

Multimodal Pain Therapy

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Regional Chief Medical Officer
Covenant Health



CovenantHealth



 **THA**
2017
ANNUAL CONFERENCE & EXPO

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Providence Health & Services
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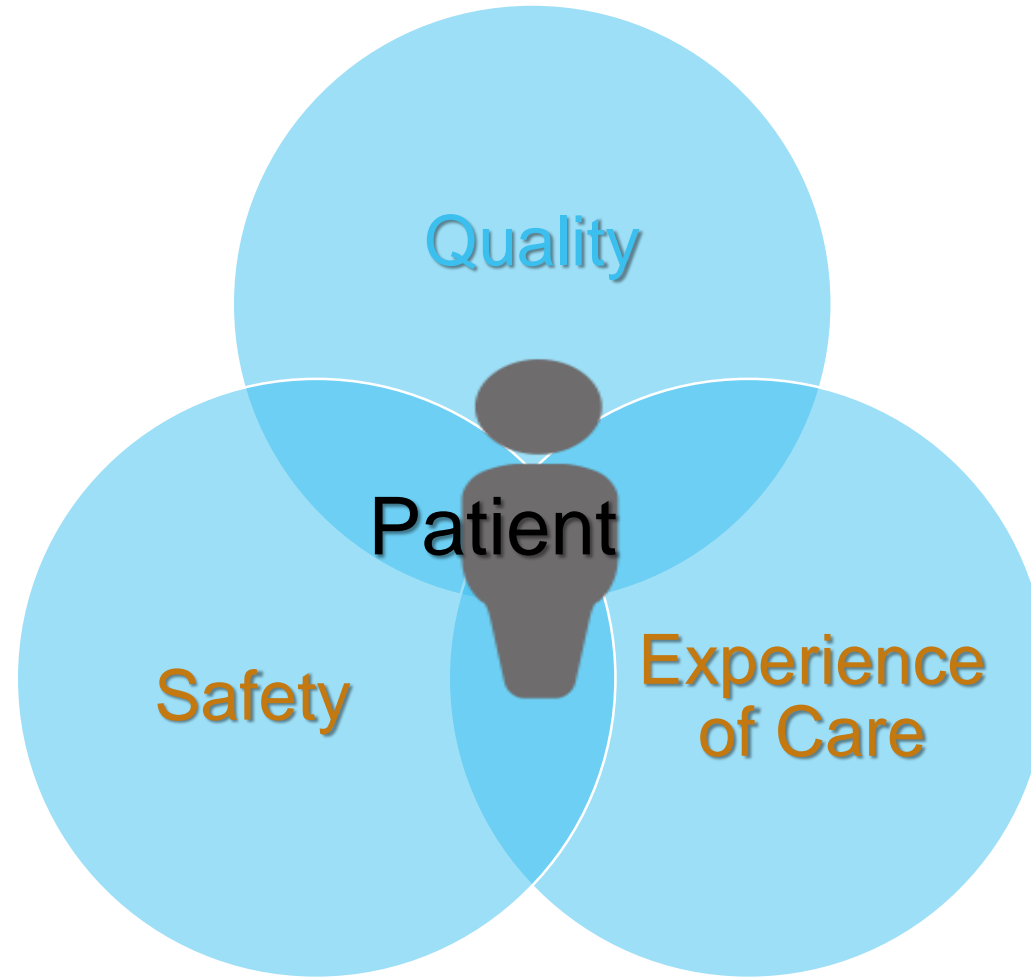
Providence Health & Services
Oregon
Providence Health Plan



St. Joseph Health
West Texas/Eastern New Mexico, including Covenant Health and Covenant Medical Group FirstCare Health Plans



New Paradigm for Patient Care



Hospital Consumer Assessment of HealthCare Providers and Systems (HCAHPS)

- Three broad goals:
 1. Produce data on patients' perspectives of care
 2. Public reporting to improve quality of care
 3. Enhance accountability through transparency
- 27 items; 18 critical aspects of hospitalization:
 - ✓ Communication with doctors and nurses
 - ✓ Responsiveness of hospital staff
 - ✓ Quietness of environment
 - ✓ **Pain management**
 - ✓ Communication about medications
 - ✓ Discharge information
 - ✓ Overall rating; recommend hospital to others
- A focus on Patient Satisfaction and Pain Management has been viewed by some as driving overuse of opioid monotherapy, resulting in increased adverse events

