# 2025 Early Career Scholar Program

## *An Intensive Multi-day Opioid REMS Initiative in Pain Management*

CME OUTFITTERS

This activity is supported by an independent educational grant from the Opioid Analgesic REMS Program Companies.

Please see https://www.opioidanalgesicrems.com/Resources/Docs/List_of_RPC_Companies.pdf for a listing of REMS Program Companies. This activity is intended to be fully compliant with the Opioid Analgesic REMS education requirements issued by the U.S. Food and Drug Administration (FDA).

# Multimodal Acute Pain Management

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# Learning Objectives

- Incorporate strategies from the 2022 CDC Guideline for Prescribing Opioids into the development of safe and effective pain management plans for patients with acute, subacute, and chronic pain
- Assess opioid nonmedical use risk when developing multimodal pain management plans

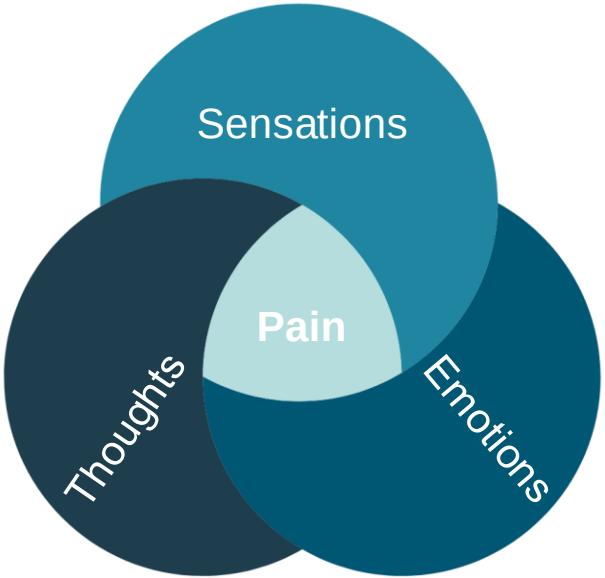
# Why Does This Topic Matter?

# Audience Response

## Can acute pain be prevented?

A. Yes
B. No
C. Maybe

Pain is “an unpleasant sensory and emotional experience” comprised of **pain itself** and a **reaction to the pain**.




# Pain Definitions

## Acute

- **Cause:** Generally known
- **Duration:** Short < 1 month
- **Treatment:** Resolution of underlying cause, usually self-limited

## Subacute

- **Cause:** Generally known
- **Duration:** Persists longer after healing 1-3 months, can become chronic
- **Treatment:** Resolution of underlying cause

## Chronic

- **Cause:** Often unknown
- **Duration:** Persists after healing > 3 months
- **Treatment:** Not a cure but outcome is often improved function



Dowell D, et al. *MMWR Recomm Rep.* 2022;71(3):1-95.

# Acute Pain Overview

## Most Common Signs and Symptoms

- sharp pain
- throbbing
- burning
- stabbing pain
- tingling
- weakness
- numbness

## Common Causes

- blunt trauma
- broken bones
- surgery
- dental work
- childbirth
- cuts and infections
- burns
- pulled or strained muscle
- sprains of a body part

## Treatment and Therapies

- rest
- heat or ice
- non-opioid medications
- opioid medications
- physical therapy (PT)
- exercise
- stress reduction
- bioelectric therapy

Dowell D, et al. *MMWR Recomm Rep.* 2022;71(3):1-95. Qaseem A, et al. *Ann Intern Med.* 2020;173(9):739-748.

# U.S. Acute Pain Painful Facts

- 20% general population
- 80 million adults receive medicine for acute pain
- 40 million are prescribed an opioid
- 85,000 adults are expected to develop OUD within a year of their prescribed treatment for acute pain
- 100 million surgeries annually
- 80% report postoperative pain
- 70% ED visits related to pain
- Dentists prescribe 8.6% of all opioids

ED = emergency department; OUD = opioid use disorder.

Expert Market Research (EMR)/Claight Corporation. 2025. https://www.expertmarketresearch.com/epidemiology-reports/acute-pain-epidemiology-forecast.
Smith J, et al. *Medicine*. 2025;53(2):102-108. Sinatra R. *Pain Med*. 2010;11(12):1859-1871. Castroman P, et al. *Cure*. 2022;14(4). Banerjee S, et al. Canadian Agency for Drugs and Technologies in Health. 2019. Centers for Disease Control and Prevention [CDC]. 2024. https://www.cdc.gov/overdose-prevention/hcp/clinical-care/dental-pain-care.html.

# Assessment: Defining Endpoints

## What are the goals of acute pain therapy?

- ✓ Pain reduction
- ✓ Improved function (physical, social, emotional)
- ✓ Decreased disability (work, self-care)

## How are these goals assessed?

- ✓ Self-reporting
- ✓ Unemployment/disability
- ✓ Quality of life and physical function surveys

Dowell D, et al. *MMWR Recomm Rep.* 2022;71(3):1-95. Qaseem A, et al. *Ann Intern Med.* 2020;173(9):739-748.

# Patient Case Study: Part 1

25 y/o male presents with right knee pain

Patient was shoveling snow in the driveway, twisted and heard a pop in his right knee

X-ray imaging shows no significant findings, mild effusion noted

**How would you proceed?**

# Step Approach to Acute Pain Management


CDC. *Nonopioid Therapies for Pain: A Clinical Reference*. 2022. https://www.cdc.gov/overdose-resources/pdf/DOP_Nonopioid_Tool_508_FINAL.pdf.
Dey S, et al. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing. 2025. https://www.ncbi.nlm.nih.gov/books/NBK574543/.

# Non-Pharmacologic Treatment Options for Acute Pain

### Self-Care

- Ice
- Heat
- Rest
- Immobilization
- Elevation of affected limb

### Complementary and Integrative Therapies

- Acupuncture
- Massage
- Chiropractic therapy

### Rehabilitation Therapies

- Physical therapy
- Occupational therapy

### Exercise

- Stretching
- Swimming
- Walking
- Tai chi
- Yoga
- Chair exercises

### Psychosocial Interventions

- Cognitive behavioral therapy (CBT)
- Acceptance and commitment therapy (ACT)
- Progressive relaxation therapy
- Mindfulness-based therapies
- Behavior groups



CDC. 2022. https://www.cdc.gov/overdose-resources/hcp/files/non-opioid-therapies-for-pain-a-clinical-reference.html.

# Non-Opioid Pharmacologic Therapies

## Non-opioid analgesic agents

- Acetaminophen
- Non-steroidal anti-inflammatory drugs (NSAIDs)
- Antidepressants
- Anticonvulsants
- Local anesthetics
- Muscle relaxants
- Capsaicin

CDC. *Nonopioid Therapies for Pain: A Clinical Reference*. 2022. https://www.cdc.gov/overdose-resources/pdf/DOP_Nonopioid_Tool_508_FINAL.pdf.

# Non-Opioid Pharmacology Acute Pain

## Oral Therapy

### Acetaminophen

- First-line therapy for the treatment of OA and MSK pain
- Not associated with gastrointestinal ulcer; no significant platelet or anti-inflammatory effect at doses < 2000 mg/day
- Maximum dosage 2000 mg daily inpatients with liver disease and 4000 mg daily in patient without liver disease
  - Caution patients about acetaminophen in OTC and combination products

### NSAIDs

- First-line agents for MSK pain and acute and chronic lower back pain
  - May be more effective than APAP, but are associated with more side effects
- Trial more than one NSAID, since there can be variability in patient response
- Adding a NSAID to a pain regimen containing an opioid may have an opioid-sparing effect of approximately 20-35%

### Non-benzodiazepine skeletal muscle relaxants

- Use for acute or exacerbation of chronic lower back pain or neck pain with muscle spasms, for short term use only (< 7 days)
- Drowsiness is common, avoid driving, operating heavy machinery, and ETOH
- Recommend against using carisoprodol due to potential for abuse/and or misuse
- Recommend against using benzodiazepines due to lack of benefit and higher risks

## Topicals

### NSAIDs

- Diclofenac formulations: gels, solution, or patch
- Used for localized/regional pain in a joint area such as the knee, ankle, shoulder, and wrist
  - Produced localized anti-inflammatory effects
  - Evidence dose not support use for lower back pain
- Less systemic side effects compared to oral NSAIDs due to minimal systemic absorption
- Safer to use in patient on oral anticoagulants

### Lidocaine

- Lidocaine formulations: patch, gel, cream, or ointment
- Used for peripheral neuropathic pain
- Blocks abnormal peripheral neuronal conduction
  - Provider of local analgesia on skin where the medication is applied
- Systemic absorption is very low when applied to intact skin

### Methyl Salicylate

- Methyl salicylate formulations: cream, ointment, or patch
  - Can be combined with menthol and/or camphor
- Used for local/regional effect for musculoskeletal pain
- Counterirritant causing mild inflammation which results in a deeper pain relief
- Apply to intact skin

### Capsaicin

- Capsaicin formulations: cream, ointment, or patch
- Used for peripheral neuropathic pain and MSK pain
- Depletes substance P with daily use leading to desensitization of sensory nerve fibers and resulting in less pain
- Must use multiple times a day every day to maintain effect

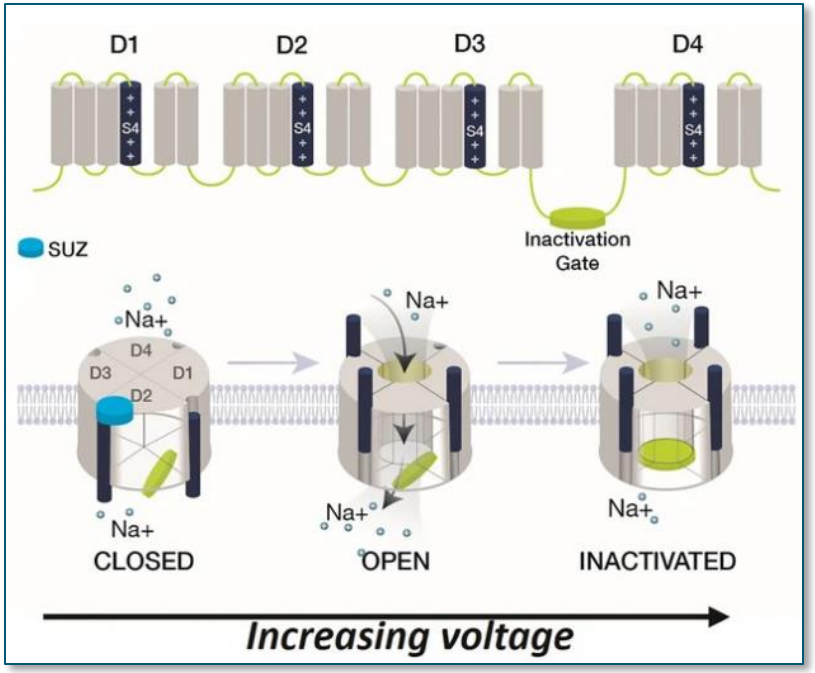
APAP = acetaminophen; ETOH = ethyl alcohol; MSK = musculoskeletal; OA = osteoarthritis; OTC = over the counter.

Dowell D, et al. *MMWR Recomm Rep.* 2022;71(3):1-95. Amaechi O, et al. *Am Fam Physician.* 2021;104(1):63-72. Qaseem A, et al. *Ann Intern Med.* 2020;173(9):739-748.

# Novel Medication for Acute Pain

## Suzetrigine (SUZ) Oral Tablet

- Approved January 30, 2025
- Selective NaV1.8 pain signal inhibitor
- Indication: moderate to severe acute pain in adults
- Binds second voltage sensing domain (VSD2) to stabilize the closed state of the channel
- Tonic inhibition of NaV1.8 reduces pain signals in primary human dorsal root ganglion (DRG) sensory neuron




U.S. Food and Drug Administration [FDA]. 2025. https://www.fda.gov/news-events/press-announcements/fda-approves-novel-non-opioid-treatment-moderate-severe-acute-pain. Suzetrigine [package insert]. https://www.accessdata.fda.gov/drugsatfda_docs/label/2025/219209s000lbl.pdf.
Osteen JD, et al. *Pain Ther*. 2025 Jan 8. [Epub ahead of print].

# Emerging Medication for Acute Pain

## Cebranopadol Oral Tablet

- Acts on the mu-opioid receptor and the nociceptin/orphanin FQ receptor
- Recent study shows low human intranasal abuse potential
- Indication: chronic moderate to severe pain
- Phase III clinical trial
- Fast-track designation by FDA

Ziemichod W, et al. *Molecules*. 2022;27(13):3987. Meara K. Drug Topics Website. 2025. https://www.drugtopics.com/view/cebranopadol-shows-lower-abuse-potential-compared-to-existing-pain-therapies.

# Opioid Prescribing For Acute Pain

- ✓ The prescription drug monitoring program (PDMP) accessed prior to prescribing controlled substances Schedules 2-5, in compliance with state law
- ✓ Non-opioid therapies should be encouraged as a primary treatment for pain management (e.g., acetaminophen, ibuprofen)
- ✓ Non-pharmacologic therapies should be encouraged (e.g., ice, elevation, PT)
- ✓ Do **not** prescribe opioids with other sedative medications (e.g., benzodiazepines)
- ✓ Short-acting opioids should be prescribed for no more than 3-5-day courses (e.g., hydrocodone, oxycodone)

Dowell D, et al. *MMWR Recomm Rep*. 2022;71(3):1-95. FDA. 2023. https://www.fda.gov/media/173774/download?attachment.

