



The Billion Pill Pledge: How Iowa is Modeling the Way Nationally for Opioid Prevention



John Greenwood

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Disclosures:

Hold stock options in Intuitive
Hold COO position and stock option in Goldfinch Health

Learning Objectives

- Learn how the **Iowa primary prevention program** can **decrease opioid misuse and diversion**
- Define **Enhanced Recovery strategies** and how they **optimize surgery outcomes** leading to improved patient health outcomes, savings in healthcare costs, and a reduction in the need for opioids post-surgery.
- Identify **alternatives to opioids** and opioid-sparing protocols – including multi-modal pain management

Gateway to opioid addiction

Opioid Prescribing in US/Canada vs. Elsewhere

JAMA Network | **Open**

Original Investigation | Anesthesiology

Opioid Prescribing After Surgery in the United States, Canada, and Sweden

Karim S. Ladda, MD, MSc; Mark D. Neuman, MD, MSc; Gabriella Broms, MD, PhD; Jennifer Bethell, PhD; Brian T. Bateman, MD, MSc; Duminda N. Wijeyesundara, MD, PhD; Max Bell, MD, PhD; Linn Hallqvist, MD; Tobias Svensson, MSc; Craig W. Newcomb, MSc; Colleen M. Brensinger, MS; Lakisha J. Gaskins, MHS; Hannah Wunsch, MD, MSc

Abstract

IMPORTANCE Small studies and anecdotal evidence suggest marked differences in the use of opioids after surgery internationally; however, this has not been evaluated systematically across populations receiving similar procedures in different countries.

OBJECTIVE To determine whether there are differences in the frequency, amount, and type of opioids dispensed after surgery among the United States, Canada, and Sweden.

DESIGN, SETTING, AND PARTICIPANTS This cohort study included patients without previous opioid prescriptions aged 16 to 64 years who underwent 4 low-risk surgical procedures (ie, laparoscopic cholecystectomy, laparoscopic appendectomy, arthroscopic knee meniscectomy, and breast excision) between January 2013 and December 2015 in the United States, between July 2013 and March 2016 in Canada, and between January 2013 and December 2014 in Sweden. Data analysis was conducted in all 3 countries from July 2018 to October 2018.

MAIN OUTCOMES AND MEASURES The main outcome was postoperative opioid prescriptions filled within 7 days after discharge; the percentage of patients who filled a prescription, the total morphine milligram equivalent (MME) dose, and type of opioid dispensed were compared.

RESULTS The study sample consisted of 129 379 patients in the United States, 84 653 in Canada, and 9802 in Sweden. Overall, 52 427 patients (40.5%) in the United States were men, with a mean (SD) age of 45.1 (12.7) years; in Canada, 25 074 patients (29.6%) were men, with a mean (SD) age of 43.5 (13.0) years; and in Sweden, 3314 (33.8%) were men, with a mean (SD) age of 42.5 (13.0). The proportion of patients in Sweden who filled an opioid prescription within the first 7 days after discharge for any procedure was lower than patients treated in the United States and Canada (Sweden, 1086 [11.1%]; United States, 98 594 [76.2%]; Canada, 66 544 [78.6%]; $P < .001$). For patients who filled a prescription, the mean (SD) MME dispensed within 7 days of discharge was highest in United States (247 [145] MME vs 169 [93] MME in Canada and 197 [191] MME in Sweden). Codeine and tramadol were more commonly dispensed in Canada (codeine, 26 136 patients [39.3%]; tramadol, 12 285 patients [18.5%]) and Sweden (codeine, 170 patients [15.7%]; tramadol, 315 patients [29.0%]) than in the United States (codeine, 3210 patients [3.3%]; tramadol, 3425 patients [3.5%]).

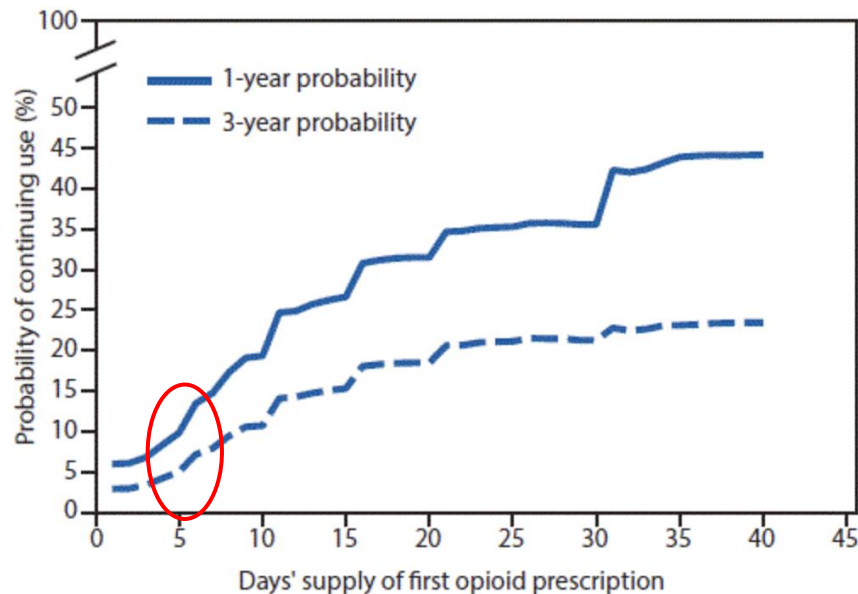
CONCLUSIONS AND RELEVANCE The findings indicate that the United States and Canada have a 7-fold higher rate of opioid prescriptions filled in the immediate postoperative period compared with Sweden. Of the 3 countries examined, the mean dose of opioids for most surgical procedures was highest in the United States.

JAMA Network Open. 2019;2(9):e1910734. doi:10.1001/jamanetworkopen.2019.10734

- Study Details (Sept 2019)
 - Journal of American Medical Association
 - 130,000 patients
- "The findings indicate that the United States and Canada have a 7-fold higher rate of opioid prescriptions filled in the immediate postoperative period compared with Sweden"
- Takeaway: North America has a unique opioid problem

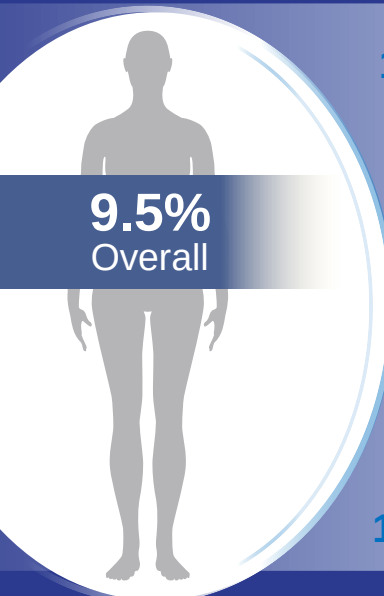
Risk of Persistent Opioid Use

FIGURE 1. One- and 3-year probabilities of continued opioid use among opioid-naïve patients, by number of days' supply* of the first opioid prescription — United States, 2006–2015



Impact of Opioid-Dependent Analgesia

Percentage of Newly Persistent Opioid Patients*



9.5%
Overall

10.2% Rotator cuff

17.6% Colectomy

7.5% Hysterectomy

8.5% Sleeve gastrectomy

7.2% Hernia

9.9% Total hip

16.7% Total knee



1 in 15 surgical patients who are prescribed an opioid go on to long-term use or abuse^{2,3}



