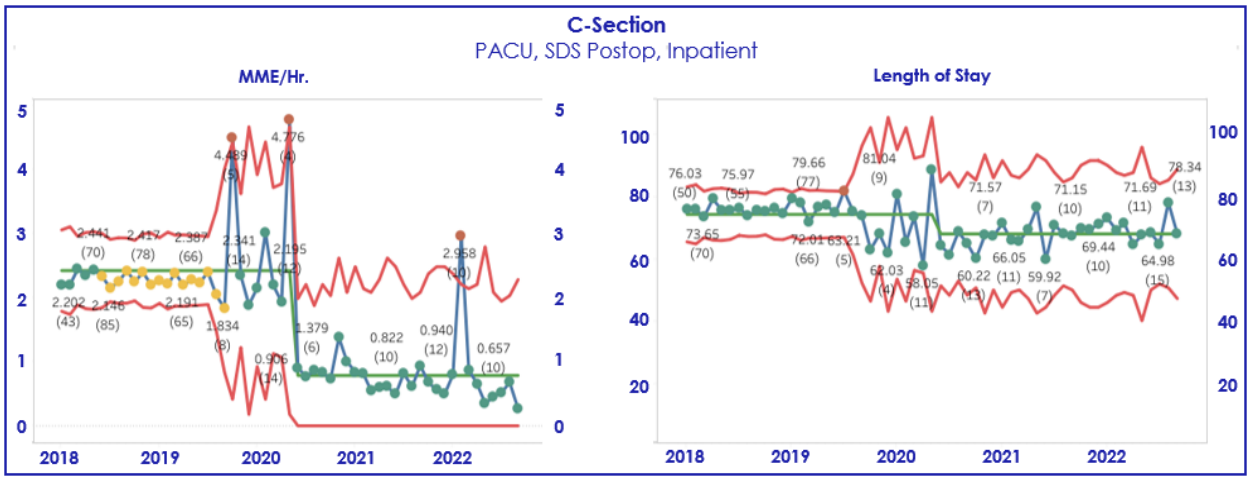



**Figure 17 – Mothers Undergoing a C-Section between 2018 and October 2022.**
Timeline visualizing decrease in MME/Hr. requirements and length of stay outcomes overtime at single site after introducing neuraxial morphine.

time of impactful interventions which allows for increased adoption. (Figures 16, 17)

These same opioid-sparing techniques applied in our orthopedic patients became our lifeline throughout the Covid-19 pandemic as we needed comfortable, alert, non-nauseated, home-going patients to free up beds for our citizens with Covid-19. The benefit continued as we expanded the implementation of our ambulatory surgical centers (ASCs) which require same day surgeries and efficient workflows. With significant decreases in opioid requirements, length of stay, and PONV for total knees replacement patients, we were able to successfully transition these cases to outpatient care. (Figures 18,19, Next page)

With the opioid sparing tool, anesthesia leadership could evaluate the role of various blocks used in total knee arthroplasties and how effective certain scheduled multimodal pain medications were for specific surgical cases. With the increased visualization provided by reporting we could track interventions overtime and monitor compliance to standards amongst the surgical specialties. Opioid stewardship teams developed a compliance dashboard for tracking use multimodal pain orders. Multimodal pain compliance has been a watch metric

since the beginning with high compliance at the start and compliance at 89.52% between May 2022 – May 2023. (Figure 20) With the data easily accessible the tool became a vehicle to drive

and maintain standards making it easy to evaluate current state, defining points for intervention, and the outcomes of interventions post implementation.