# Opioid Prescribing For Acute Pain

- ✓ Fentanyl or long-acting opioids such as methadone and oxycodone ER should **not** be prescribed to opioid-naïve patients
- ✓ Consider offering a naloxone co-prescription to patients who may be at increased risk for overdose, including those with a history of overdose, a SUD, those already prescribed benzodiazepines, and patients who are receiving higher doses of opioids (e.g., > 50 morphine milligram equivalents [MME]/day)

ER = extended release; SUD = substance use disorder.

Dowell D, et al. *MMWR Recomm Rep*. 2022;71(3):1-95. FDA. 2023. https://www.fda.gov/media/173774/download?attachment.

# Opioid Prescribing For Acute Pain

- ✓ Educate patient and/or parent/guardian regarding safe use of opioids, potential side effects, overdose risks, and developing dependence or addiction

Dowell D, et al. *MMWR Recomm Rep*. 2022;71(3):1-95. FDA. 2023. https://www.fda.gov/media/173774/download?attachment.

# Side Effects of Opioids

| | |
|---|---|
| Nausea | Constipation |
| Sedation/sleepiness | Mental confusion/dullness |
| Breathing issues | Cardiac concerns |
| Hormone dysfunction | Increased fall risk |
| Depression | Poor sleep |
| Hyperalgesia | Cravings |
| Tolerance | Risk for addiction |

Dowell D, et al. *MMWR Recomm Rep*. 2022;71(3):1-95. FDA. 2023. https://www.fda.gov/media/173774/download?attachment.
CDC. https://www.cdc.gov/overdose-prevention/about/prescription-opioids.html.

# Patient Education For Acute Opioid Use

- Do not use opioids at the same time as alcohol, benzodiazepines, muscle relaxers, sleep aids, or other medications that can cause sleepiness.
- Anyone who uses an opioid, even for just a short time, is at risk for dependence, tolerance, misuse, addiction, and overdose.
- Use opioids only for severe breakthrough pain that is not controlled with non-opioid medications; as pain gets better, stop using or use fewer opioids.
- Talk to your provider about a prescription for naloxone, which is a medication that temporarily reverses the dangerous effects of an opioid overdose.

Hyland SJ, et al. *Healthcare (Basel)*. 2022;11(1):34.

# Opioid Prescribing For Acute Pain

- ✓ Educate patient and/or parent/guardian regarding safe use of opioids, potential side effects, overdose risks, and developing dependence or addiction
- ✓ Educate on tapering of opioids as acute pain resolves
- ✓ Example: an opioid-naïve patient who is discharged from the clinic/ED with a fracture/injury might be prescribed enough opioid for 3 days
  - Oxycodone 5 mg or hydrocodone 10/325 mg, 1 tablet PO 3 to 4 times per day as needed (12 pills) until follow-up

PO = orally.

Dowell D, et al. *MMWR Recomm Rep*. 2022;71(3):1-95. FDA. 2023. https://www.fda.gov/media/173774/download?attachment.

# Management of MOUD for Acute Pain

| Medication | Mechanism of Action | Acute Pain Strategies |
|---|---|---|
| Buprenorphine | Partial mu-opioid agonist, kappa-opioid antagonist | Continue home regimen;<br>Split home regimen into TID dosing for same TDD |
| Methadone | Full mu-opioid agonist, NMDA antagonist | Continue home regimen;<br>Split home regimen into TID dosing for same TDD |
| Naltrexone (IM) | Mu-opioid antagonist | Stop IM dose 30 days prior to painful procedure and until patient has been opioid-free for 3 days afterward; Multimodal therapies to treat painful crisis, consider ketamine and regional anesthesia |
| Naltrexone (PO) | Mu-opioid antagonist | Stop therapy 72 hours prior to painful procedure and until patient has been opioid-free for 3 days afterward; Multimodal therapies to treat painful crisis, consider ketamine and regional anesthesia |

Management of MOUD during acute painful episodes.



IM = intramuscularly (depot formulation); MOUD = medication(s) for opioid use disorder; NMDA = N-methyl-D-aspartate; TDD = total daily dose; TID = three times daily.

Hyland SJ. *Healthcare (Basel)*. 2022;11(1):34.

# Acute Pain Prescribing Opioid Table

| Opioid | Milligrams (mg) | Conversion Factor | Drug Prescribed | Initial Quantity Limit to 3-5 Day |
|---|---|---|---|---|
| Hydrocodone | 5-10 mg | 1 | Hydrocodone 5/325 1 tablet every 6 hours PRN | #5-10 |
| Oxycodone IR | 5-10 mg | 1.5 | Oxycodone 5 mg 1 tablet every 6 hours PRN | #5-10 |
| Tramadol IR | 50-100 mg | 0.2 | Tramadol 50 mg 1 tablet every 6 hours PRN | #5-10 |
| Acetaminophen with Codeine | 30-60 mg | 0.15 | Tylenol #3 1 tablet every 6 hours PRN | #5-10 |
| Morphine IR | 15-30 mg | 1 | Morphine 15 mg 1 tablet every 6 hours PRN | #5-10 |
| Hydromorphone IR | 2-4 mg | 5 | Hydromorphone 2 mg 1 tablet every 6 hours PRN | #5-10 |
| Tapentadol IR | 50-100 mg | 0.4 | Tapentadol 50 mg 1 tablet every 6 hours PRN | #5-10 |

CME OUTFITTERS

PRN = as needed.

Dowell D, et al. *MMWR Recomm Rep.* 2022;71(3):1-95. FDA. 2023. https://www.fda.gov/media/173774/download?attachment. Michigan OPEN. 2024. https://michigan-open.org/wp-content/uploads/2024/08/All-Adult-Prescribing-Recs.pdf.pdf.

# Patient Case Study: Part 2

The same 25 y/o male patient returns with another injury to his right knee. He states that he was playing basketball and came down hard on his knee last night. He heard a loud pop sound and had significant pain after. He feels that his knee is not stable.

He has tried bracing, rest, ice, heat, acetaminophen, and ibuprofen. He states that he is not able to sleep because of the pain. He has not been as active, and he had to miss work today.

Magnetic resonance imaging (MRI) ordered and shows right anterior cruciate ligament (ACL) tear.

**How would you proceed?**

# Postsurgical Pain Management

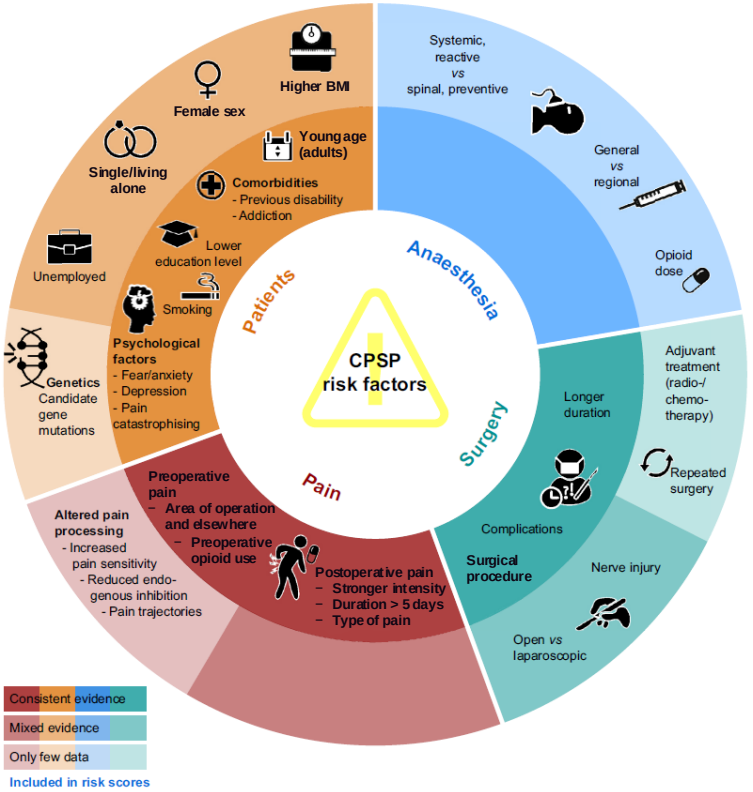
# Audience Response

## Can we prevent new chronic opioid use after surgery?

A. Yes
B. No
C. Maybe

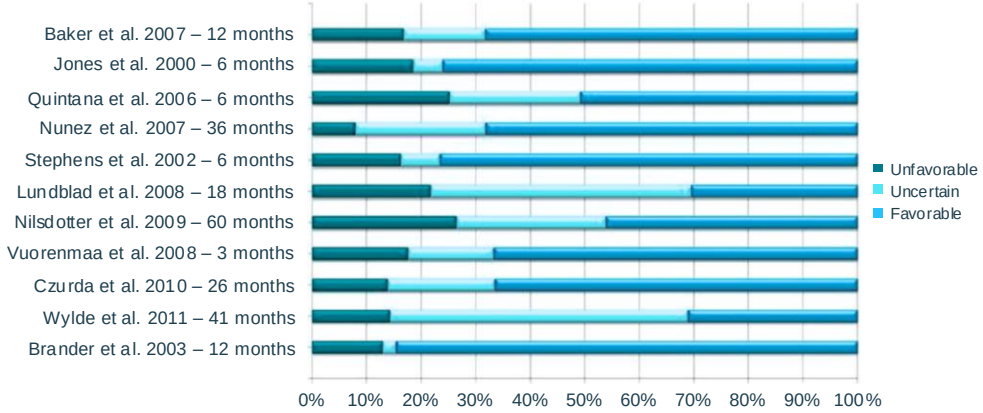
# What is Postsurgical Pain?

- **Acute postoperative pain**
  - Pain occurring immediately after and up to 7 days after surgery
- **Chronic (persistent) postsurgical pain (CPSP)**
  - Pain lasting more than 3-6 months after surgery
  - Estimated 10-50% of individuals following common surgeries




Fregoso G, et al. *Pain Physician*. 2019;22(5):479-488. Rosenberger DC, et al. *BJA Educ.* 2022;22(5):190-196.

# Incidence of Postsurgical Pain




Studies of total knee arthroplasty (TKA) reporting proportion of patients with pain at follow-up. Reproduced from Beswick et al., with permission from BMJ Publishing Group Ltd.

**Prevalence of Chronic Postsurgical Pain in Common Surgeries in the United States**

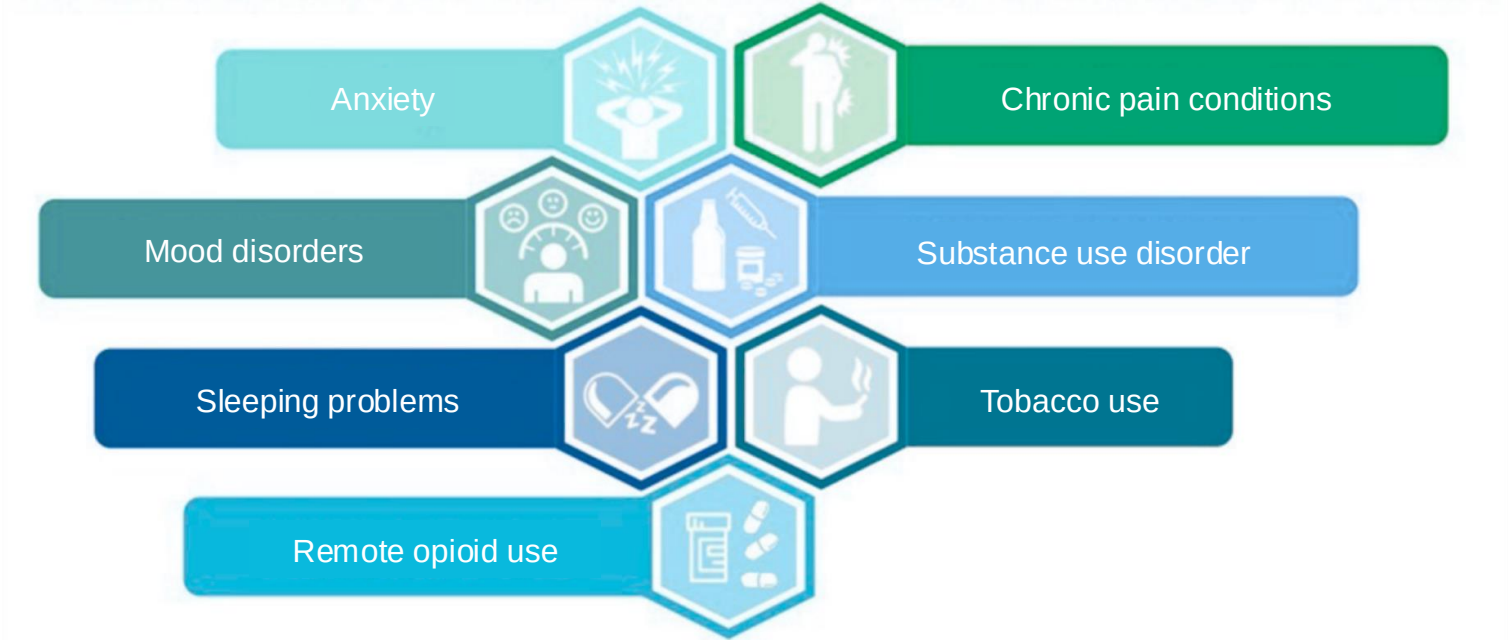
| | Any Intensity (%) | Moderate-Severe Intensity (%) | Prevalence (%); Prevalence if Restricted to a Severe Pain Rating | Number of Operations in U.S. Non-Federal Community Hospitals* in 2014 |
|---|---|---|---|---|
| Amputation of limb | 30-85% | 5-10% | Up to 85% | Not available |
| Arthroplasty, knee | 13-44% | 15% | 44% (15%) | 723,086 |
| Caesarean section | 6-55% | 5-10% | Up to 12% | 1,142,680 |
| Cholecystectomy | 3-50% | Not reported | Not reported | 300,245 |
| Craniotomy | 0-65% | 25% | 12-16% | Not available |
| Hip replacement | 27% | 6% | 27% (15%) | 487,625 |
| Inguinal hernia repair | 5-63% | 2-4% | 6-29% | Not available |
| Laminectomy and spinal fusion | 10-40% | 4-6% | 5-36% | 564,911 |
| Mastectomy | 11-57% | 5-10% | 22% | Not available |
| Coronary artery bypass graft | 30-50% | 5-10% | 28% (4%) | 160,240 |
| Thoracotomy | 5-65% | 10% | 48% | Not available |

*Non-federal community hospitals account for 786,874 (87%) of 902,202 hospital beds in the United States.