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HCAHPS Questions on Pain Management

12. During this hospital stay, did you need medicine for pain?

¹ Yes

² No ⇒ If No, Go to Question 15

13. During this hospital stay, how often was your pain well controlled?

¹ Never

² Sometimes

³ Usually

⁴ Always

14. During this hospital stay, how often did the hospital staff do everything they could to help you with your pain?

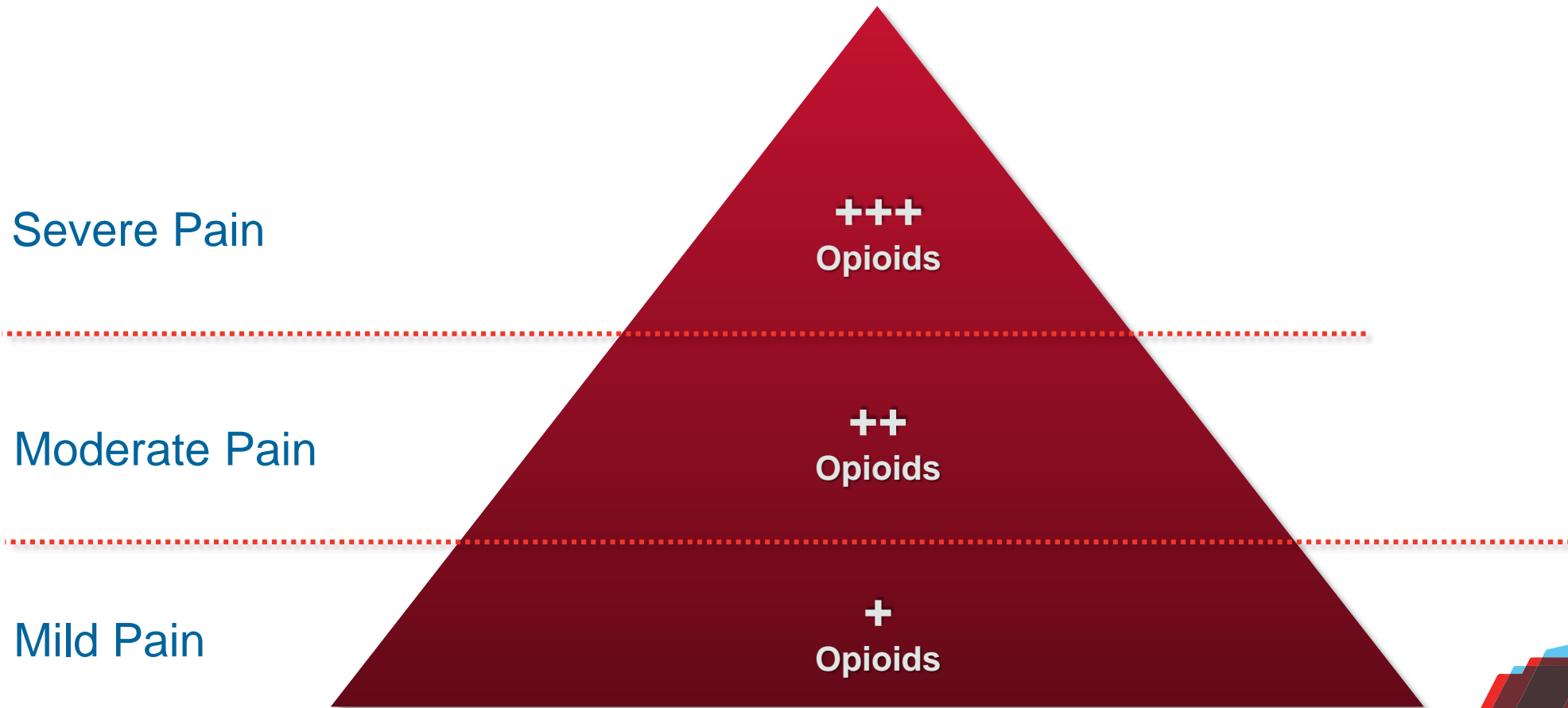
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² Sometimes

³ Usually

⁴ Always

Traditional Pain Management



Aubrun et al., 2003

Aubrun F, Langeron O, Quesnel C, Coriat P, Riou B. *Anesthesiology*. 2003; 98(6): 1415-1421.