>4 out of 5 new heroin users started out misusing opioid pain relievers⁴

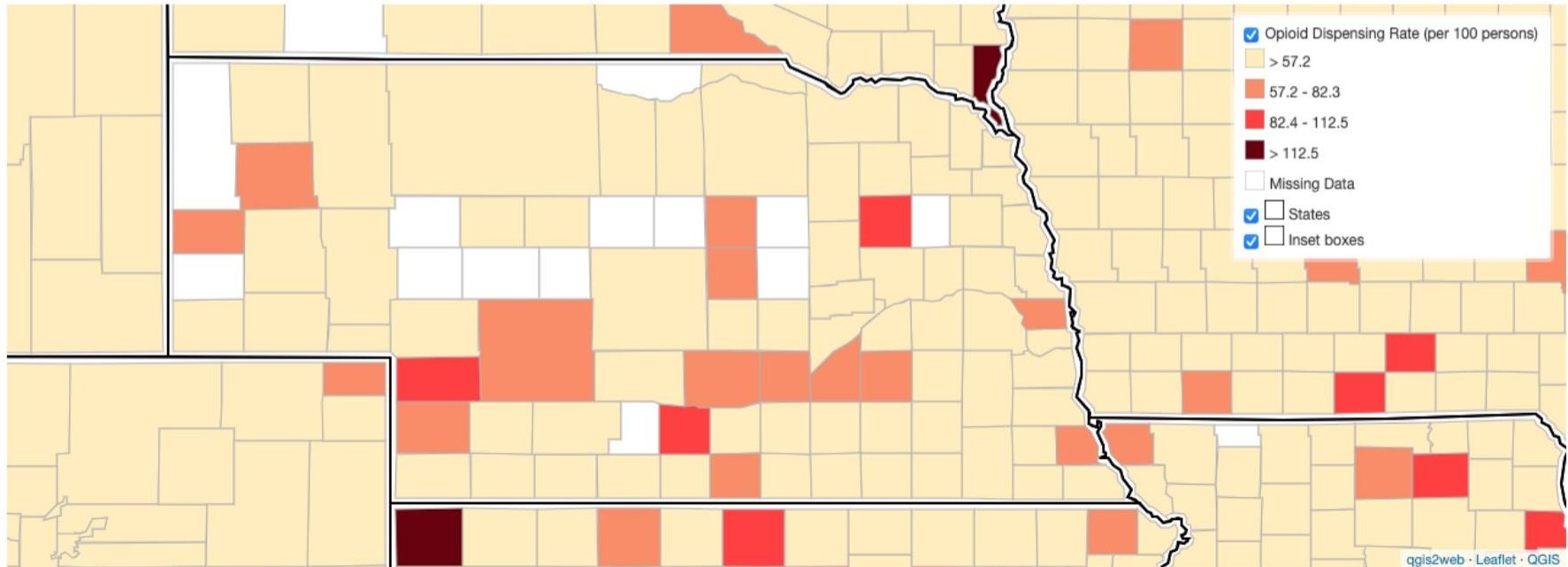


53% of people who are using pain relievers for nonmedical reasons obtained them from a friend or relative⁵

32% Decrease in Nebraska Opioid Dispensing Rates

2013: 71 Rx/100 people and ranked 35th

2020: 48 Rx/100 and ranked 12th



The Reality of Prescription Opioids

- The National Institute of Drug Abuse (NIDA) cited frightening statistics about prescription opioids (March 2021)
 - 21 - 29% of patients **prescribed opioids for chronic pain misuse them**
 - 8-12% of people **using an opioid for chronic pain develop an opioid use disorder**
 - About 80% of people **who use heroin first missed prescription opioids**

Opioid Prescriptions Impact the Whole Family

Study Details: 1.7 million adults, 1.2 million households

Increased risk of opioid OD
with one Rx



60%

Increased risk of opioid
OD with two Rx in
household

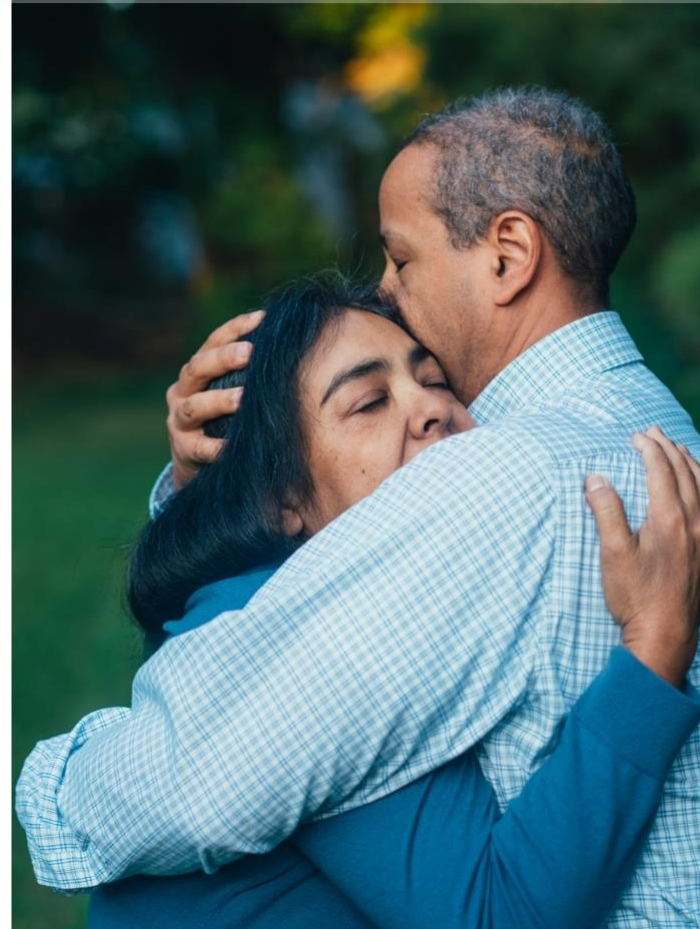


625%

Opioids leading cause of childhood poisoning deaths

www.aap.org/en/news-room/news-releases/pediatrics2/2022/study-opioid-poisoning-deaths-rising-disproportionately-in-infants-young-children

Michelle A. Hendricks, PhD¹; Sanae El Ibrahim, PhD,
MPH^{1,2}; Grant A. Ritter, PhD³; et al. JAMA Netw
Open. 2023;6(3):e233385



Previous policies have fallen short
of curbing the Opioid Crisis



Study: Has Prescription Monitoring Curbed the Opioid Epidemic?

- Study details (July 2022)
Production and Operations Management
- PDMPs decreased opioid prescriptions
6.1%
- No reduction in deaths due to prescription
opioids
- 50% increase in heroin-related deaths

Long-Term Opioid Use and \$\$\$

- Study Details

Journal of Managed Care Pharmacy, June 2021

2+ million patients

- New persistent opioid users, 1 year after surgery (total health care costs)

- Commercial outpatient: \$18,751 vs. \$7,517

- Commercial inpatient: \$29,499 vs. \$11,798

- Takeaway: Opioid use not only increases risk to patients and families by increases costs as well

760 RESEARCH

Increased health care costs associated with new persistent opioid use after major surgery in opioid-naïve patients

Chad M Brummett, MD; Jackie Evans-Shields, PharmD; Christina England, MPH; Amanda M Kong, DrPH; Carolyn R Lew, PhD; Caroline Henriques, MPH; Nicole M Zimmerman, MS; and Eric C Sun, MD, PhD

What is already known about this subject

- Patients who are prescribed opioids for postoperative pain are at higher risk for new persistent opioid use than those who are not prescribed opioids.
- Receipt of an opioid prescription is associated with higher health care utilization and costs; however, the economic impact of new persistent opioid use after surgery among opioid-naïve patients has not been studied adequately.
- Opioid use and misuse is common across all major payer types (commercial, Medicare, Medicaid).