Wylde V, et al. *EFORT Open Rev*. 2018;3(8):461-470. Glare P, et al. *Lancet.* 2019;393:1537-1546.

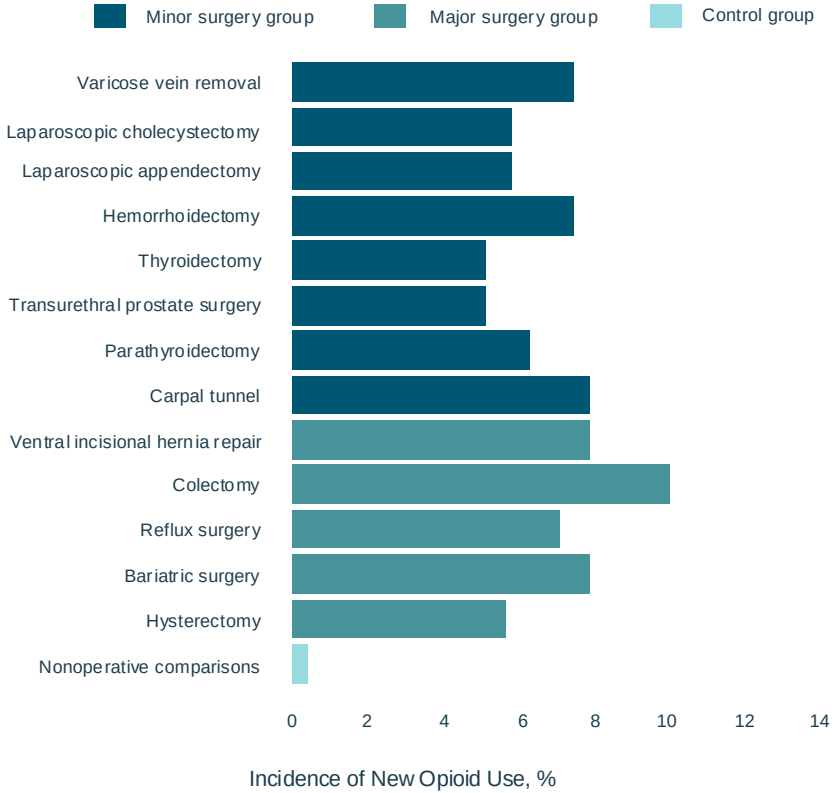
# Who is at Risk for Persistent Postoperative Opioid Use?






Larach DB, et al. *Anesthesiology.* 2022;136(4):594-608.

# Outcomes of Postsurgical Pain

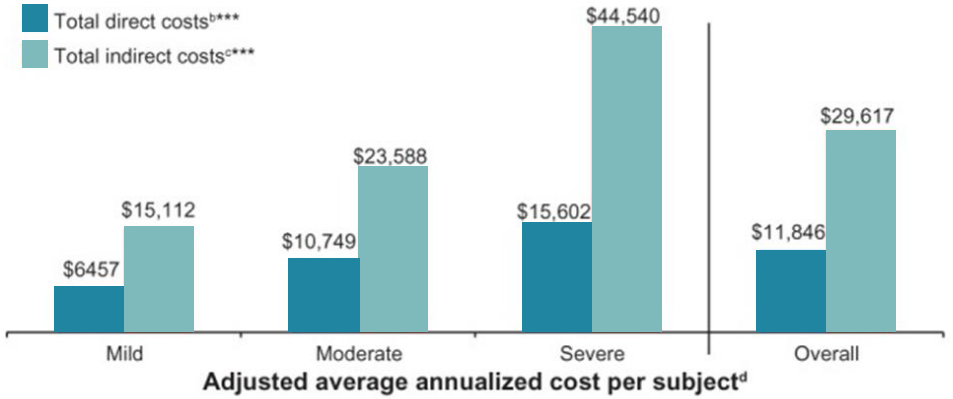





Huang A, et al. *Pain Manag*. 2016;6(5):435-443.

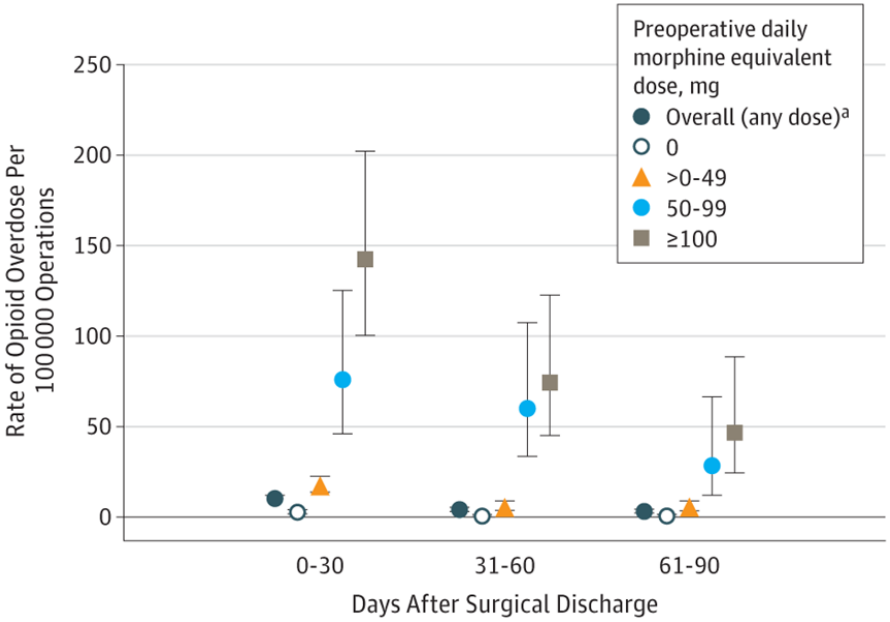
# Chronic Pain After Surgery is Costly and Contributes to the Opioid Epidemic

- **Direct medical costs**
  - Specialty evaluations
  - Radiographic studies
  - Surgeries and procedures
  - Medications
- **Indirect medical costs**
  - Lost work and productivity
    - Disability



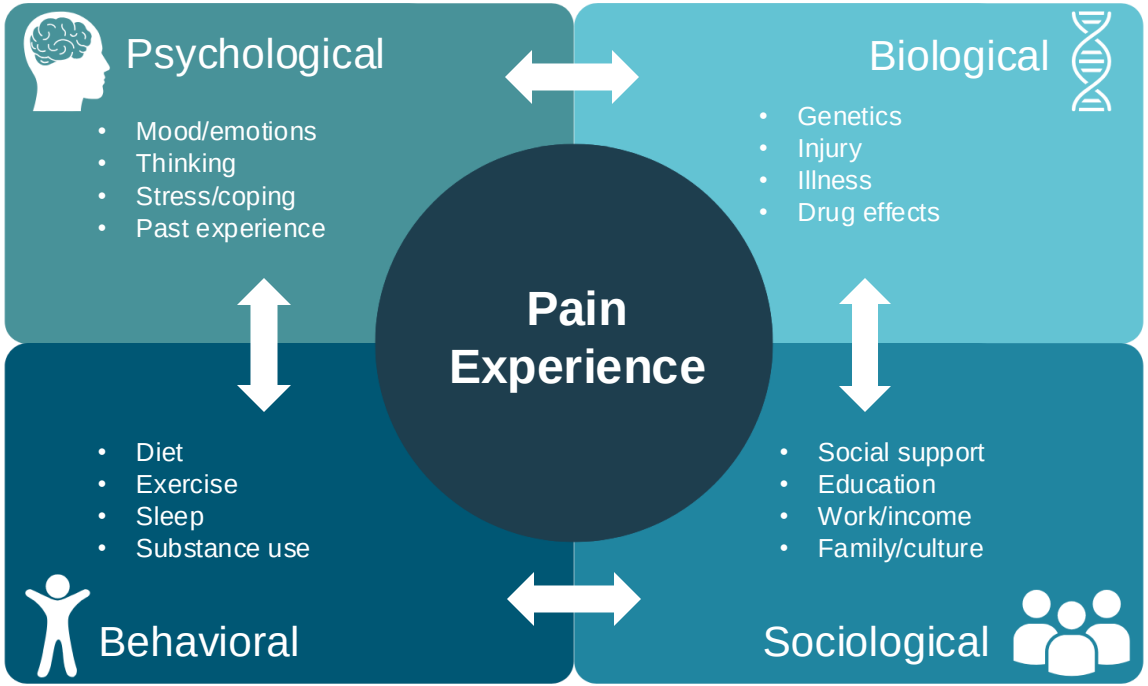
# Opioid Overdose After Surgical Discharge

- Risks factors of opioid overdose
  - First 30 days after discharge
  - Preoperative opioid use
  - Spinal fusion and lower extremity amputation



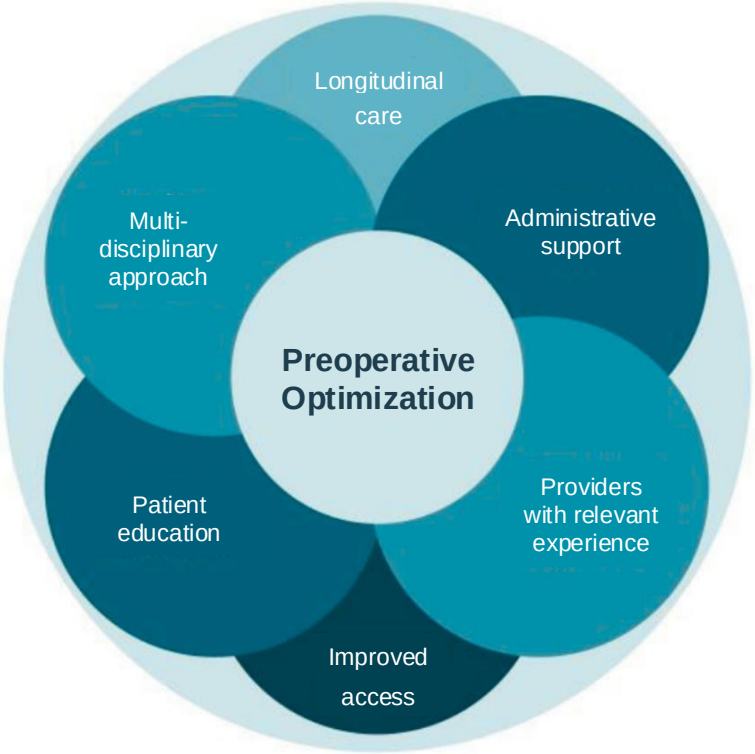

Lyden JR, et al. *J Gen Intern Med*. 2023;38:2560-2567. Henry SG, et al. *J Gen Intern Med*. 2024;39:393-402.