Traditional Thinking

- Single Pain Treatment Regimen is easier to titrate
- There is less risk of drug-drug reactions
- If I give more than one pain medication, I won't be able to determine which one may be causing a problem if a problem arises
- It will be simpler to transition home if I only give a single pain medication
- We will save money and avoid risk if we only give the pain medicine when it is needed (PRN).

WRONG!

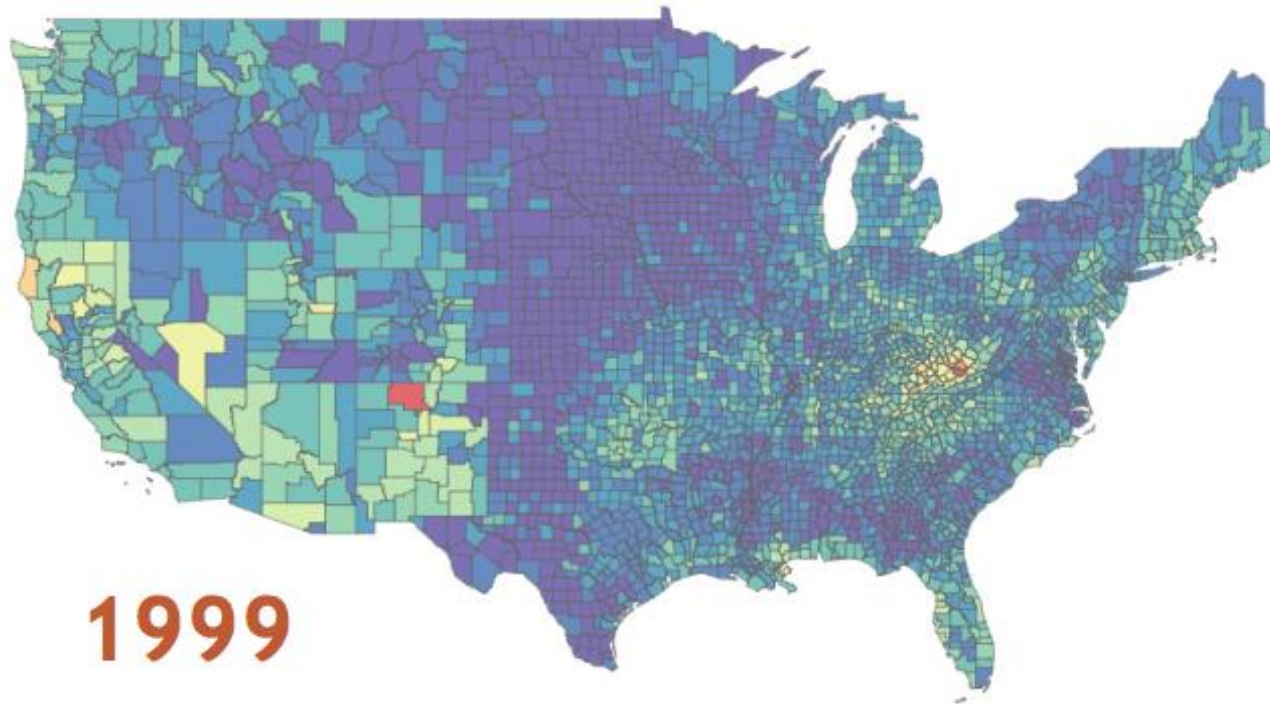
Deaths from prescription opioids have more than quadrupled since 1999

CDC. (2016, Dec 16). Understanding the epidemic. Retrieved from <https://www.cdc.gov/drugoverdose/epidemic/index.html>.