What this study adds

- Although new persistent opioid use and associated costs have been previously demonstrated for various specific surgery types, this study shows that the effect of persistent use on costs may be generalizable to all major surgeries across all 3 major payer types.
- This study showed that previously opioid-naïve patients with new persistent opioid use after a major surgical procedure had higher adjusted health care utilization and costs in the year following their surgery than those who did not have persistent use, regardless of payer.
- Adjusted all-cause health care costs were 1.62- to 2.50-fold higher for patients with new persistent use than for those without, with incremental costs between \$5,598 and \$17,702, depending on payer and surgical setting.

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J Manag Care Spec Pharm.
2021;27(6):760-71

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ABSTRACT

BACKGROUND: Opioid use after surgery is associated with increased health care utilization and costs. Although some studies show that surgical patients may later become persistent opioid users, data on the association between new persistent opioid use after surgery and health care utilization and costs are lacking.

OBJECTIVE: To compare health care utilization and costs after major inpatient or

outpatient surgery among opioid-naïve patients who had new persistent opioid use after surgery versus those who did not become new persistent opioid users after surgery.

METHODS: The IBM MarketScan Research databases were used to identify opioid-naïve patients with major inpatient or outpatient surgeries and at least 1 year of continuous enrollment before and after this index surgery. Cohorts were stratified by new persistent opioid utilization status, setting

of surgery (inpatient, outpatient), and payer (commercial, Medicare, Medicaid). Patients were considered new persistent opioid users if they had at least 1 opioid claim 4-90 days after index surgery and at least 1 opioid claim 91-180 days after index surgery. Patients with opioid prescription claims between 1 year and 15 days before their index event were excluded. Health care utilization and costs (excluding index surgery) were measured in the 1-year period after surgery. Predicted costs and cost ratios were

Medicaid & "Safe" Opioids

- Study Details
 - PLOS Digital Health/Stanford
 - August 2022
 - 180,000 patients
- 30% of opioid-naïve Medicaid patients develop a dependency after prescription
- Weak opioid agonist (Tramadol) prescribing is not "safer"
- Takeaway: **Special consideration is required for vulnerable populations**

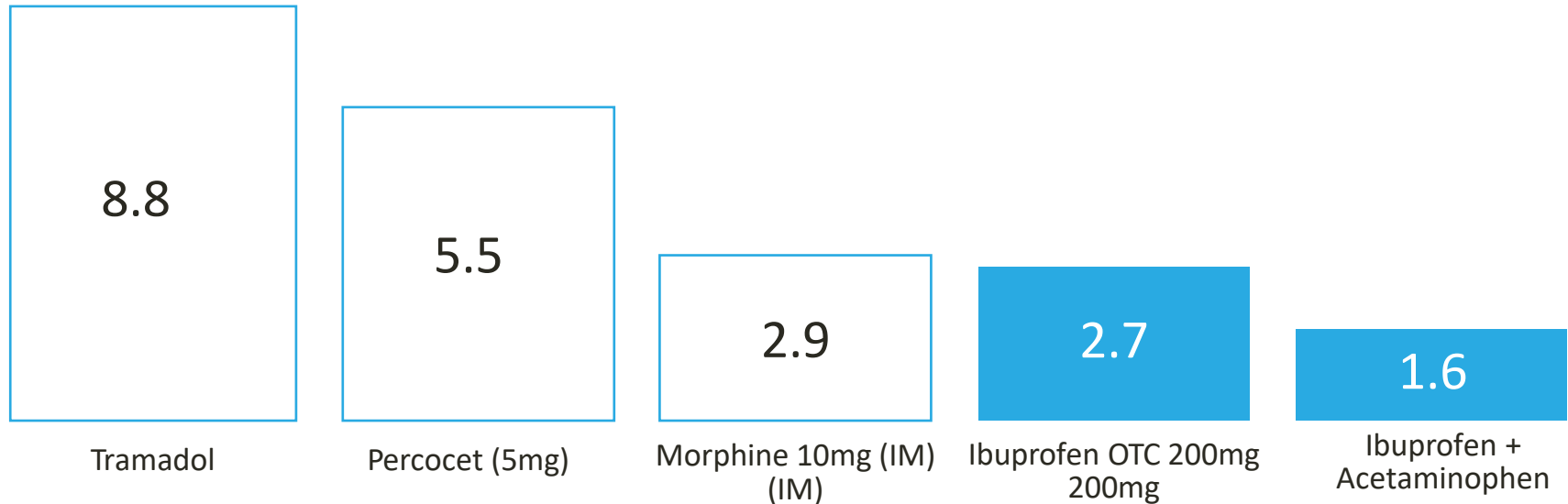


Pain medication: what is the “good stuff?”

“... in the majority of situations in which opioid painkillers are used today, they are not appropriate”
not appropriate”

Don Teater, MD, National Safety Council

Number of people needed to treat for *ONE patient* to get 50% pain relief



High Opioid Doses Linked to Increase in Complications after Orthopedic Surgery

“In summary our data show that **when you prescribe more opioids, you will have more complications,**” said Dr. Memtsoudis... “Further, these data should entice clinicians and patients to **look for ways to minimize opioid-based pain management...**”

- 50% increased odds for **gastrointestinal complications, deep venous thrombosis, and postoperative infections** in patients who underwent joint-replacement surgery
- 37% increase in **infection rates**
- 30% increased odds for **pulmonary embolism**
- 15% increased odds for **respiratory and urinary complications** following joint-replacement surgery

THE RECIPE FOR SUCCESS

A comprehensive approach to surgery and recovery.



Key Aspects of Enhanced Recovery



Prehabilitation

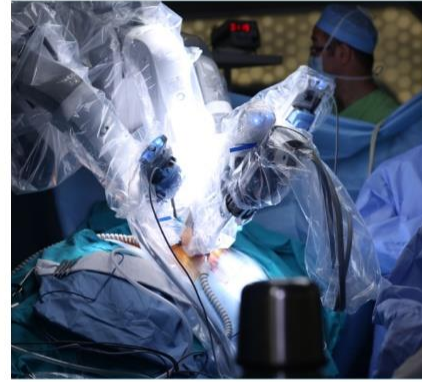
Patient education and nutritional preparation are critical to an optimal surgery and recovery experience.



Multimodal pain management

Use of several pain medications in the body better controls patient pain before, during, and after surgery.

- "TLC"
- Scheduled Pain Management
- Oxycodone PRN



Minimally-invasive surgery

Laparoscopic and robotic-assisted surgery— preferred in most procedures today—reduce trauma to the patient's body by minimizing the size of surgical incisions.