# Pain Experience



# Patient Risk Screening for Opioid Prescribing for Transitions Of Care

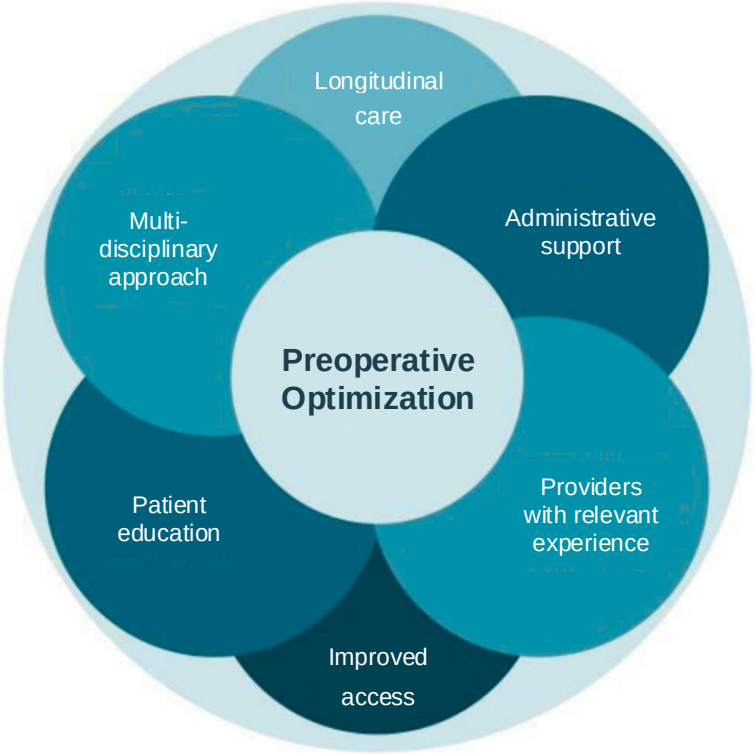
- Qualitative interviews
  - Conducted with 24 surgery, primary care, and anesthesia providers
- Behaviors and attitudes about screening surgical patients to inform perioperative opioid prescribing in relation to transitions of care
- Anesthesia and primary care providers saw value in knowing patients' preoperative risk related to opioid use



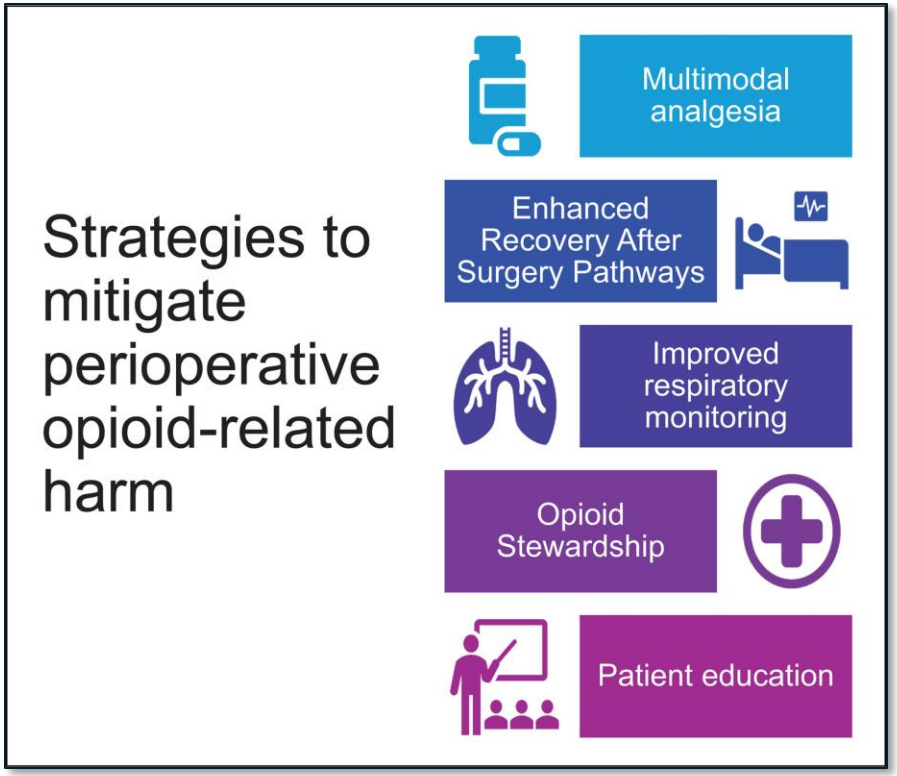

Hinds S, et al. *Reg Anesth Pain Med*. 2022;47(8):475-483.

# Patient Risk Screening for Opioid Prescribing for Transitions Of Care

- Providers favored a screening tool coupled with actionable recommendations, sufficient resources, facilitation of coordination between specialties
- Findings provide a context to address risk for prescription opioids in surgical transitions of care, including:
  - Identifying high-risk patients
  - Implementing a coordinated plan
  - Emphasizing actionable recommendations



# Assess Opioid Non-Medical Use While Developing a Pain Management Plan



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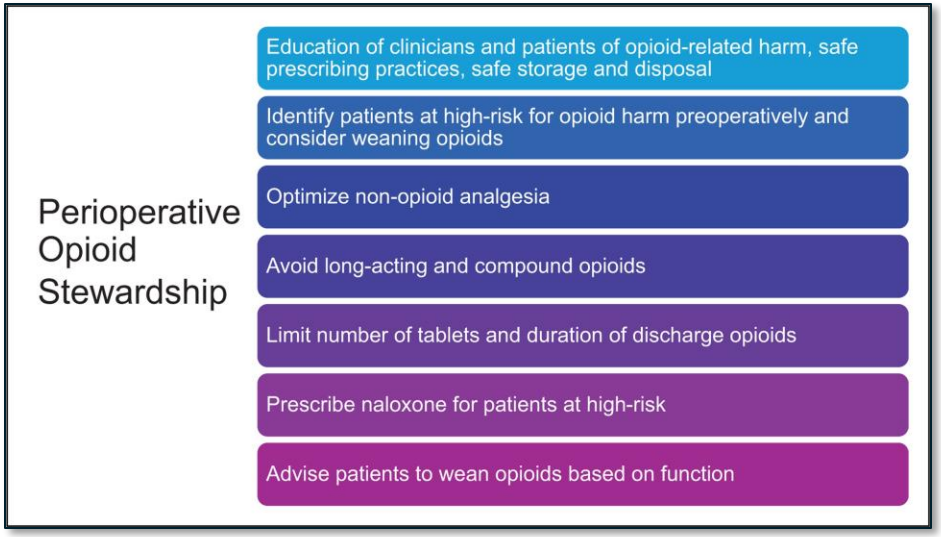
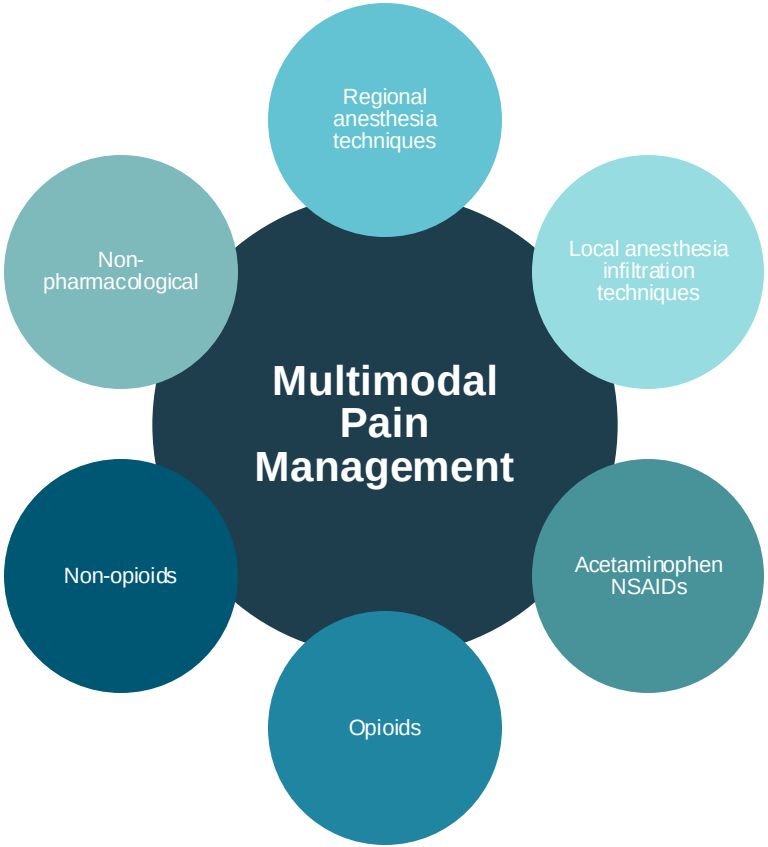
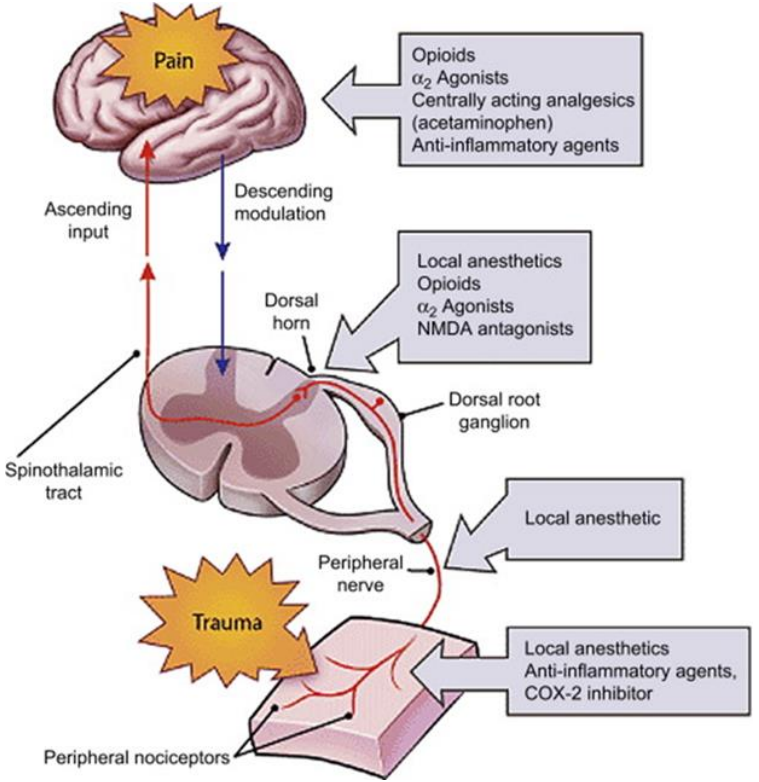



- Flag risk factors
  - Complex procedures
  - Comorbidities
  - Benzodiazepine use
  - Nonmedical opioid use
- Counsel on preoperative tapering of opioids in cases of overuse or nonmedical use
- Set realistic pain expectations and functional goals
- Maximize use of non-opioid adjuncts
- Recommend naloxone at discharge

Dowell D, et al. *MMWR Recomm Rep*. 2022;71(3):1-95. FDA. 2023. https://www.fda.gov/media/173774/download?attachment. Hinds S, et al. *Reg Anesth Pain Med*. 2022;47(8):475-483. Harbell MW, et al. *Curr Opin Anaesthesiol*. 2024;37(6):697-704.

# Perioperative Multimodal Pain Management






Chou R, et al. *J Pain*. 2016;17(2):131-157. Gottschalk A, et al. *Am Fam Physician*. 2001;63(10):1979-1985.

# Safe and Successful Acute Pain Management

Scheduled multimodal analgesia

Stratified opioid therapy

Person-specific adjustments


Expectant management of chronic pain and MOUD therapies

# Stratified Opioid Therapy

## Stratified Empiric Opioid Therapy – Dosing
### O-NET+ Classification System

**Prior Opioid Use**

| Opioid-Naive | Opioid-Exposed | Opioid-Tolerant |
|---|---|---|
| No opioids within 90 days before DOS | <60 MED within 90 days before DOS | ≥60 MED within 7 days before DOS |

**+ Risk Modifiers**

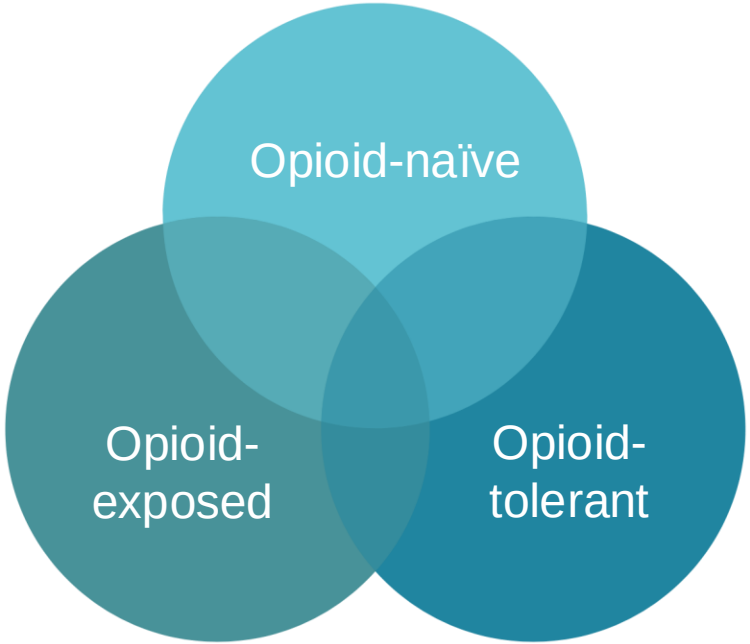
| + Modifiers | | |
|---|---|---|
| Psych | Substance | Surgery |
| Depression | Opioid Use or Other Use Disorder | Procedure associated with persistent pain |
| Anxiety | | |
| Bipolar | | |

**60 MED =**
- 40 mg oxycodone/day
- 60 mg hydrocodone/day
- 15 mg oral hydromorphone/day
- 600 mg tramadol/day
- Any daily methadone or buprenorphine

**Opioid-naïve and/or Very high-risk – Consider:**
- Oxycodone or hydrocodone 5-10 mg PO q4h PRN moderate-to-severe pain
- With or without: Oxycodone 5 mg SL q4h PRN moderate-to-severe BTP × 24-48 hours
- Consider longer dosing intervals in very advance age

**Opioid-exposed or Opioid-tolerant + high-risk – Consider:**
- Same as naïve with closer monitoring for adjustment OR ↑BTP dosing

OR
- Oxycodone or hydrocodone 10-15 mg PO q4h PRN
- With or without: Oxycodone 5 mg SL q4h PRN BTP, or higher BTP dose or longer duration based on condition




BTP = breakthrough pain; DOS = day of surgery; MED = morphine equivalent dose; q4h = every 4 hours.