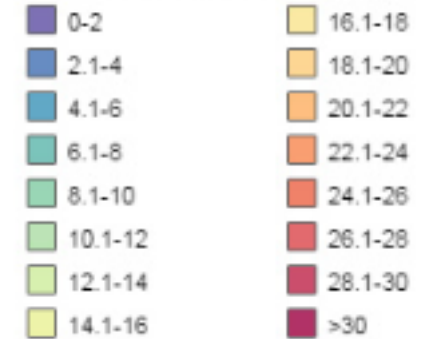
Rossen, L.M., Basan, B., Warner, M., Khan, D., and Chong, Y. (2017). Drug poisoning mortality: United States, 1999–2015. National Center for Health Statistics. Retrieved from <https://www.cdc.gov/nchs/data-visualization/drug-poisoning-mortality/>



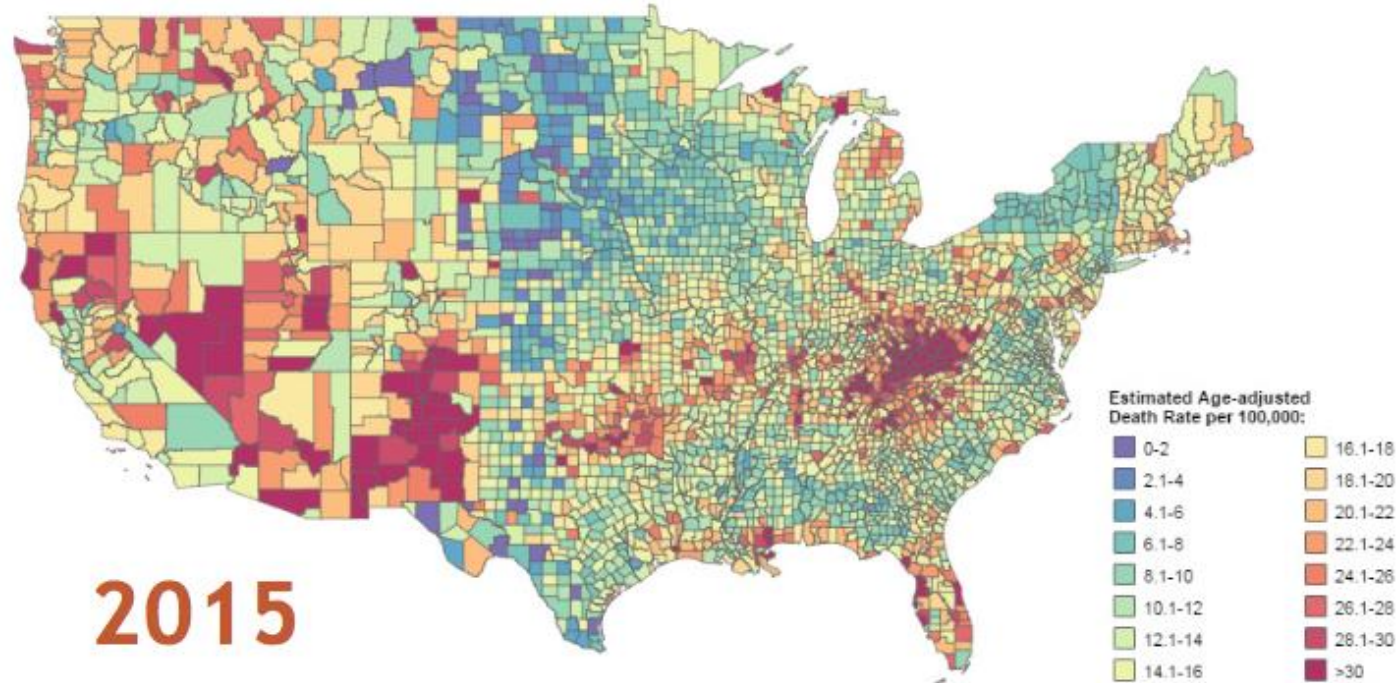
Mortality 18 years ago



Estimated Age-adjusted
Death Rate per 100,000:



Mortality in 2015



The Problem with Traditional Thinking?