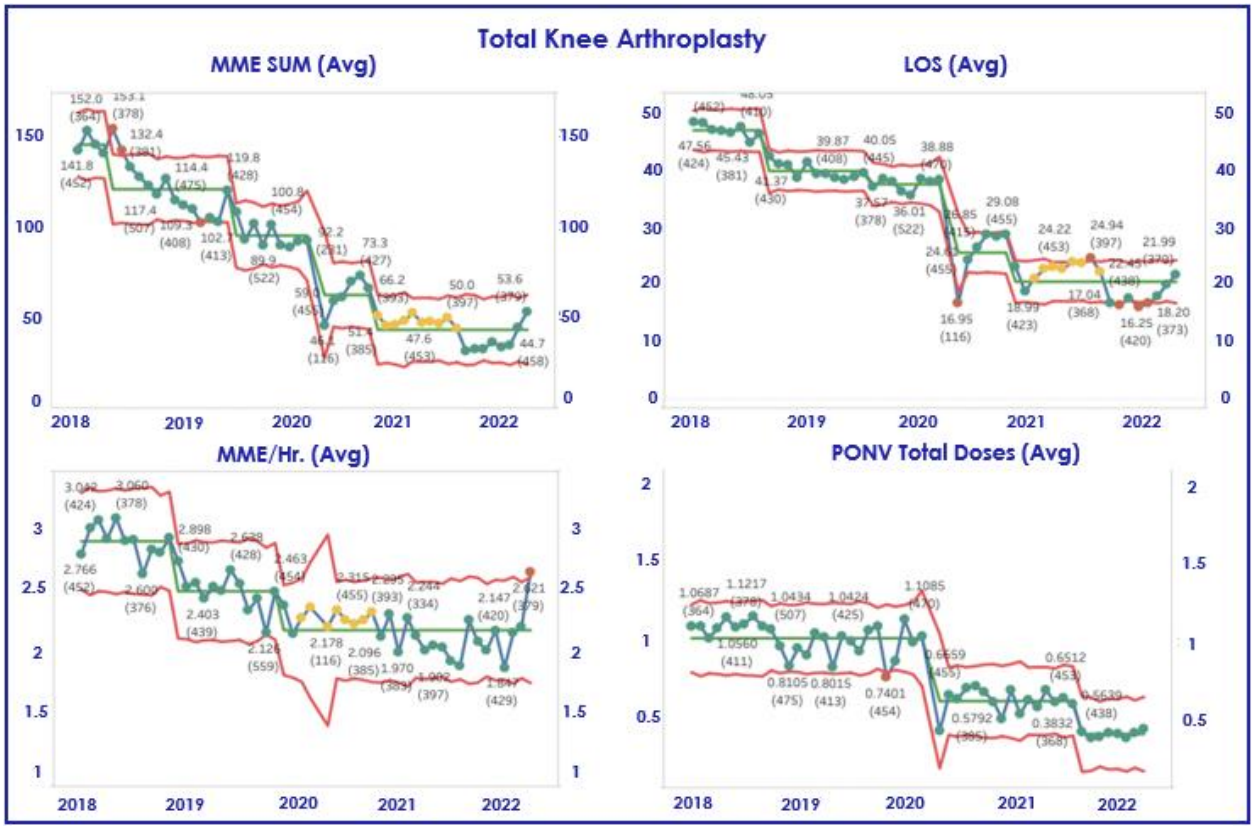



**Figure 19 – Total knee arthroplasty cases: 2018 – 2022**
Outcomes over time of the opioid stewardship initiatives in practice. Various interventions were introduced in 2020 resulting in significant reductions in the MME/Hr. and total sum with corresponding decreases in LOS (Hrs.) and PONV.