Hyland SJ, et al. *Healthcare (Basel)*. 2022;11(1):34.

# Management of LTOT and OUD for Perioperative Pain

- A multidisciplinary approach (surgery, anesthesia, regional teams) in collaboration with the patient's primary prescriber and/or addiction psychiatrist should help guide the perioperative pain management of opioid-tolerant patients and patients receiving OUD medications
- Multimodal analgesic techniques, including both pharmacologic and nonpharmacologic modalities and regional/neuraxial anesthesia, should be employed throughout the perioperative period
- Opioids prescribed for chronic pain should be continued throughout the perioperative period (especially long-acting opioids), including the morning of surgery
- For patients treated with medications for OUD:
  - Buprenorphine (with or without naloxone) and methadone should generally be continued throughout the perioperative period
  - Naltrexone (intramuscular or oral) should be held preoperatively
- Patients should be given detailed discharge instructions, and close postoperative follow-up with the primary provider/prescriber is essential



LTOT = long-term oxygen therapy.

Burns SL, et al. *Curr Opin Anaesthesiol*. 2022;35(4):514-520. Chou R, et al. *J Pain*. 2016;17(2):131-157.

# Perioperative and Postoperative Management

| Medication | Perioperative Plan | Postoperative Plan |
|---|---|---|
| **Long-acting pure mu-opioid agonists for chronic pain** , including continuous transdermal use or intrathecal infusions | Continue typical dose throughout periop period including on DOS, in addition to sufficient intraop analgesia | Continue typical dose and provide opioid-tolerant dosing for PRN opioid orders, consider PCA if expect significant pain |
| **Methadone** | Continue typical dose throughout periop period including on DOS, in addition to sufficient intraop analgesia | Continue typical dose, may divide into q6-8-hour dosing to maximize analgesic benefit<br>Provide opioid-tolerant dosing for PRN opioid orders |
| **Buprenorphine oral, sublingual, and buccal formulations** including combination products with naloxone | Option 1: Continue typical dose throughout periop period including on DOS, in addition to sufficient intraop analgesia | Continue typical dose and provide opioid-tolerant dosing for PRN opioid orders |
| | Option 2: (*consider if high risk for relapse and/or very painful procedure*): Continue typical dose through day prior to surgery; temporarily increase and/or divide dosing into shorter intervals starting DOS, in addition to sufficient intraop analgesia | Continue increased and/or divided buprenorphine regimen and use opioid-tolerant dosing for PRN opioid orders<br>Discharge on original/typical buprenorphine regimen with sufficient opioid-tolerant PRN opioid supply |
| **Buprenorphine transdermal patch, subdermal implant, or subcutaneous implant** | Continue typical dose throughout periop period including on DOS, in addition to sufficient intraop analgesia | Continue typical dose and provide opioid-tolerant dosing for PRN opioid orders |
| **Naltrexone oral formulations** | Discontinue 3 days prior to surgery and hold on DOS, provide usual intraop analgesia | Continue to hold therapy postop, provide opioid-naïve dosing for PRN opioid orders with close monitoring |
| **Naltrexone extended-release IM injection** | Ideally schedule surgery for ≥ 4 weeks after last injection and hold throughout periop period, provide usual intraop analgesia | Discontinue naltrexone at discharge and reinitiate with outpatient prescriber after pain recovery complete |

PCA = patient-controlled analgesia.

Hyland SJ, et al. *Healthcare (Basel)*. 2021;9(3):333.

# Example of Postoperative Inpatient Pain Management Orders

| Medication (Route) | Application | Dose Range | Comments |
|---|---|---|---|
| **Acetaminophen (PO)** | All patients without contraindication | 650 mg PO q4h while awake or<br>975 mg PO q6h | Selective use of the IV and PR routes may be appropriate, see discussion |
| **Anti-Inflammatory**—Choose one in all patients without contraindication (see Section 3.2) | | | |
| Celecoxib (PO) | | 100-200 mg PO q12-24h | May be preferred to ibuprofen |
| Ketorolac (IV) | | 15 mg IV q6h x 24h, max duration 5 days | Limit use to first 24-28 h, change to alternative when can take PO |
| Ibuprofen (PO) | | 400 mg PO TID with meals or q6h | |
| **Neuropathic Agent**—Choose one in patients with significant pain or high opioid use, weighting patient-specific risks and benefits (see Section 3.2) | | | |
| Gabapentin (PO) | | 100 mg PO TID, or 100 mg with breakfast and lunch plus 300 mg qHS dose | Opioid-sparing benefits must be weighed against patient-specific risks for sedation, respiratory depression, and dizziness |
| Pregabalin (PO) | | 25-50 mg PO BID | |
| **Oral As-Needed Opioid**—Choose one in patients undergoing painful procedures for duration of expected moderate-to-severe surgical pain, gradually decreasing dose during recovery period | | | |
| Oxycodone (PO) | | Opioid-naïve: 5 mg PO q4h PRN moderate-to-severe pain, may repeat 5 mg dose within 1 hr if ineffective (total available range 5-10 mg q4h PRN) | Initial dosing for opioid-tolerant patients should be based upon baseline opioid use, usually allowing for 25-100% increase from baseline exposure in immediate postop period |
| Hydrocodone (PO) | | Dosing as above, recognizing this is slightly lower analgesic potency (see Table 1) | Decrease or discontinue scheduled acetaminophen to avoid overexposure if using combination products |
| **As-Needed Opioid for Breakthrough Pain**—Choose one for first 24 h postop; if used frequently and/or needed beyond immediate recovery phase then assess for other causes of pain and/or increase primary as-needed opioid | | | |
| Oxycodone (SL) | | 5 mg PO/SL q4h PRN moderate-to-severe breakthrough pain | Consider "may repeat" dose and/or initial 10 mg dose for breakthrough pain in opioid-tolerant patients |
| Hydromorphone (IV) | | 0.2-0.5 mg IV/SC q3h PRN moderate-to-severe breakthrough pain | Only order IV opioids for severe breakthrough pain or absolute contraindications to oral analgesia<br>Consider "may repeat" dose and/or initial 0.8-1 mg dose for breakthrough pain in opioid-tolerant patients |
| **NMDA Antagonist**—Consider in severely painful procedures, in opioid-tolerant patients, or in cases of pain-sedation mismatch in appropriate patients | | | |
| Ketamine (IV) | | 0.1-0.35 mg/kg or 5-10 mg IVP once or q2h PRN for refractory pain, or in cases of pain-sedation mismatch precluding opioid use | Continuous infusion of 0.05-0.35 mg/kg/hr may be considered postoperatively where supported by institutional protocol |

IV = intravenous; IVP = IV push; q6h = every 6 hours; q12-24h = every 12-24 hours; qHS = every night at bedtime; SC = subcutaneous; SL = sublingual.

Hyland SJ, et al. *Healthcare (Basel)*. 2021;9(3):333.

# Summary of Multimodal Analgesics

| Component | Example | Summary of Recent Evidence |
|---|---|---|
| Opioids | Fentanyl, morphine, hydromorphone | Genetic research is allowing for the identification of patients who experience more severe pain, inadequate response to certain opioids, and those at risk for opioid use disorder, so more informed decision-making regarding opioid prescription can be made |
| | Methadone | Studies examining use are heterogenous (route and total dose) but did show a reduction of postoperative pain and total opioid consumption. In some studies benefits were modest |
| Nonopioid analgesics | Acetaminophen and NSAIDs | Acetaminophen and NSAIDs are the most frequent administered non-opioid analgesics as part of multimodal therapy and are considered safe for the majority of patients |
| | Ketamine/esketamine | Improved early subjective quality of recovery and decrease in pain severity without an increase in adverse events or length of stay |
| | Gabapentinoids | Not shown to be universally beneficial and may be associated with greater risk of adverse events. May be beneficial in selected populations, such as orthopedic surgery patients |
| | Lidocaine infusion | Small but significant reduction in total opioid consumption when administered as an adjunct |
| | Magnesium infusion | As with lidocaine, some benefit shown when administered as an adjunct. Hypotension with dosing may limit usability |
| | Alpha-2 agonists | Dexmedetomidine infusion resulted in lower pain scores and opioid consumption in recovery room. Usefulness may be limited by hypotension at higher doses |
| | Glucocorticoids | May reduce opioid consumption in orthopedic surgery. Periarticular injections may confer benefit over IV administration |
| Regional and local anesthetics | Neuraxial anesthesia/regional/local/intra-articular administration<br>Fascial plane blocks | Application of nanotechnology-based drug delivery holds promise for prolonged analgesic delivery and extended pain control. Guidance for the incorporation of regional techniques in commonly performed procedures has been published. Challenges include training and ensuring competencies in current and evolving techniques |
| Nonpharmacologic interventions | Virtual reality (VR), music therapy, mindfulness-based interventions (MBI) | VR effectiveness varies and is likely more beneficial in acute than chronic pain. Music therapy in the recovery room decreased pain scores and opioid use in orthopedic surgery patients. MBIs can be embedded into perioperative pathways. Nonpharmacologic strategies have a low risk of complications, but not all studies are methodologically robust, and others have shown a decrease in pain but not a decrease in opioid consumption |

Harbell MW, et al. *Curr Opin Anaesthesiol*. 2024;37(6):697-704.

# Example of Postoperative Prescribing Recommendations

## Adult Prescribing Recommendations

| Procedure | Oxycodone 5 mg tablets* |
|---|---|
| **Breast Cancer Surgery** | |
| Breast Biopsy or Lumpectomy | 0-5 |
| Lumpectomy + Sentinel Lymph Node Biopsy | 0-5 |
| Sentinel Lymph Node Biopsy Only | 0-5 |
| Simple Mastectomy + Sentinel Lymph Node Biopsy | 0-20 |
| Modified Radical Mastectomy + Sentinel Lymph Node Biopsy | 0-30 |
| **Cardiothoracic Surgery** | |
| Cardiac Surgery via Median Sternotomy | 0.25 |
| **Dentistry** | |
| Dental Extraction | 0 |
| **Obstetrics and Gynecology** | |
| Hysterectomy - Vaginal or Laparoscopic/Robotic or Abdominal | 0-10 |
| Cesarean Section | 0-20 |
| **Orthopedic Surgery** | |
| Total Hip Arthroplasty | 0-30 |
| Total Knee Arthroplasty | 0-40 |
| **Urology** | |
| Prostatectomy | 0-10 |
| **Vascular Surgery** | |
| Carotid Endarterectomy | 0-5 |

| Procedure | Oxycodone 5 mg tablets* |
|---|---|
| **General Surgery** | |
| Anti-reflux (Nissen) - Laparoscopic | 0-5 |
| Enterolysis - Laparoscopic | 0-5 |
| Excision of Rectal Tumor - Transanal | 0-5 |
| Thyroidectomy | 0-5 |
| Appendectomy | 0-10 |
| Cholecystectomy - Laparoscopic or Open | 0-10 |
| Colectomy - Laparoscopic or Open | 0-10 |
| Donor Nephrectomy - Laparoscopic | 0-10 |
| Enterostomy Closure - Laparoscopic | 0-10 |
| Gastrorrhaphy | 0-10 |
| Hernia Repair - Minor or Major | 0-10 |
| Ileostomy/Colostomy Creation, Re-sitting, or Closure | 0-10 |
| Pancreatectomy | 0-10 |
| Sleeve Gastrectomy | 0-10 |
| Small Bowel Resection or Enterolysis - Open | 0-10 |
| **Melanoma Surgery** | |
| Sentinel Lymph Node Biopsy Only | 0-5 |
| Wide Local Excision + Sentinel Lymph Node Biopsy | 0-20 |

*If prescribing hydrocodone 5 mg, the number of tablets remain the same as listed above

Michigan OPEN. 2024. https://michigan-open.org/wp-content/uploads/2024/08/All-Adult-Prescribing-Recs.pdf.pdf.

# Opioid Tapering for Acute Pain

| Regimen Component | Approach for Opioid-Naïve | Approach for Opioid-Tolerant |
|---|---|---|
| Goals of opioid tapering | Limit excess exposure to opioids and opioid-related adverse events once pain is improving, limit conversion to persistent opioid use if not otherwise indicated by patient condition, limit quantity of unused opioids | More complex and patient-specific, may entail tapering back to previous chronic pain or MOUD regimen (or reevaluating chronic regimen in concert with applicable prescriber), limiting opioid-related adverse events, avoiding relapse of OUD, limiting long-term adverse events related to chronic opioid exposure |
| Dose reduction at each step of taper | Consider decreasing daily dose by 20-25% | More gradual reductions may be needed at each step |
| Frequency of tapering | Every 1-2 days once pain is improving | Less frequent reductions are likely to be needed, consider every 2-7 days once acute pain improving |
| Total duration of taper | Most patients can successfully taper off opioids within 3-7 days after a major scheduled surgery, assuming multimodal and enhanced recovery techniques are used concurrently | Longer tapers will be needed, may take weeks to months to be successful depending on patient-specific circumstances |
| Other considerations | Consider reducing dose before lengthening dosing interval to help maintain smoother pain control without large peaks/valleys of analgesic effect | More multimodal therapies, psychosocial support, monitoring, and coordination of care often needed |



Hyland SJ, et al. *Healthcare (Basel)*. 2021;9(3):333.