- Perioperative pain
 - Approximately 46 million inpatient procedures and 35 million outpatient surgeries were performed in the US in 2006^{1,2}
 - With the advent of Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) surveys, patients are now able to make decisions on hospitals based on quality of care, including quality of pain management
 - Despite new treatment standards, guidelines, and educational efforts, acute postoperative pain continues to be undertreated, with up to 75% of patients in the US still failing to receive adequate postoperative pain relief^{3,4}

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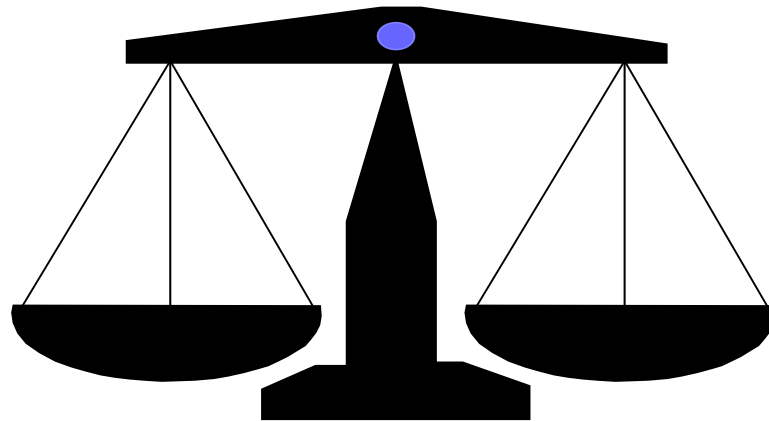
1. DeFrances CJ, Lucas CA, Buie VC, Golosinksiy A. *Natl Health Stat Report*. 2008 Jul 30; (5): 1-20. 2. Cullen KA, Hall MJ, Golosinksiy. *Natl Health Stat Report*. 2009 Jan 28; (11): 1-25. 3. Wu CL, Raja SN. *Lancet*. 2011; 377: 2215-2225. 4. Phillips DM. *JAMA*. 2000; 284(4): 428-429.



Traditional RESULTS

- The harder we “push” with single mode analgesia, the greater the degree of side-effects

↓
Analgesia



Side-effects



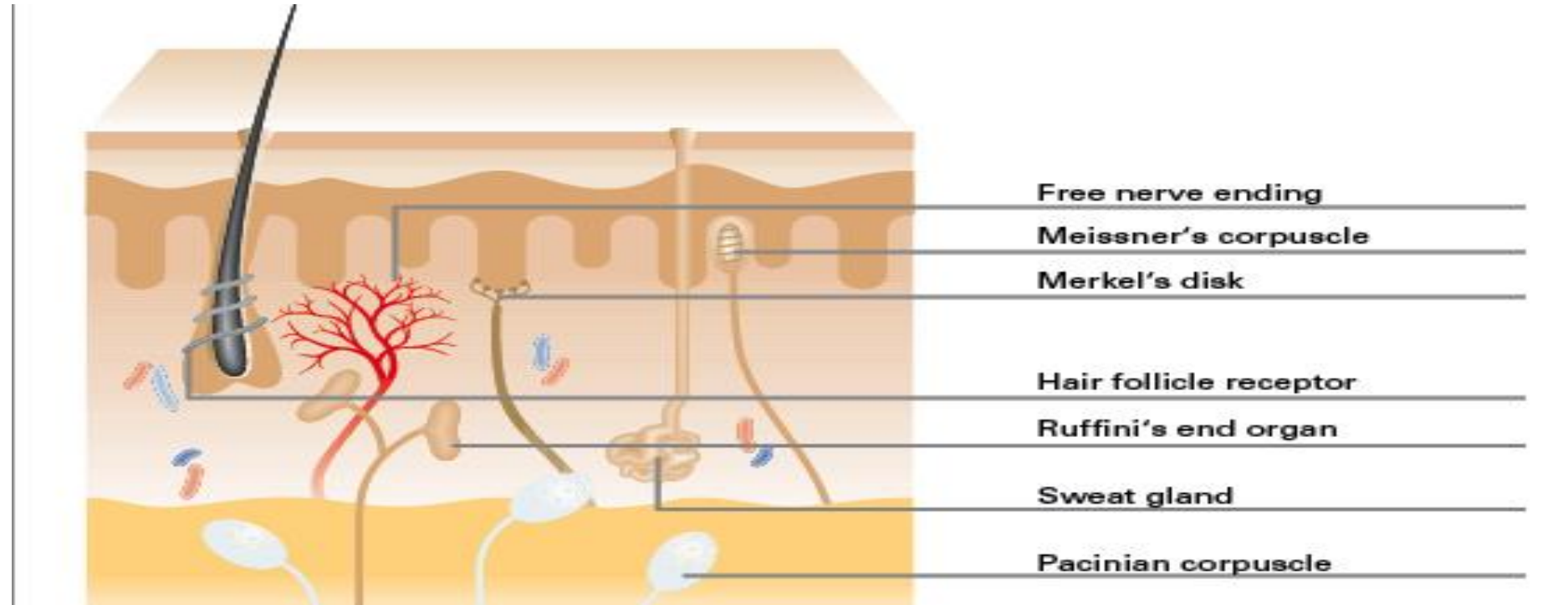
How do we change the “Pain Equation”?