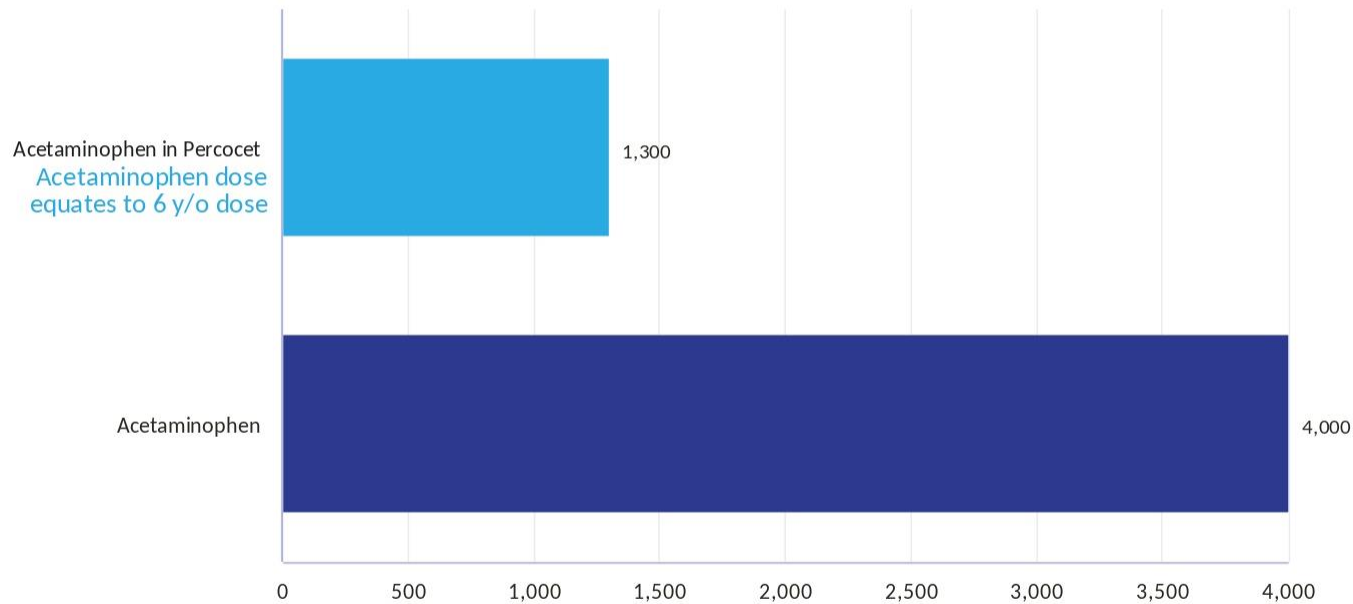


Post-surgery support

Expert nurse navigation in the stressful post-surgery period drives patient adherence to care plan, enhances satisfaction, improves recovery time, and prevents unnecessary and expensive ER visits.

Optimize Acetaminophen Dosing

Daily dosing (mg) for stand alone Acetaminophen versus Percocet



Enhanced Recovery:

The Results

Enhanced recovery after surgery (ERAS) protocol is associated with lower post-operative opioid use and a reduced office burden after minimally invasive surgery

Khrystyna Levytska ^a , Ziqing Yu ^b, Meghan Wally ^b, Susan Odum ^{b, d}, Joseph R. Hsu ^b, Rachel Seymour ^b, Jubilee Brown ^c, Erin K. Crane ^c, David L. Tait ^c, Allison M. Puechl ^c, Brittany Lees ^c, R. Wendel Naumann ^c
PRIMUM Group

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- 20% improvement in same-day discharge
- 65% reduction in readmissions
- 53% reduction in opioid refills/MMEs cut in half
- 74% reduction in unplanned visits
- 60% fewer phone calls related to pain



Billion Pill Pledge - Initial Results

Opioid settlement funded, Billion Pill Pledge includes participating rural hospitals

Average Opioid Prescription Reduction	70%	Pre-BPP AVG: 62 Current BPP AVG: 18.3
Average # of Opioids Utilized Post Discharge	~8	Benchmark 27 doses for patients experiencing pain
Patients with an opioid refill	1.7%	25% benchmark
Post Surgery ER Visit	<1%	7% benchmark

Systematic review and meta-analysis of enhanced recovery programmes in surgical patients

A. Nicholson¹, M. C. Lowe⁴, J. Parker⁵, S. R. Lewis², P. Alderson² and A. F. Smith³

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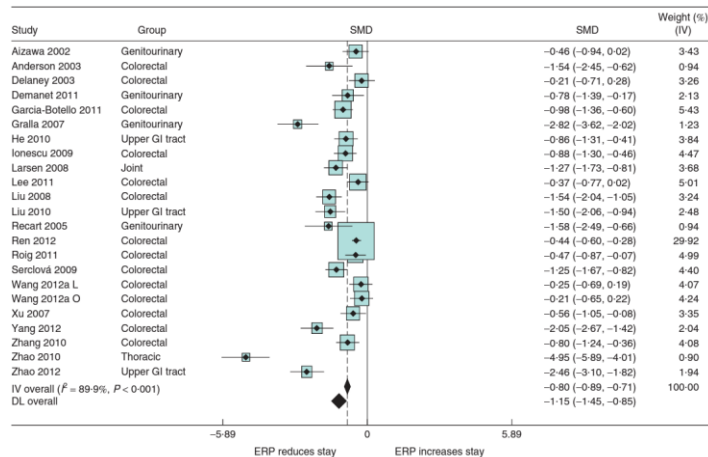


Fig. 6 Meta-analyses of length of primary hospital stay in enhanced recovery programme (ERP) versus control groups. Standardized mean differences (SMDs) are shown with 95 per cent confidence intervals. Overall effect estimates are shown for inverse-variance (IV) fixed-effect and DerSimonian and Laird (DL) random-effects models. GI, gastrointestinal; L, laparoscopic; O, open

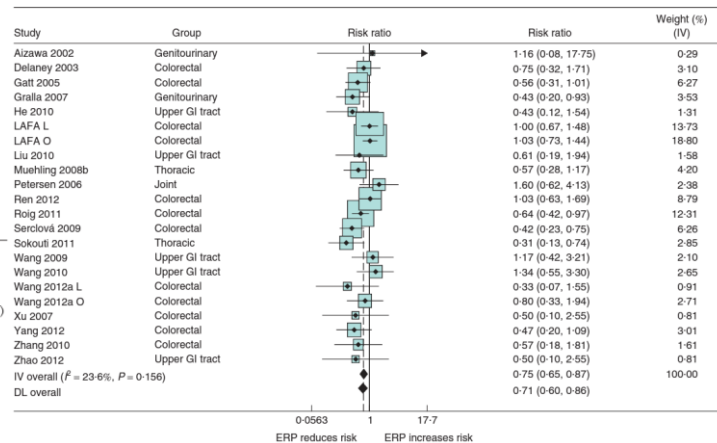


Fig. 3 Meta-analyses of all complications (by patient) in enhanced recovery programme (ERP) versus control groups. Risk ratios are shown with 95 per cent confidence intervals. Overall effect estimates are shown for inverse-variance (IV) fixed-effect and DerSimonian and Laird (DL) random-effects models. GI, gastrointestinal; LAFa, LAParoscopic and/or FAs track multimodal management versus standard care trial; L, laparoscopic; O, open

ERAS has consistently demonstrated lower LOS for TKA and THA, without an increase in complications

- Feder Ol, et al.
- McDonald et. al.
- Auyong et. al.
- denHertog et. al.
- Maempel et. al.
- Malviua et. al.
- Stambough et. al.
- Stowers et. al.



Faster Without Fasting: Pre-Arthroplasty Hydration Hastens Mobilization at Tertiary Care Hospital

Jacob Drew, MD¹, C. Elizabeth Keleher¹, Muzna Ali¹, Kevin Kennedy, BS¹, Julian Zapata, Ayesha Abdeen¹, MD, FRCS(C)
¹Beth Israel Deaconess Medical Center, Boston, MA

Introduction

As feasibility of outpatient arthroplasty for younger, healthier patients at ambulatory surgery centers grows, early postoperative mobilization and timely discharge remains challenging among the hip and knee arthroplasty population typically encountered at tertiary care hospitals.