# Putting It All Together: Surgical Pain Management

# Best Practices for Management of Surgical Pain


Hyland SJ, et al. *Healthcare (Basel)*. 2021;9(3):333.

# Best Practices for Management of Surgical Pain

## Screen

- At risk for persistent postsurgical pain
- At risk for persistent postsurgical opioid use
- Screen for opioid use and substance use before surgery to identify those at risk for poor pain and opioid use outcomes

## Assess

- Identify patients at increased risk of respiratory depression:
  - Concurrent medication use (e.g., prior opioid prescriptions, sleep aids, benzodiazepines)
  - Obstructive sleep apnea, obesity, neurological disorder, oxygen desaturation prior to discharge
- Remember to be sensitive with your language and consider various options to improve communication and mitigate stigma


Harbell MW, et al. *Curr Opin Anaesthesiol*. 2024;37(6):697-704. Hyland SJ, et al. *Healthcare (Basel)*. 2021;9(3):333. Fregoso G, et al. *Pain Physician*. 2019;22(5):479-488.

# Best Practices for Management of Surgical Pain

## Educate

- Educate patients and families
- Discuss and recommend non-pharmacological as part of a multimodal approach
- Acetaminophen and NSAIDs should be used together as first-line medications for postoperative pain in surgical patients, unless patients have contraindications or high risk of adverse effects
- Use of opioids **only** to manage severe breakthrough pain that is not relieved by acetaminophen and NSAIDs
- Pain expectations and how to taper opioid use as pain improves
- Pain usually peaks and then improves after the first few days following surgery
- The risks and side effects of opioid medications
  - Sedation, respiratory depression, dependence, withdrawal, addiction, overdose, etc.
- How to safely store and dispose of opioids
- Appropriate use of naloxone, if prescribed


Harbell MW, et al. *Curr Opin Anaesthesiol*. 2024;37(6):697-704. Hyland SJ, et al. *Healthcare (Basel)*. 2021;9(3):333. FDA. 2023. https://www.fda.gov/media/173774/download?attachment.

# Best Practices for Management of Surgical Pain

## Coordinate

- Postoperative pain management plan
  - With surgical and anesthesia teams
  - With the patient's primary care provider and/or usual prescriber
- Information about the patient's operative procedure
- Plan for management of acute postoperative pain if the patient is on chronic opioid therapy or medication for addiction treatment
- With any member of the patient care team that is in part of the perioperative planning (e.g., mental health provider, palliative care, PT, etc. with plan for acute pain management)


Harbell MW, et al. *Curr Opin Anaesthesiol*. 2024;37(6):697-704. Hyland SJ, et al. *Healthcare (Basel)*. 2021;9(3):333. FDA. 2023. https://www.fda.gov/media/173774/download?attachment.

# Education and Surgical Expectations

- Pre-surgical education helps inform care plans and sets treatment and outcome expectations for patients
- Components of education:
  1. Overview of the team, its structure, and its purpose/function
  2. Education about perioperative pain management
     - Goals of postoperative pain management
       - Eat, sleep, breathe deeply, ambulate
     - Regional/neuraxial anesthesia techniques
     - Pharmacologic modalities
       - Opioid medications and non-opioid medications
     - Non-pharmacologic modalities
  3. Education on opioid safety: opioid-related risks, side effects, tapering, etc.
  4. Overview of post-surgical functional goals
  5. Behavioral health education

Harbell MW, et al. *Curr Opin Anaesthesiol*. 2024;37(6):697-704. Hyland SJ, et al. *Healthcare (Basel)*. 2021;9(3):333. FDA. 2023. https://www.fda.gov/media/173774/download?attachment.

# Patient Case Study: Part 2

Scheduled for a right ACL repair
Discuss surgical expectations
PT recommendations
Post-op pain management recommendations

- Regional anesthesia
  - Femoral or adductor canal block
- Non-opioid analgesics:
  - Scheduled acetaminophen 1000 mg TID
  - Scheduled NSAID i.e., ibuprofen 800 mg TID
  - Consider gabapentin or pregabalin if needed
- Opioid analgesics:
  - Oxycodone 5 mg every 6 hours PRN for 3-5 days for severe pain #20
- Nonpharmacologic therapies
  - Knee brace
  - Ice machine
  - Behavioral interventions: mindfulness (apps), biofeedback, hypnosis
  - PT

**HOW WOULD YOU PROCEED?**

# Patient Case Study: Part 2

Postoperative day #14
PT recommendations: not progressing per PT notes
Postop pain management recommendations

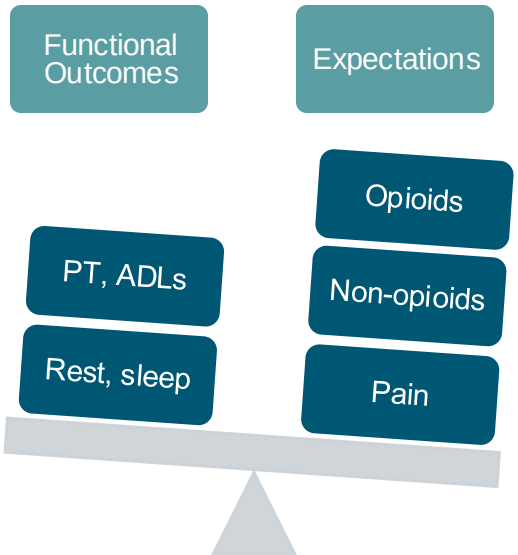
- Non-opioid analgesics:
- Scheduled acetaminophen 1000 mg TID
- Scheduled ibuprofen 800 mg TID
  - Consider starting pregabalin 75 mg twice a day (BID) and titrate up
- Opioid analgesics:
  - Patient states that the oxycodone is not helping with the pain and has had a refill already on postoperative day #5
    - How would you proceed?
- Nonpharmacologic therapies
  - Knee brace
  - Ice machine
  - Behavioral interventions: (hasn't used) mindfulness (apps), biofeedback, hypnosis
  - PT

**HOW WOULD YOU PROCEED?**

# Patient Case Study: Part 2

Patient expectations for post-surgical pain and opioid use

- Set pain expectations in relation to procedure
- Focus on postoperative functional goals:
  - Ability to eat, move, breathe deeply, sleep
- Focus on non-opioid pain management
  - NSAIDs, acetaminophen, PT, acupressure, meditation/mindfulness
- Discuss appropriate use of opioids
  - Indication for acute post-surgical pain
  - Discuss adverse effects and risks of opioids
  - Educate on safe storage and disposal




ADLs = activities of daily living.

Hyland SJ, et al. *Healthcare (Basel)*. 2021;9(3):333.

# Preventing Acute Postsurgical Pain From Becoming Chronic

- There are significant psychosocial, medical, and economic consequences of developing chronic pain after surgery and trauma
- Interaction of patient, surgical, and environmental risk factors may play a significant role in the pathophysiology of transition from acute to chronic postsurgical pain
- Identifying and counseling high-risk patients and comprehensive management of acute postoperative pain via multimodal regimens is key
    - Incorporation of SNRIs or loco-regional techniques ± concomitant NMDA antagonists or gabapentinoids may have a role in decreasing the incidence of chronic postsurgical pain



SNRI = serotonin and norepinephrine reuptake inhibitor.

Oweidat A, et al. *Curr Opin Anaesthesiol.* 2024;37(5):588-596.

# Preventing Acute Postsurgical Pain From Becoming Chronic

- TPS incorporates pre, intra-hospital care, and post-discharge follow-up of patients providing a comprehensive pain management plan
- Allows for timely identification of patients transitioning from acute to chronic postsurgical pain
- Artificial intelligence through machine learning can modify current diagnostic and treatment approaches by analyzing large data

# Audience Response

## Can a Transitional Pain Service (TPS) be cost effective?

A. Yes
B. No
C. Maybe

# Considerations for Referral

## Preoperative

- Surgery type
- High-risk medications
- Current or history of substance use
- Mental health concerns

## Surgery
## Acute Postoperative

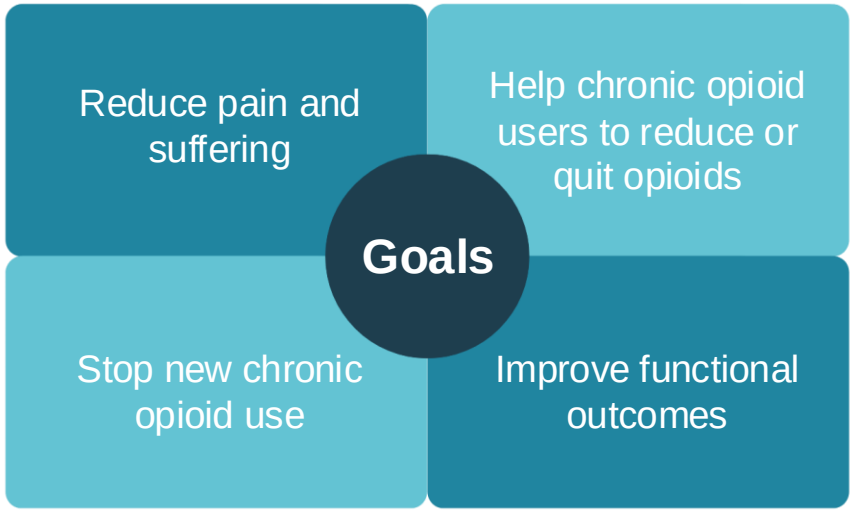
- Severe postoperative pain
- High opioid requirement
- Mental health concerns
- Need for pain management specialist

## Post-Discharge Postoperative

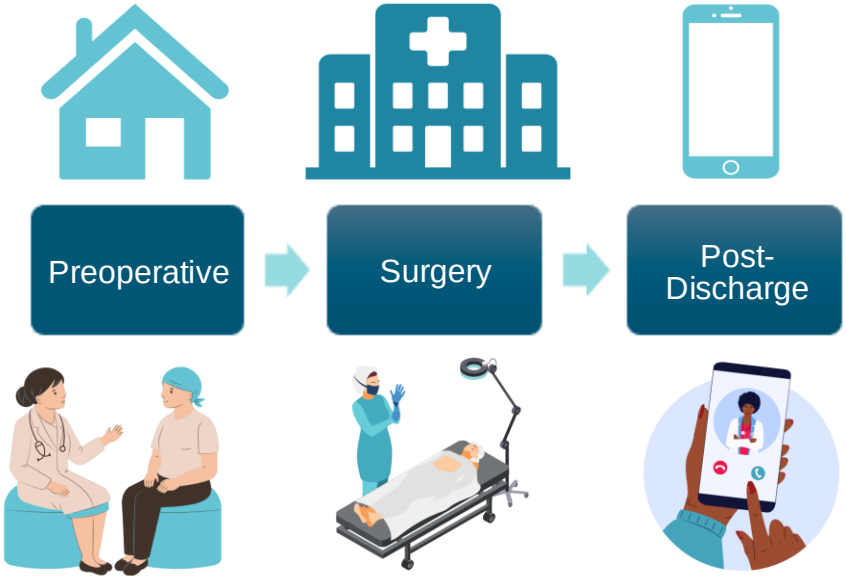
- Goal transition back to baseline by 30 days postop
- Opioid taper recommendations

Klimke R, et al. *Curr Pain Headache Rep*. 2024;28(6):457-464. Katz J, et al. *Can J Pain*. 2019;3(2):49-58. Dunworth S, et al. *Curr Pain Headache Rep*. 2024;28(3):141-147.

# Role of a Transitional Pain Service (TPS)




## Coordination of Care




Klimke R, et al. *Curr Pain Headache Rep*. 2024;28(6):457-464. Katz J, et al. *Can J Pain*. 2019;3(2):49-58.