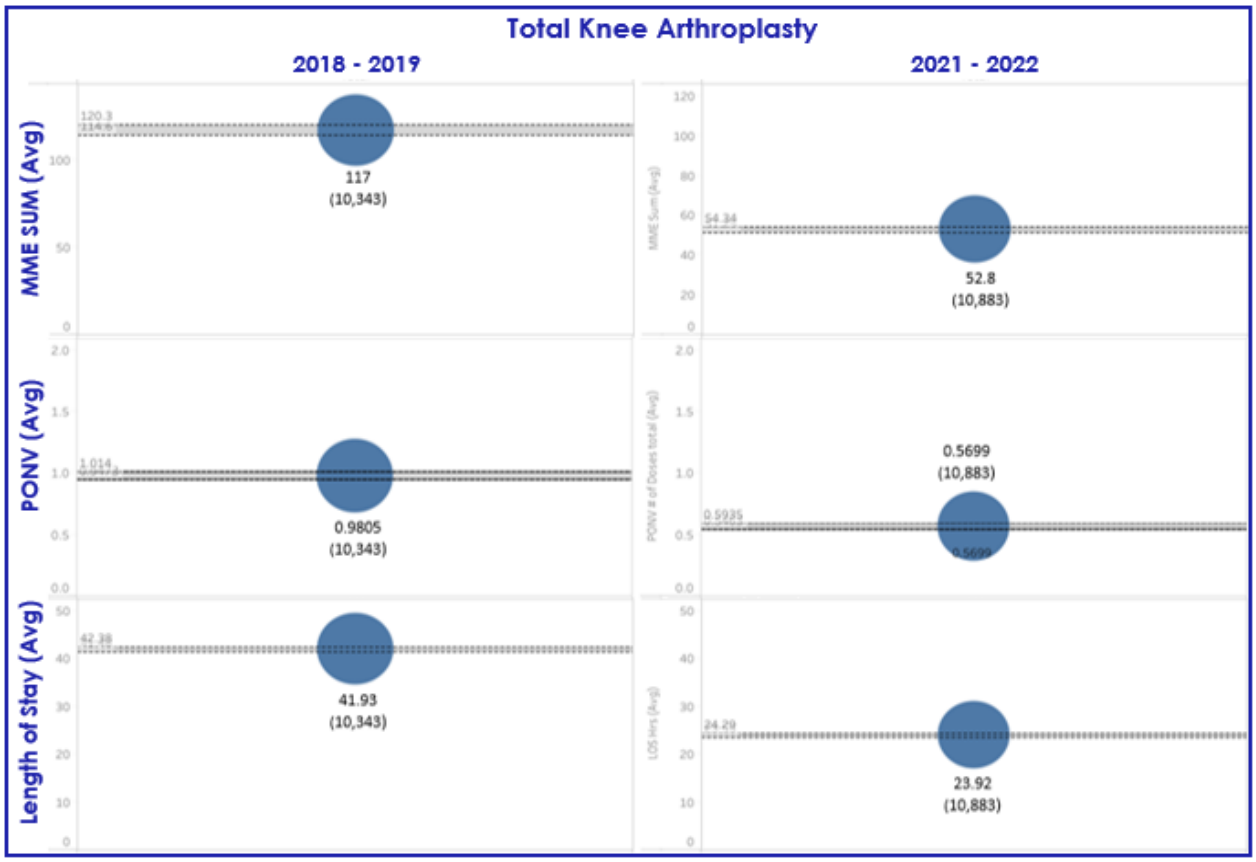



**Figure 18 –** Significant reduction in opioid requirements with increased use of non-opioid alternatives led to decreases in length of stay and PONV in patients all leading to quicker discharges and increased utility of outpatient surgery for this total knee arthroplasties.