We hypothesized that **modification of traditional preoperative overnight fasting in favor of guided preoperative nutrition & hydration** in this setting would

1. Increase early participation in physical therapy (PT)
2. Reduce postoperative hypotension
3. Decrease length of stay (LOS).

Methods

This IRB-approved study matched 200 consecutive primary hip and knee arthroplasty patients who were prescribed the new Hydration protocol to a retrospective matched group of 200 arthroplasty subjects who previously had surgery under "traditional" (NPO after midnight) guidelines. The Hydration group received Ensure 6-12 hours and Gatorade 2 hours prior to arrival for surgery. Groups were compared using chi-square and Student's T-tests.



- Traditional and Hydration groups were similar in age, gender, BMI, and ASA (Table 1).
- Nearly half (46.5%) of included subjects were ASA 3 or 4.
- 163 Hydration subjects were compliant with the protocol (81.5%).

Early Participation in Physical Therapy

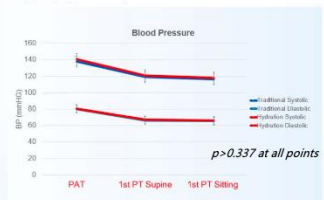
- Hydration subjects participated in a higher number of PT sessions than the Traditional group (mean 4.15, SD 2.04 versus 3.26, SD 1.39, $p < 0.001$)
- Hydration subjects walked a greater distance than the Traditional group (mean 80.24 feet, SD 94.92 versus 51.72, SD 92.45, $p = 0.010$).
- Dizziness during the first PT session occurred in 28.2% of Hydration and 32.5% of Traditional patients ($p < 0.004$).

Postoperative Hypotension

- Postoperative blood pressure was similar between the groups ($p > 0.337$).

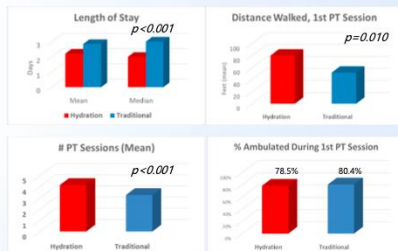
Length of Stay

- Median LOS was 2.00 days for the "hydration" group compared to 3.00 for the "traditional" group ($p < 0.001$).



Results

	TRADITIONAL n = 163	HYDRATION n = 200	P-Value
Gender			0.643
F	98 (60.1%)	125 (62.5%)	
M	65 (39.9%)	75 (37.5%)	
Age at Surgery			0.848
Mean $\pm$ SD	65.77 $\pm$ 9.89	65.97 $\pm$ 9.71	
Median (IQR)	66.00 (60.00, 73.00)	66.00 (60.00, 73.00)	
BMI			0.286
Mean $\pm$ SD	31.05 $\pm$ 6.51	30.35 $\pm$ 6.00	
Median (IQR)	30.70 (26.31, 35.19)	29.32 (26.24, 33.85)	
ASA Score			0.276
1	1 (0.6%)	2 (1.0%)	
2	84 (51.5%)	104 (52.0%)	
3	75 (46.0%)	94 (47.0%)	
4	3 (1.8%)	0 (0.0%)	
Procedure Type			0.998
THR	66 (40.5%)	81 (40.5%)	
TKR	97 (59.5%)	119 (59.5%)	
Laterality			0.221
BILATERAL	0 (0.0%)	1 (0.5%)	
L	70 (42.9%)	101 (50.5%)	
R	93 (57.1%)	98 (49.0%)	



Conclusions

Institution of a preoperative hydration protocol for arthroplasty patients at a tertiary care hospital significantly improved early participation with PT and reduced LOS but did not change postoperative hypotension when compared to the traditional preoperative fasting protocol.

Preoperative hydration benefits patients with significant medical comorbidities and should be considered for patients with planned admission to a tertiary care hospital following hip and knee arthroplasty.

Early Participation in Physical Therapy

- Hydration subjects participated in a higher number of PT sessions than the Traditional group (mean 4.15, SD 2.04 versus 3.26, SD 1.39, $p < 0.001$)
- Hydration subjects walked a greater distance than the Traditional group (mean 80.24 feet, SD 94.92 versus 51.72, SD 92.45, $p = 0.010$).
- Dizziness during the first PT session occurred in 28.2% of Hydration and 32.5% of Traditional patients ($p < 0.004$).

Postoperative Hypotension

- Postoperative blood pressure was similar between the groups ($p > 0.337$).

Length of Stay

- Median LOS was 2.00 days for the "hydration" group compared to 3.00 for the "traditional" group ($p < 0.001$).

Association of Multimodal Pain Management Strategies with Perioperative Outcomes and Resource Utilization

A Population-based Study

Stavros G. Memtsoudis, M.D., Ph.D., F.C.C.P., Jashvant Poeran, M.D., Ph.D., Nicole Zubizarreta, M.P.H., Crispiana Cozowicz, M.D., Eva E. Mörwald, M.D., Edward R. Mariano, M.D., M.A.S., Madhu Mazumdar, Ph.D.

Background: Multimodal analgesia is increasingly considered routine practice in joint arthroplasties, but supportive largescale data are scarce. The authors aimed to determine how the number and type of analgesic modes is associated with reduced opioid prescription, complications, and resource utilization. Methods: Total hip/knee arthroplasties (N = 512,393 and N = 1,028,069, respectively) from the Premier Perspective database (2006 to 2016) were included. Analgesic modes considered were opioids, peripheral nerve blocks, acetaminophen, steroids, gabapentin/pregabalin, nonsteroidal anti-inflammatory drugs, cyclooxygenase-2 inhibitors, or ketamine. Groups were categorized into “opioids only” and 1, 2, or more than 2 additional modes. Multilevel models measured associations between multimodal analgesia and opioid prescription, cost/length of hospitalization, and opioid-related adverse effects. Odds ratios or percent change and 95% CIs are reported. Results: Overall, 85.6% (N = 1,318,165) of patients received multimodal analgesia. In multivariable models, additions of analgesic modes were associated with stepwise positive effects: total hip arthroplasty patients receiving more than 2 modes (compared to “opioids only”) experienced 19% fewer respiratory (odds ratio, 0.81; 95% CI, 0.70 to 0.94; unadjusted 1.0% [N = 1,513] vs. 2.0% [N = 1,546]), 26% fewer gastrointestinal (odds ratio, 0.74; 95% CI, 0.65 to 0.84; unadjusted 1.5% [N = 2,234] vs. 2.5% [N = 1,984]) complications, up to a –18.5% decrease in opioid prescription (95% CI, –19.7% to –17.2%; 205 vs. 300 overall median oral morphine equivalents), and a –12.1% decrease (95% CI, –12.8% to –11.5%; 2 vs. 3 median days) in length of stay (all P < 0.05). Total knee arthroplasty analyses showed similar patterns. Nonsteroidal antiinflammatory drugs and cyclooxygenase-2 inhibitors seemed to be the most effective modalities used.