# Example of Inclusion Criteria for TPS

**Surgery Type**

- Total joint replacements
- Open abdominal surgeries
- Limb amputation
- Thoracotomy

**High Risk Factors**

- High-risk medications
- Current or historical substance abuse disorder
- Mental health
- Any consult from a provider

# Transitional Pain Service, Salt Lake City, Utah VA

## Preoperative

### Preoperative Screening Assessment

Pain history, chronic opioid use, substance use disorder, mental health history, PROMIS scores, planned surgical procedure

### Preoperative Education

Post-surgical pain expectations
Surgical expectations class
Pain coping strategies
Focused opioid safety
Develop individualized post-surgical pain plan

### Specialty Referrals

Anesthesia Acute Pain Service
VIP/Addiction Medicine
Pain and PM&R Medicine
Whole health

## Surgery

### Inpatient Interdisciplinary Rounds

Implement comprehensive pain management plan

Surgical Specialty/Medicine Team

### Inpatient Interventions

Recommend inpatient postoperative pain management and discharge medications

Individualized discharge postoperative opioid taper plan
ACT Matrix, Biofeedback, hypnosis/relaxation, mindfulness

### Discharge Education

Medication safety

Reinforcement of preoperative education

Reinforcement of pain coping strategies

Post-discharge follow-up plan & care coordination

## Post-Discharge

### Pre-Specified Follow-Up Patient Assessments

Post-discharge days:

2, 7, 14, 21*, 30*, 60*, 90, 180^, 360^

* If off opioids for ≥ 7 consecutive days, get pill count and no need to call until 3 months

^ If off opioids, perform chart review & review State Prescription Database Monitoring Program (PDMP)

### Post-Discharge Assessments

Reinforcement of education

Evaluate progress of post-op pain plan

Recommend post-op pain management strategies

Assist and coordinate pain management and opioid taper with other providers

### TPS Clinic Referrals

Patients not off opioids or at baseline, pre-surgical opioid use by day 30

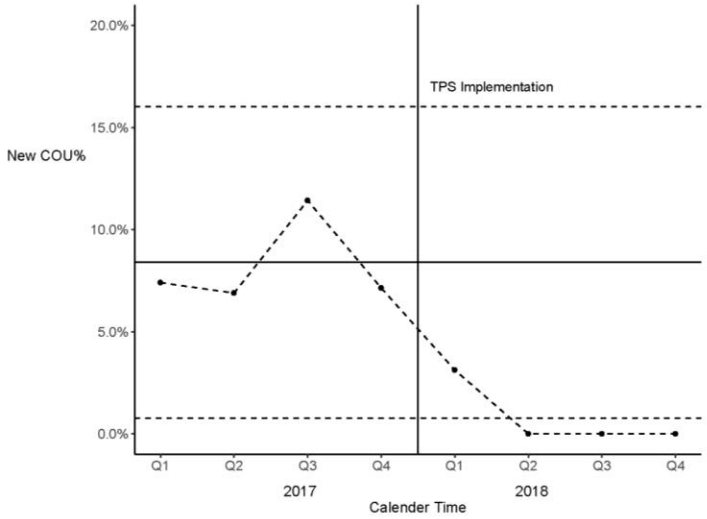
ACT = acceptance and commitment therapy;
PM&R = pain medicine and rehabilitation.
Buys MJ, et al. *Fed Pract*. 2020;37(10):472-478.

# Multidisciplinary TPS Associated With Reduced Opioid Dependence after Total Knee Arthroplasty

### Incidence of New Chronic Opioid Use Among Previously Opioid-Naïve Veterans After Orthopedic Joint Surgery

| | Post-TPS | Pre-TPS | P value |
|---|---|---|---|
| n | 137 | 71 | |
| Male Gender (n(%)) | 127 (92.7) | 64 (90.1) | 0.710 |
| Age | 68.01 (8.51) | 67.45 (7.20) | 0.637 |
| BMI | 30.22 (4.71) | 31.42 (4.87) | 0.094 |
| Rural (n(%)) | 31 (22.6) | 18 (25.4) | 0.790 |
| Length of stay (days) | 1.77 (1.41) | 2.04 (1.03) | 0.146 |
| Anxiety (n(%)) | 32 (23.4) | 7 (9.9) | 0.029 |
| Depression (n(%)) | 41 (29.9) | 19 (26.8) | 0.752 |
| PTSD (n(%)) | 33 (24.1) | 16 (22.5) | 0.938 |
| Substance use disorder (n(%)) | 23 (16.8) | 7 (9.9) | 0.254 |
| Total knee arthroplasty surgery (n(%)) | 95 (69.3) | 43 (60.6) | 0.264 |
| Number of tablets prescribed at discharge | **38.91 (24.10)** | **85.28 (28.55)** | < 0.001 |
| Number of tablets prescribed at 90 days | **48.76 (35.50)** | **119.02 (64.17)** | < 0.001 |
| Persistent opioid use at 90 days | **1 (0.7)** | **7 (9.9)** | 0.004 |
| All variables reported as mean(SD) unless otherwise specified | | | |
| Student's paired T test used for continuous variable comparisons | | | |
| Fisher's exact test was used for categorical variable comparisons | | | |

### Patient Demographics and Opioid Consumption Orthopedic TKA and THA



# Postoperative Opioid Prescribing Use and Trends Among Veterans

| Variable | Non-Opioid Users (N = 223) | Chronic Opioid Users (N = 34) | P value |
|---|---|---|---|
| No opioid use after hospital discharge, n (%) | 35 (16) | 0 (0) | 0.007 |
| Baseline opioid use (MEDD) | 0 (0, 0) | 25 (10, 88) | < 0.001 |
| 24-hour pre-discharge opioid consumption (MEDD) | 8 (0, 22) | 14 (4, 75) | 0.18 |
| Discharge prescription size (# of pills) | **10 (7, 12)** | **10 (5, 12)** | 0.79 |
| Opioids consumed in 90 days (# of pills) | **4 (0, 10)** | N/A | |
| Leftover opioid pills | **5 (0, 10)** | N/A | |
| Refill required | 19 (9) | **0 (0)** | 1.00 |
| Time to opioid cessation (days) | **4 (4-5)** | N/A | - |
| Patients using opioids at 2 days, n (%) | 105 (50.5) | N/A | |
| Patients using opioids at 7 days, n (%) | 18 (8.7) | N/A | |
| Patients using opioids at 14 days, n (%) | 5 (2.3) | N/A | |
| Patients using opioids at 30 days, n (%) | 3 (1.3) | N/A | |
| Patients using opioids at 60 days, n (%) | 0 (0) | N/A | |

MEDD = morphine equivalent daily dose.

Bleicher J, et al. *Reg Anesth Pain Med.* 2022;47(8):487-493.

# Opioid Use Among Veterans Undergoing Major Joint Surgery Managed by a TPS

- At 90 days after surgery, patients enrolled in TPS were significantly less likely to be taking opioids (13.4% TPS vs 27.3% pre-TPS)
- TPS group had 69% lower odds of postoperative chronic opioid use compared with the preintervention group
- Opioid-naive patients enrolled in TPS were less likely to have new chronic opioid use after surgery (0.7% TPS vs 8.4% pre-TPS)
- Patients enrolled in TPS with existing chronic opioid use prior to surgery were more likely to reduce or completely stop opioid use after surgery (67.5% TPS vs 45.3% pre-TPS)
- These data suggest that a TPS is an effective strategy for preventing new chronic opioid use and reducing overall opioid use following orthopedic joint procedures in a Veterans Affairs (VA) hospital



Buys MJ, et al. *Reg Anesth Pain Med.* 2020;45(11):847-852.

# Stopping Opioids After Surgery Improves Pain Measures in Chronic Opioid Users

- 341 surgical patients with chronic opioid use underwent surgery, of which 44 (13%) completely tapered off opioids within 60 days after discharge from the hospital
  - Patients who completely tapered had significant improvement in patient-reported outcomes for pain intensity and interference, with significant differences at 30 and 60 days after discharge for both measures when compared to the partial/no taper group
  - In risk-adjusted analyses, patients with lower baseline MME and those staying longer in the hospital were more likely to achieve complete opioid tapering
- Complete opioid tapering can be successfully achieved after surgery among patients with chronic opioid use with corresponding improvements in self-reported pain intensity and pain interference



Holeman TA, et al. *Surgery*. 2022;172(3):943-948.

# Opioid Tapering in Patients With Chronic Opioid Use

**Qualitative findings from interviews among chronic opioid user patients about behavioral change themes related to different degrees of opioid tapering achieved at 90 days after surgery**

| Theme | Definition | Opioid Tapering Group | Representative Quotation |
|---|---|---|---|
| Activity | Energy level and ability to participate in social activities | Complete tapering | "And I noticed I was alert more. Then about two weeks out my activity level started to increase. And four weeks off opioids and I feel better than I've ever– I feel like a curtain has been lifted off of my eyes." |
| | | Partial tapering | "I started being more active, because I was able to– you know, wear shoes and be more aware of my pain." |
| | | No tapering | "Well, I had more pain than I had to deal with and I had to reduce my physical activity so I wouldn't have to deal with additional pain. And just didn't feel as functional as before." |
| Cognition and thinking | Attention, working memory, and executive function | Complete tapering | "Once I was able to not take any at all, my system felt clearer. I didn't feel as tired. I felt more clear-headed." |
| | | Partial tapering | "More confidence. Clearer headed. You know, not being fuzzy and sleepy." |
| | | No tapering | "I didn't taper anything, so I didn't notice any changes." |
| Mood | Feelings of anxiety or depression, and mood swings from elation to hostility | Complete tapering | "I think my mood was affected a little bit, a little bit of depression…And then, I was able to get through it and at the end, like the reward of being able to say that I'm finally done with opioid medication, it was amazing." |
| | | Partial tapering | "I feel better, I'm happier. I'm positive. I feel good about the future." |
| | | No tapering | "I was extremely angry at myself. But I didn't let it affect the way I treated other people." |
| Sleep quality | Duration of sleep, need for sleep medications, sleep onset, and insomnia | Complete tapering | "Yeah, I sleep better. Before I was really hurting and would get up half the night and take pills and then wait for the pain to go away, but now I sleep most the nights." |
| | | Partial tapering | "Well, yes, I was able to sleep…I was in a much better mood because of that." |
| | | No tapering | "I've lost sleep as a result. I woke up I don't know how many times as a result of the pain and nothing else." |

**WHAT IS ALREADY KNOWN ON THIS TOPIC**

⇒ Prior studies suggest that partial or complete opioid tapering among chronic opioid users may have a negative impact on mental health and quality of life.

**WHAT THIS STUDY ADDS**

⇒ The results of this study show that the ability of Veterans with chronic opioid use (COU) to taper their opioid requirements after surgery is associated with significant improvements in patient-reported pain control and quality of life. Many negative health effects associated with COU are not found in Veterans within 90 days after surgery when their opioid use has been significantly reduced.

**HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY**

⇒ The findings from this study support patient-centered clinical strategies and policies designed to taper chronic opioid user patients off opioids within 90 days after surgery when feasible to achieve positive health benefits.

Brooke BS, et al. *Reg Anesth Pain Med.* 2024;49(10):699-707.

# Post Orthopedic Surgery Opioid Use in Veterans Discharged to SNF vs Home

- Patients who were discharged to a SNF used opioids for twice as long as those who were discharged home (22 vs 11 days)
- Discharge to a SNF was associated with continued opioid use at all time points
- Patients discharged after orthopedic surgery to a SNF used opioids for twice as long as those who were discharged home

**Patient characteristics and outcomes by discharge location (skilled care vs home)**

| Variable | Skilled Care (N=77) | Home (N=371) | P-value |
|---|---|---|---|
| **Sex** | | | |
| Female | 9 (12%) | 26 (7%) | 0.16[c] |
| Male | 68 (88%) | 345 (93%) | - |
| **Age at Discharge** | 70 (65, 75) | 67 (57, 72) | <0.001[w] |
| **Age Group** | | | |
| <55 | 5 (6%) | 78 (21%) | 0.010[c] |
| 55~70 | 36 (47%) | 156 (42%) | - |
| ≥70 | 36 (47%) | 137 (37%) | - |
| **Married** | 37 (48%) | 248 (67%) | 0.002[c] |
| **Rural** | 14 (18%) | 96 (26%) | 0.15[c] |
| **Body Mass Index** | 31 (27, 36) | 30 (27, 34) | 0.14[w] |
| **Surgery Type** | | | |
| Knee/Hip Replacement* | 56 (73%) | 215 (58%) | 0.016[c] |
| Other Orthopedic Surgery | 21 (27%) | 156 (42%) | - |
| **ASA Score** | | | |
| 1 | 0 (0%) | 17 (5%) | 0.001[f] |
| 2 | 10 (13%) | 109 (29%) | - |
| 3 | 64 (83%) | 233 (63%) | - |
| 4 | 3 (4%) | 12 (3%) | - |
| **Anxiety** | 16 (21%) | 95 (26%) | 0.37[c] |
| **Depression** | 25 (32%) | 130 (35%) | 0.67[c] |
| **PTSD** | 13 (17%) | 103 (28%) | 0.047[c] |
| **Other Mental Health Diagnosis** | 9 (12%) | 22 (6%) | 0.07[c] |
| **Any Mental Health Problems** | 36 (47%) | 177 (48%) | 0.88[c] |
| **THC Use** | 7 (9%) | 28 (8%) | 0.65[c] |
| **Ethanol Use Disorder** | 14 (18%) | 60 (16%) | 0.67[c] |
| **Opioid Use Disorder** | 1 (1%) | 2 (1%) | 0.43[f] |
| **Methamphetamine Use Disorder** | 4 (5%) | 7 (2%) | 0.10[f] |
| **Any Substance Use Disorder** | 19 (25%) | 77 (21%) | 0.45[c] |
| **In Hospital Stay** | 76 (99%) | 287 (77%) | <0.001[c] |
| **Hospital Length of Stay (days)** | 3 (2, 4) | 1 (1, 2) | <0.001[w] |
| **Baseline MEDD** | 0 | 0 | 1.00[t] |
| **Discharge Day MEDD** | 24 (9, 45) | 22 (5, 45) | 0.27[w] |
| **Baseline P3A T-Score** | 54 (49, 60) | 54 (49, 58) | 0.045[g] |
| **Baseline P6B T-Score** | 66 (60, 70) | 64 (60, 67) | 0.06[g] |
| **Opioid Use > 90 Days After Discharge** | 3 (4%) | 0 (0%) | 0.005[f] |
| **Days to cessation** - Median (95% CI) | 22 (19,26) | 11 (10,12) | <0.001[l] |

SNF = skilled nursing facility.