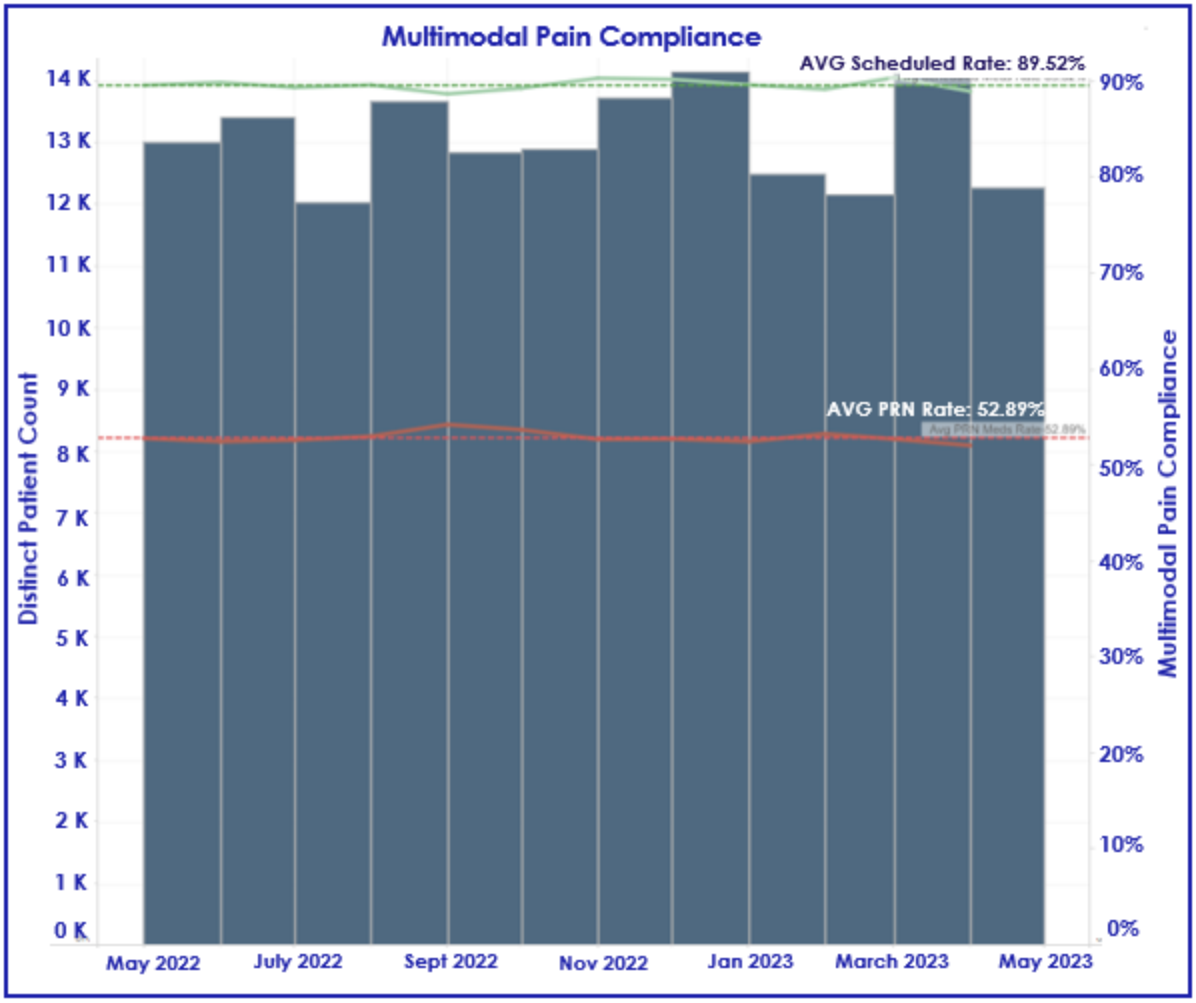



**Figure 20– Multimodal Pain Compliance Dashboard.**
Initial goals with the introduction of multimodal pain into workflows was to update the order sets. As a new way of managing pain for the system initial compliance metrics were not established. However, multimodal pain compliance was high at roll out for each surgical specialty and compliance has been a watch metric since roll out.

Intermountain Health successfully used technology to incorporate data into provider workflows to reduce opioid exposure, dependence, and addiction. System initiatives all aiming at the same target, reducing the impact of opioids on our patients and communities, allowed us to align and take a multi factorial collaborative approach to address the opioid epidemic. Considering the entire workflow, from the time the patient enters our healthcare systems to the time their care is completed allows for a holistic and comprehensive approach for continuity of interventions that support each other along the path to healthy outcomes. Continuous team efforts in education and optimizing a multidisciplinary approach to pain management was essential. Real time data and reporting allowed our teams to identify, implement, and evaluate the impact of interventions and increase adoption. With increased adoption and adherence came improved quality of care, outcomes, improved patient satisfaction, and ultimately decreases in opioid dependence and addiction. It also allowed us to pivot and adjust practice as needed which aligned with our goals for continuous improvement. Collaboration amongst teams and a safer approach to pain management allowed us to align goals that had significant impact to clinical practice, patients safety, and our communities.

References


1. What is the U.S Opioid Epidemic? U.S. Department of Health and Human Services. Published October 27, 2021. Accessed September 27, 2022. www.hhs.gov/opioids/about-the-epidemic/index.html
2. Sheldon, RR et al. Stemming the Tide of Opioid Addiction – Dramatic Reductions in Postoperative Opioid Requirements Through Preoperative Education and a Standardized Analgesic Regimen. *Mil Med*. 2020;185(3/4): (436-444). doi: 10.1093/milmed/usz279
3. R3 Report Issue 11: Pain Assessment and Management Standards for Hospitals. The Joint Commission. Published January 1, 2018. Accessed September 27, 2022. www.jointcommission.org/standards/r3-report/r3-report-issue-11-pain-assessment-and-management-standards-for-hospitals/


**Primary Contact Information:**


**Farukh Usmani, MD, MS**
Medical Director, Digital Technology Services
Intermountain Health
Email: **Farukh.Usmani@imail.org**