Conclusions: While the optimal multimodal regimen is still not known, the authors' findings encourage

Multimodal approaches and tailored therapies for pain management: the trolley analgesic model

Arturo Cuomo^{1,*}

Sabrina Bimonte^{1,*}

Cira Antonietta Forte¹

Gerardo Botti²

Marco Cascella¹

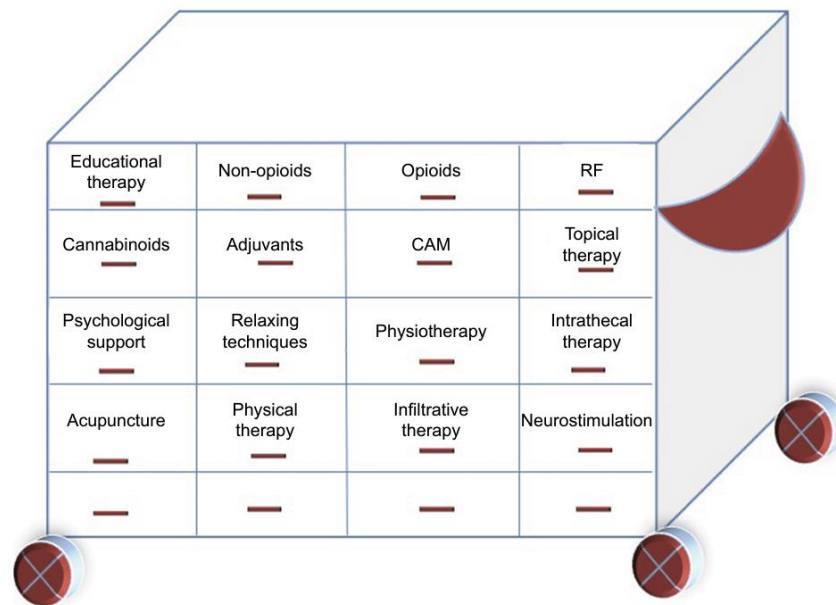


Figure 1 The analgesic trolley model for pain management.

Abbreviations: CAM, complementary and alternative medicine; RF, radiofrequency.



REVIEW ARTICLE/BRIEF REVIEW

Optimizing pain management to facilitate Enhanced Recovery After Surgery pathways

Optimiser le contrôle de la douleur pour faciliter la Récupération rapide après la chirurgie

Mingjuan Tan, BA · Lawrence Siu-Chun Law, BSSc ·
Tong Joo Gan, MD

Gynecologic surgery
(Complex
cytoreductive, staging
and pelvic organ
prolapse surgeries)

(Kalogera *et al.* 2014)¹²⁰

Non-ERAS

- Not standardized

ERAS

- Celecoxib 400 mg *po* once
- Acetaminophen 1,000 mg *po* once
- Gabapentin 600 mg *po* once

Non-ERAS

- Local wound infiltration generally not used
- Triple antiemetics and prokinetics generally not used

ERAS

- Intravenous opioids at discretion of anesthesiologist supplemented with ketamine, ketorolac, or both
- Local anesthetic infiltration of bupivacaine at incision site after closure
- PONV prophylaxis with single dexamethasone bolus 4 mg *iv* plus droperidol 0.625 mg *iv* ($\pm$ 30 min before incision); and single bolus of granisetron 0.1 mg *iv* ($\pm$ 30 min before incision closure)

Non-ERAS

- Opioid PCA

ERAS

- Goal: no intravenous PCA
- Oxycodone 5–10 mg *po q4 h prn* pain > 3 or greater than patient stated comfort goal (5 mg for pain rated 4–6 or 10 mg for pain rated 7–10); for patients who received intrathecal analgesia, start 24 hr after intrathecal dose
- Acetaminophen 1 g *po q6–12 h*
- Ketorolac 15 mg *iv q6 h* for 4 doses, then ibuprofen 800 mg *po q6 h*. For NSAID-intolerant patients, tramadol 100 mg *po q6–12 h* starting on POD 1
- For breakthrough pain (pain more than 7 > 1 hr after receiving oxycodone), hydromorphone 0.4 mg *iv* once if patient did not receive intrathecal medications; may repeat once after 20 min if first dose ineffective
- Hydromorphone PCA started only if continued pain despite 2 doses of intravenous hydromorphone

ERAS Benefits

- Significantly decreased PCA opioid use in cytoreductive group (98.7% vs 33.3%) and decreased postoperative opioid use (80% decrease in the first 48 hr) with no change in pain scores
- Significantly shorter hospital LOS for all surgery types (4-day reduction)
- Significantly faster return of bowel function for complex cytoreductive [median (range) 3 (2–3) days vs 4 (3–5) days] and staging surgeries [2 (1–3) days vs 2 (2–3) days]
- Significantly faster return to general diet for all surgery types (1–5 days median difference)
- No difference in rate of severity of 30-day complications (ileus, bowel perforation, anastomotic leak, abscess) or mortality
- No difference in 30-day readmission rates or stay
- Insignificant 30-day cost savings of > \$7,600 USD per patient (18.8% reduction)

ERAS Disadvantages

- None



Enhanced recovery after surgery: A clinical review of implementation across multiple surgical subspecialties



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Key Points:

1. Multimodal narcotic-sparing pain control is the central tenet of all ERAS guidelines which encourages utilization of non-steroidal anti-inflammatory agents, acetaminophen, gabapentinoids, regional/neuraxial anesthetics, and intravenous ketamine or lidocaine infusions.
2. Multimodal postoperative pain control efforts allow for early mobilization without the side-effects of narcotics such as postoperative nausea/vomiting or constipation.
3. In patients undergoing mastectomy (with immediate subpectoral implant-based reconstruction) a multi-modal, opioid-sparing ERAS protocol has been shown to significantly reduce the amount of narcotic use in postoperative days 0-2. Mayo Clinic trial demonstrated significantly less narcotics use in postoperative days 0-3 for patients undergoing free-flap breast reconstruction using an abdominal donor site.
4. Demonstrate up to a 71% decrease in the amount of oral morphine equivalent used in ERAS cohorts when compared to traditional practice.
5. Implementation of ERAS multimodal analgesia during ventral hernia repair have shown a decreased opioid requirement postoperatively with near elimination of need for patient-controlled analgesia.
6. A meta-analysis of 27 randomized clinical trials showed while 50% of colorectal patients still used narcotics in hospitals, most did not need narcotics after discharge.

Enhanced Recovery After Surgery (ERAS)

A Perspective Review of Postoperative Pain Management Under ERAS Pathways and Its Role on Opioid Crisis in the United States

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TABLE 2. Current Trends in Opioid-sparing Under ERAS Guidelines

Preoperative
Opioid-sparing medications (NSAID, acetaminophen, gabapentin)
Change of pain (neuropathic) management strategies
Counseling and education
Reduce anxiety and pain catastrophizing
Intraoperative
Steroids
IV acetaminophen
NSAIDs
Alpha-2 agonists
NMDA antagonist
Neuraxial anesthesia
Postoperative
Acetaminophen
NSAIDs
Gabapentinoids
Transitional pain services
Opioids for pain rescue only

ERAS indicates Enhanced Recovery After Surgery; IV, intravenous; NMDA, N-methyl-D-aspartate; NSAID, nonsteroidal anti-inflammatory drugs.

CONCLUSIONS

Our perspective review identified a clear trend of ERAS protocols limiting intraoperative and postoperative opioid use by replacing them with different medications and non-pharmacological therapies. Patient and family counseling on perioperative opioid use, anxiety, and pain catastrophizing are important steps. Perioperative use of opioid-free anesthesia and analgesia regimens implemented as a significant component of ERAS protocols have proven to reduce or replace opioid use.

A pilot study of a breast surgery Enhanced Recovery After Surgery (ERAS) protocol to eliminate narcotic prescription at discharge

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Abstract

Background The evolving conceptualization of the management of surgical pain was a major contributor to the supply of narcotics that led to the opioid crisis. We designed and implemented a breast surgery-specific Enhanced Recovery After Surgery (ERAS) protocol using opioid-sparing techniques to eliminate narcotic prescription at discharge without sacrificing perioperative pain control.