Buys MJ, et al. *J Am Med Dir Assoc.* 2023;24(2):258-262.

# TPS is Financially Feasible!

## TPS SLC VA Cost Effectiveness

### Original Model (2018)

| | TPS | Control |
|---|---|---|
| Naïve | 79.7% | 66.8% |
| Prolonged use | **0.5%** | **3.1%** |
| Non-prolonged use | 99.5% | 96.9% |
| Chronic | 20.3% | 33.2% |
| Continued use | 56.6% | 61.7% |
| Non-continued use | **43.4%** | **38.3%** |

| | |
|---|---|
| Anesthesiologist | 0.5 |
| Nurse practitioner | 1.0 |
| Nurse care coordinators (RN's wage used) | 2.0 |
| Psychologist | 1.0 |

| Strategy | Cost (2019 $) | Incremental Cost (2019 $) | Effect (QALYs) | Incremental Effect (QALYs) | ICER ($/QALY) |
|---|---|---|---|---|---|
| Standard | $46,308 | | 0.8282 | | |
| TPS | $45,528 | -$780 | 0.8527 | 0.0245 | -$31,835 |

| Per patient | Total intervention cost | # of patients |
|---|---|---|
| $1,864 | $486,395 | 97 |

If # of patients is > 97, then cost-effective

### Current Model (2019+)

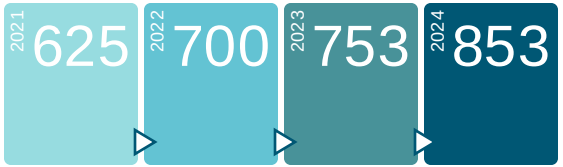
| | TPS | Control |
|---|---|---|
| Naïve | 79.7% | 66.8% |
| Prolonged use | 0.5% | 3.1% |
| Non-prolonged use | 99.5% | 96.9% |
| Chronic | 20.3% | 33.2% |
| Continued use | 56.6% | 61.7% |
| Non-continued use | 43.4% | 38.3% |

| | |
|---|---|
| Anesthesiologist | 0.5 |
| Nurse practitioner | 1.0 |
| Nurse care coordinators (RN's wage used) | **4.0** |
| Psychologist | 1.0 |

| Strategy | Cost (2019 $) | Incremental Cost (2019 $) | Effect (QALYs) | Incremental Effect (QALYs) | ICER ($/QALY) |
|---|---|---|---|---|---|
| Standard | $17,332 | | 0.8282 | | |
| TPS | $17,991 | $659 | 0.8527 | 0.0245 | -$26,911 |

| Per patient | Total intervention cost | # of patients |
|---|---|---|
| $2,430 | $634,149 | 264 |

If # of patients is > 264, then cost-effective

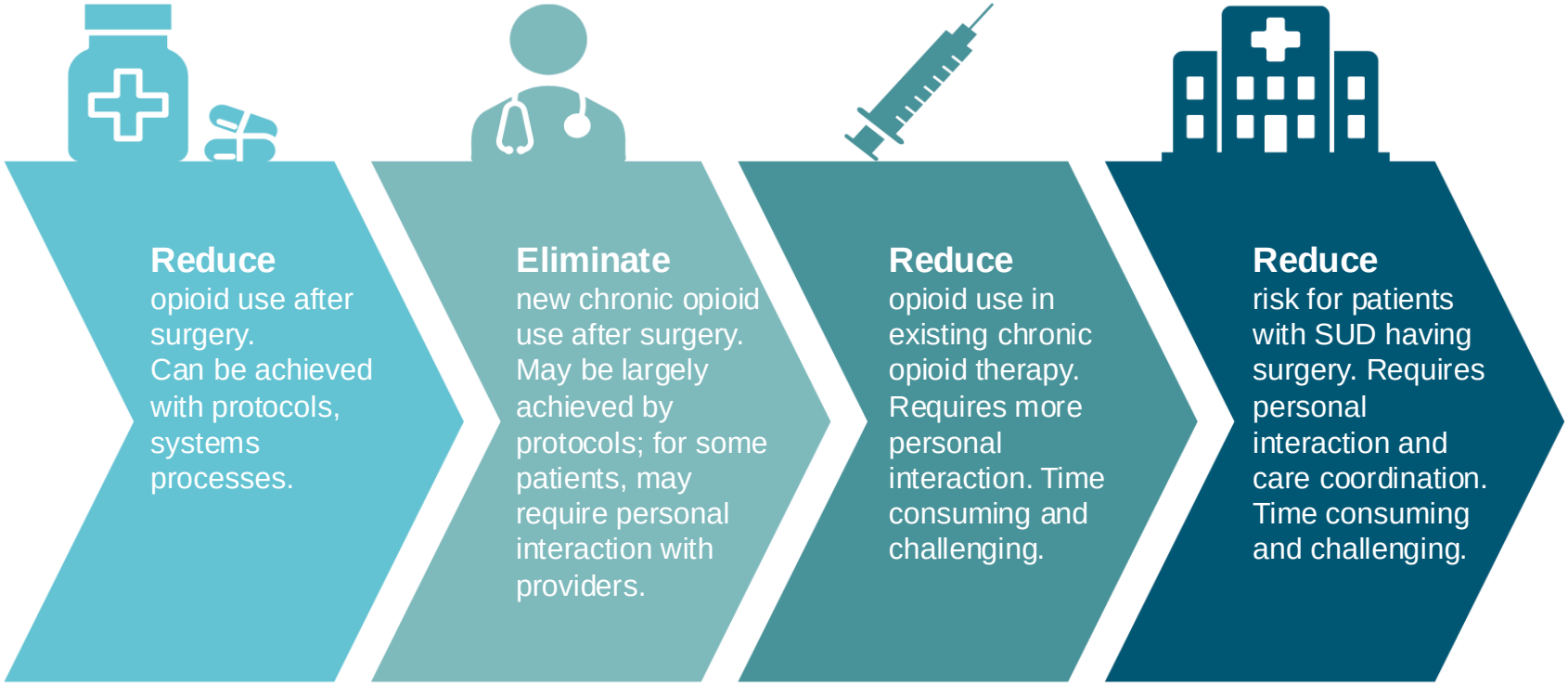


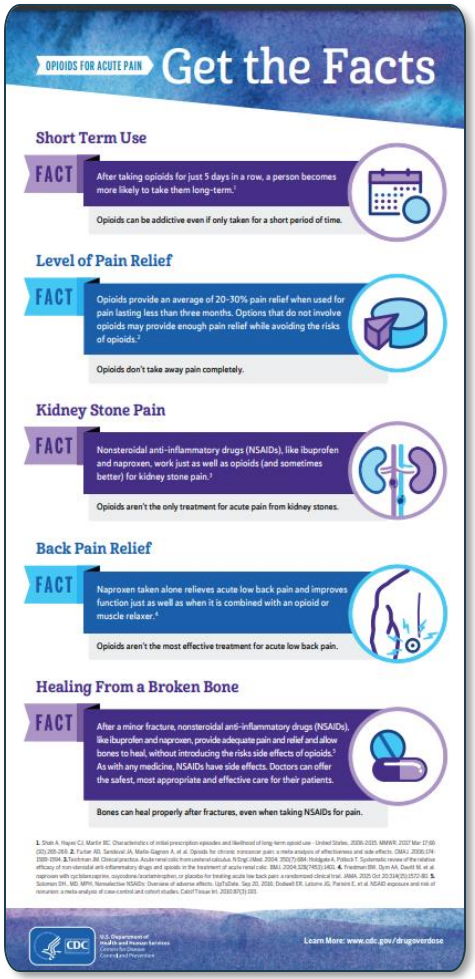

QALY = quality-adjusted life year; ICER = incremental cost-effectiveness ratio.

Yoo M, et al. *Fed Pract.* 2023;40(12):418-425.


TPS Patient Experience

# Summary of a Transitional Pain Service






# Acute Pain Takeaways

- Use non-pharmacologic and non-opioid treatments first-line for acute pain
- Educate patients on the effectiveness of NSAIDs and acetaminophen for acute and post-surgical pain; if opioids are used, prescribe the smallest amount needed for the pain
- Reserve opioid medications for severe pain conditions and limit therapy to 5 days or less of an immediate release opioid
- Patients with OUD have a high risk of overdose when taking opioid medication for pain; provide naloxone to patients with OUD
- Identify and address psychosocial risk factors early to prevent transition to chronic pain
- Goals of acute pain management are to relieve suffering, facilitate function, enhance recovery, and satisfy patients
- After surgery, additional goals are to achieve early postoperative mobilization and reduce length of hospital stay

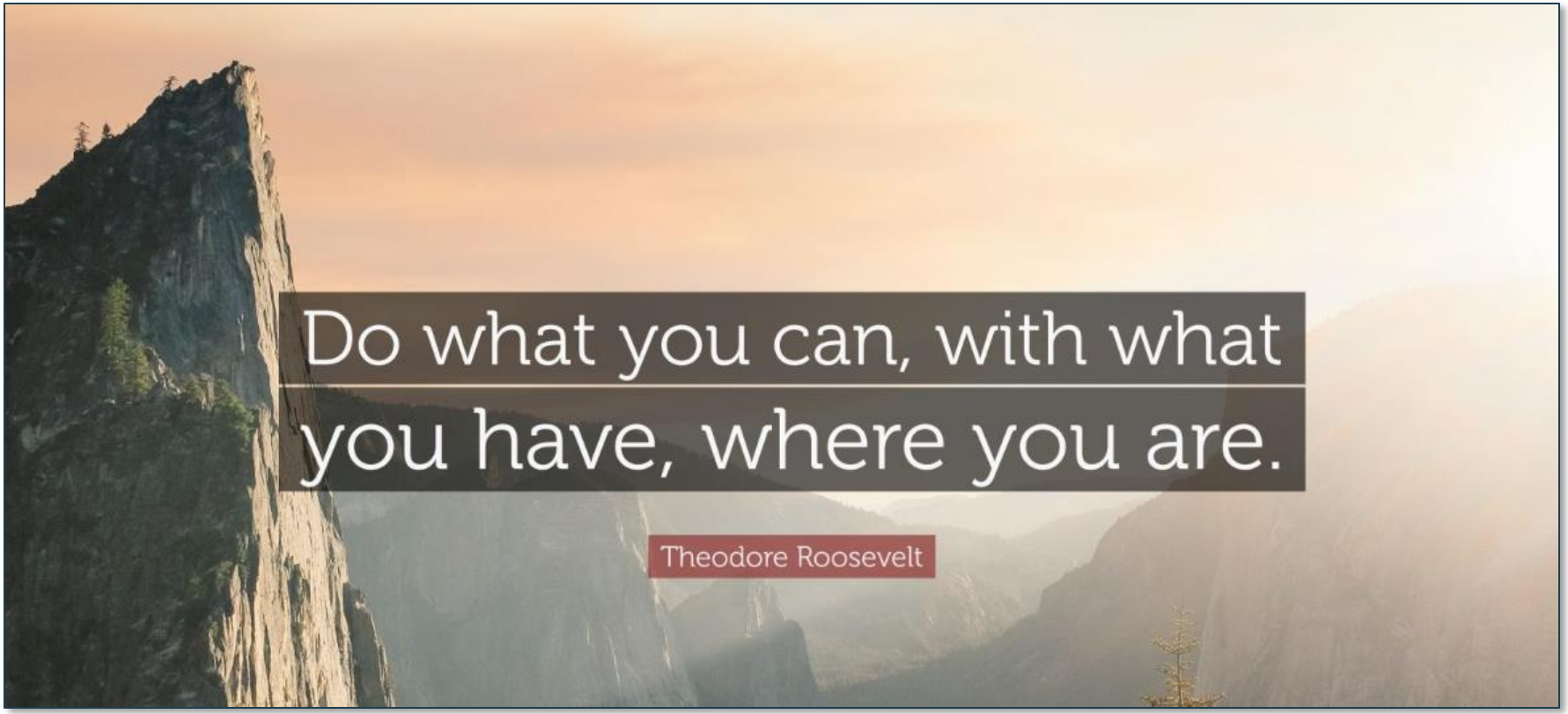
CME OUTFITTERS

CDC. 2017. https://stacks.cdc.gov/view/cdc/50294.

# What Does the Future Hold?

- Improving strategies to identify patients at risk for prolonged opioid use or challenging post-surgical pain
- Developing better criteria for TPS enrollment to focus resources
- Preventing chronic pain!

# Until Then…


Do what you can, with what you have, where you are.
Theodore Roosevelt

# SMART Goals

## Specific, Measurable, Attainable, Relevant, Timely

- Focus on holistic, patient-centered approaches for acute and postoperative pain management
- Develop treatment strategies that take into consideration each patient's baseline prescription use and pain history
- Utilize alternative modalities for acute pain and postoperative pain

# Thank you!

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