Methods A pilot observational study included patients with and without cancer undergoing lumpectomy. The convenience sample consisted of an ERAS group and a control usual care (UC) group who underwent surgery during the same time period. Discharge narcotic prescriptions were compared after converting to oral morphine milligram equivalents (MME's). Postoperative day one and week one pain scores were also compared between the two groups.

Results Ninety ERAS and 67 UC patients were enrolled. Most lumpectomies were wire-localized, and half of the patients in each group had breast cancer. There were more obese patients in the ERAS group. UC lumpectomy patients were discharged with a median of 54.5 MMEs (range 0–120), while the ERAS lumpectomy patients were discharged with none ($p < 0.001$).

~~Postoperative pain scores were not significantly different between groups, and there were few complications.~~

Conclusion A breast surgery-specific ERAS protocol employing opioid-sparing techniques successfully eliminated postoperative narcotic prescription without sacrificing perioperative pain control or increasing postoperative complications. By promoting the adoption of similar protocols, surgeons can continue to improve patient outcomes while decreasing the quantity of narcotics available for diversion within our patients' communities.

Enhanced recovery after surgery (ERAS) program for lumbar spine fusion



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Abstract

Background: There is a paucity of literature regarding the implementation of enhanced recovery after surgery (ERAS) protocols for open lumbar spine fusions. We implemented an ERAS program for 1–2-level lumbar spine fusion surgery and identified areas that might benefit from perioperative interventions to improve patient satisfaction and outcomes.

Methods: This institutionally approved quality improvement (QI) ERAS program for lumbar spine fusion was designed for all neurosurgical patients 18 years and older scheduled for 1 or 2 level primary lumbar fusions. The ERAS bundle contained elements such as multimodal analgesia including preoperative oral acetaminophen and gabapentin, postoperative early mobilization and physical therapy, and a prophylactic multimodal antiemetic regimen to decrease postoperative nausea and vomiting. No fluid management or hemodynamic parameters were included. Pre-ERAS and post-ERAS data were compared with regard to potential confounders, compliance with the ERAS bundle, and postoperative outcomes.

Results: A total of 230 patients were included from October 2013 to May 2017. The pre-ERAS phase consisted of 123 patients, 11 patients during the transition period, and 96 serving as post-ERAS patients. The pre-ERAS and post-ERAS groups had comparable demographics and comorbidities. Compliance with preoperative and intraoperative medication interventions was relatively good (~80%). Compliance with postoperative elements such as early physical therapy, early mobilization, and early removal of the urinary catheter was poor with no significant improvement in post-ERAS patients. There was no significant change in the amount of short-acting opioids used, but there was a decrease in the use of long-acting opioids in the post-ERAS phase (14.6 to 5.2%, $p = 0.025$). Post-ERAS patients required fewer rescue antiemetic medications in the recovery room compared to pre-ERAS patients (40 to 24%). There was no significant difference in postoperative pain scores or hospital length of stay between the two groups.

Conclusions: Implementing an ERAS bundle for 1–2-level lumbar fusion had minimal effect in decreasing length of stay, but a significant decrease in postoperative opioid and rescue antiemetic use. This ERAS bundle showed mixed results likely secondary to poor ERAS protocol compliance. Going forward, this QI project will look to improve post-operative ERAS implementation to improve patient outcomes.

Keywords: ERAS, Lumbar fusion, QI spine, Spine surgery

Enhanced recovery after elective spinal and peripheral nerve surgery: pilot study from a single institution

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OBJECTIVE Enhanced recovery after surgery (ERAS) protocols address pre-, peri-, and postoperative factors of a patient's surgical journey. The authors sought to assess the effects of a novel ERAS protocol on clinical outcomes for patients undergoing elective spine or peripheral nerve surgery.

METHODS The authors conducted a prospective cohort analysis comparing clinical outcomes of patients undergoing elective spine or peripheral nerve surgery after implementation of the ERAS protocol compared to a historical control cohort in a tertiary care academic medical center. Patients in the historical cohort (September–December 2016) underwent traditional surgical care. Patients in the intervention group (April–June 2017) were enrolled in a unique ERAS protocol created by the Department of Neurosurgery at the University of Pennsylvania. Primary objectives were as follows: opioid and nonopioid pain medication consumption, need for opioid use at 1 month postoperatively, and patient-reported pain scores. Secondary objectives were as follows: mobilization and ambulation status, Foley catheter use, need for straight catheterization, length of stay, need for ICU admission, discharge status, and readmission within 30 days.

RESULTS A total of 201 patients underwent surgical care via an ERAS protocol and were compared to a total of 74 patients undergoing traditional perioperative care (control group). The 2 groups were similar in baseline demographics. Intravenous opioid medications postoperatively via patient-controlled analgesia was nearly eliminated in the ERAS group (0.5% vs 54.1%, $p < 0.001$). This change was not associated with an increase in the average or daily pain scores in the ERAS group. At 1 month following surgery, a smaller proportion of patients in the ERAS group were using opioids (38.8% vs 52.7%, $p = 0.041$). The ERAS group demonstrated greater mobilization on postoperative day 0 (53.4% vs 17.1%, $p < 0.001$) and postoperative day 1 (84.1% vs 45.7%, $p < 0.001$) compared to the control group. Postoperative Foley use was decreased in the ERAS group (20.4% vs 47.3%, $p < 0.001$) without an increase in the rate of straight catheterization (8.1% vs 11.9%, $p = 0.51$).

CONCLUSIONS Implementation of this novel ERAS pathway safely reduces patients' postoperative opioid requirements during hospitalization and 1 month postoperatively. ERAS results in improved postoperative mobilization and ambulation.

Enhanced recovery after spine surgery: a systematic review

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METHODS The authors conducted a systematic review of the PubMed and MEDLINE databases up to November 20, 2018.

RESULTS Twenty full-text articles were included in the qualitative analysis. The majority of studies were retrospective reviews of nonrandomized data sets or qualitative investigations lacking formal control groups; there was 1 protocol for a future randomized controlled trial. Most studies demonstrated reduced lengths of stay and no increase in rates of readmissions or complications after introduction of an ERAS pathway.

CONCLUSIONS These introductory studies demonstrate the potential of ERAS protocols, when applied to spine procedures, to reduce lengths of stay, accelerate return of function, minimize postoperative pain, and save costs.

<https://thejns.org/doi/abs/10.3171/2019.1.FOCUS18700>

Impact of Enhanced Recovery After Surgery and Opioid-Free Anesthesia on Opioid Prescriptions at Discharge From the Hospital: A Historical-Pro prospective Study

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	Pre-ERAS (194)	ERAS (189)	Difference (95% CI)	P Value
Primary outcome				
Discharge opioid prescription	165 (85%)	147 (78%)	7% (−1% to 15%)	.067
First PACU pain score	0 (0–7)	3 (0–7)	−0.69 (−1.46 to 0.08)	.078
Medication	2 (1%)	2 (1%)	0% (−3% to 3%)	.979
PCA	41 (21%)	1 (1%)	21% (15%–27%)	<.001
Epidural	116 (60%)	108 (57%)	3% (−7% to 12%)	.599
Total morphine equivalents (mg)	40 (20–81)	27 (10–68)	13 (2.4–22.0)	.009
Highest discharge pain score	4 (2–6)	4 (2–6)	0.03 (−0.52 to 0.59)	.884
Lowest discharge pain score	0 (0–0)	0 (0–0)	−0.05 (−0.23 to 0.14)	.497

Abbreviations: CI, confidence interval; ERAS, enhanced recovery after surgery; PACU, postanesthesia care unit; PCA, patient-controlled analgesia.

CONCLUSIONS: This study is the first to report discharge opioid prescribing practices in an ERAS setting. Although an ERAS intervention for colorectal surgery led to an increase in opioid-free anesthesia and multimodal analgesia, we did not observe an impact on discharge opioid prescribing practices. The majority of patients were discharged with an opioid prescription, including those with a combination of low discharge pain scores, no preoperative opioid use, and low morphine milligram equivalents consumption before discharge. This observation in the setting of an ERAS pathway that promotes multimodal analgesia suggests that our findings are very likely to also be observed in non-ERAS settings and offers an opportunity to modify opioid prescribing practices on discharge after surgery. For opioid-free anesthesia and multimodal analgesia to influence the opioid epidemic, the dose and quantity of the opioids prescribed should be modified based on the information gathered by in-hospital pain scores and opioid use as well as pain history before admission. (Anesth Analg 2017;125:1784–92)

Tackling the opioid epidemic: Reducing opioid prescribing while maintaining patient satisfaction with pain management after outpatient surgery

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L.D. Allan et al. / The American Journal of Surgery 220 (2020) 1108–1114

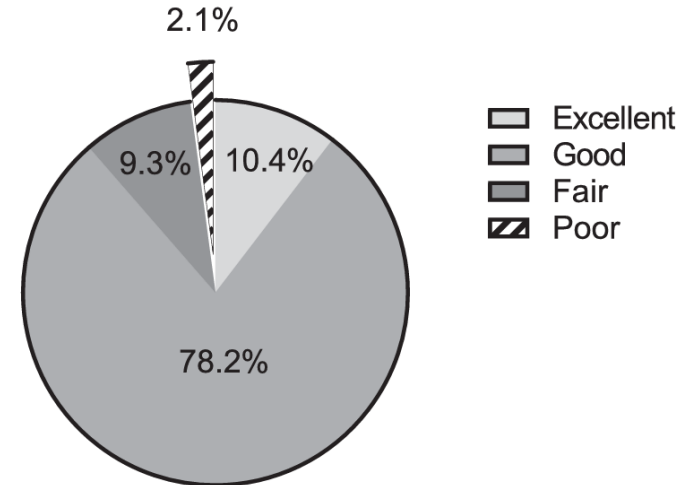
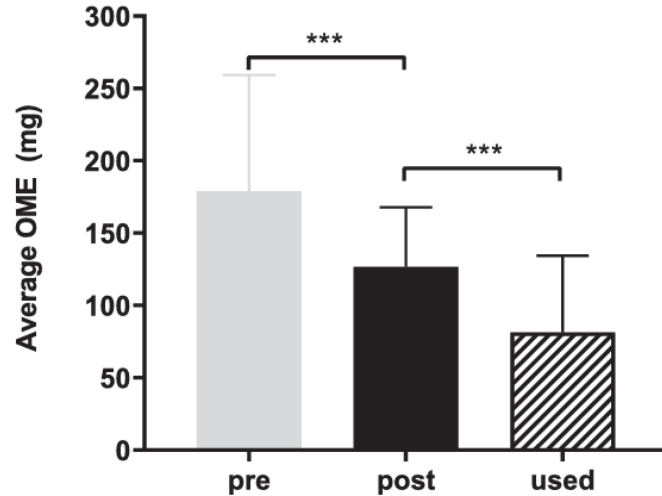


Fig. 3. Patient satisfaction ratings regarding pain management.

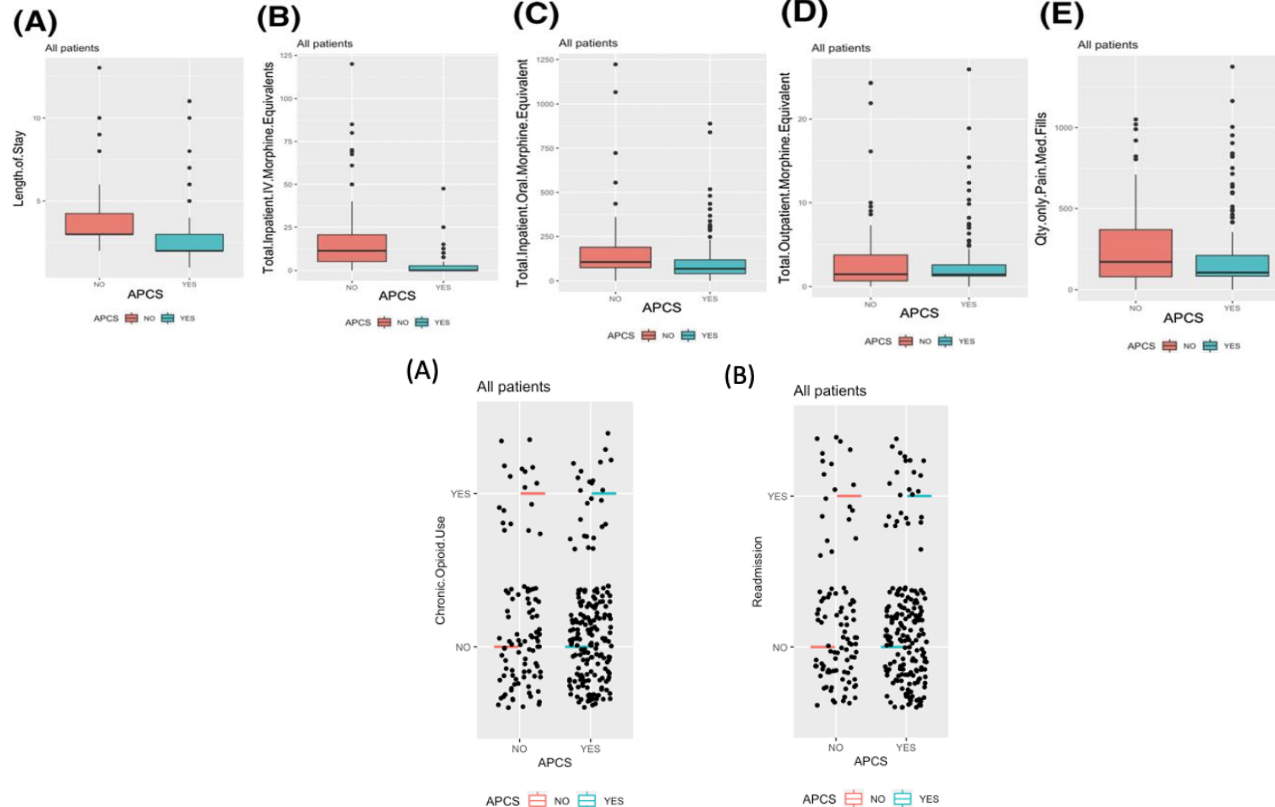
Conclusions: Using a pragmatic multimodal approach, decreasing opioid prescriptions at discharge allows for adequate pain management.



REPORTS OF ORIGINAL INVESTIGATIONS

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Effects of an anesthesia perioperative surgical home for total knee and hip arthroplasty at a Veterans Affairs Hospital: a quality improvement before-and-after cohort study



In Summary

Opioid efficacy and side effect profile should **make us question baseline opioid use and prescribing habits.**

Enhanced Recovery can **improve outcomes for patients and providers, costs, readmissions and minimize opioid use and diversion.**

Get started today

- "Liberal NPO" for nutrition
- Multi-modal analgesia surrounding surgery
- Stand alone oxycodone PRN
- Nurse support and follow-up surrounding surgery