Understanding Pain Targets



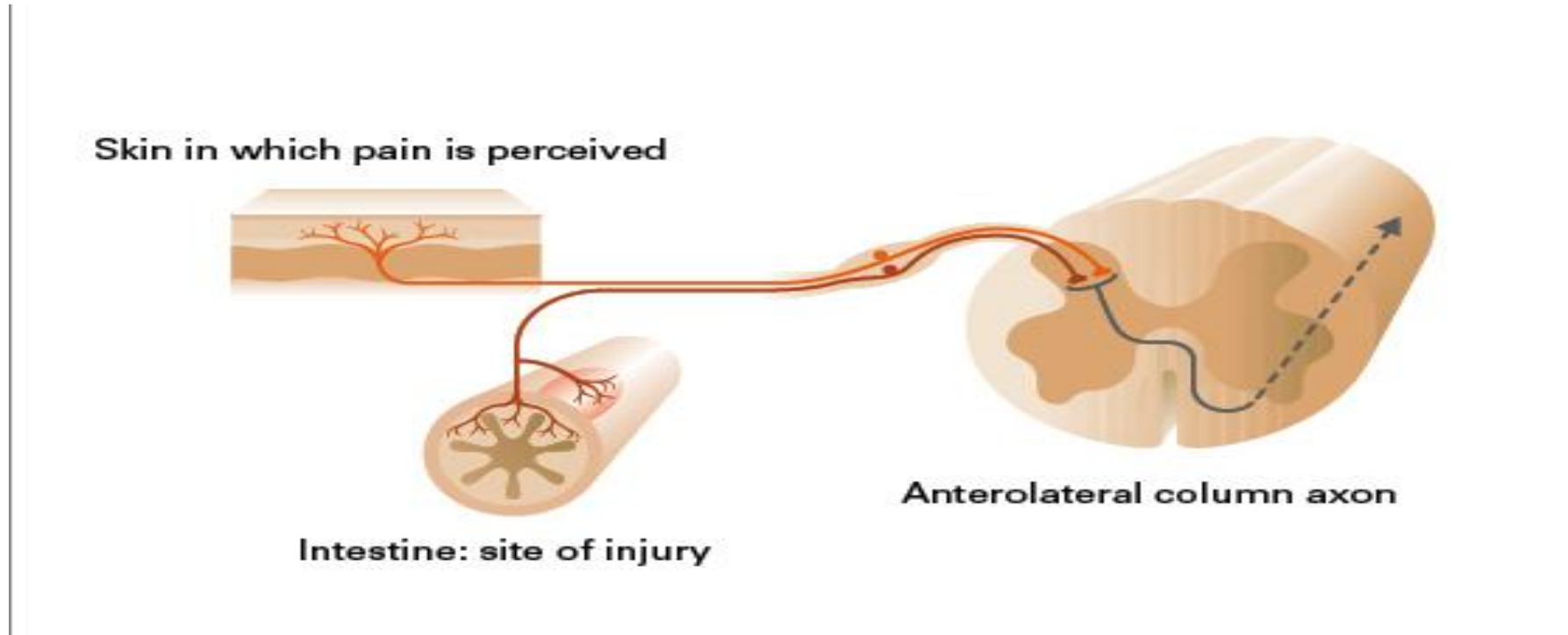
Local Tissue Damage and Pain Targets



Local Tissue Damage and Pain Targets

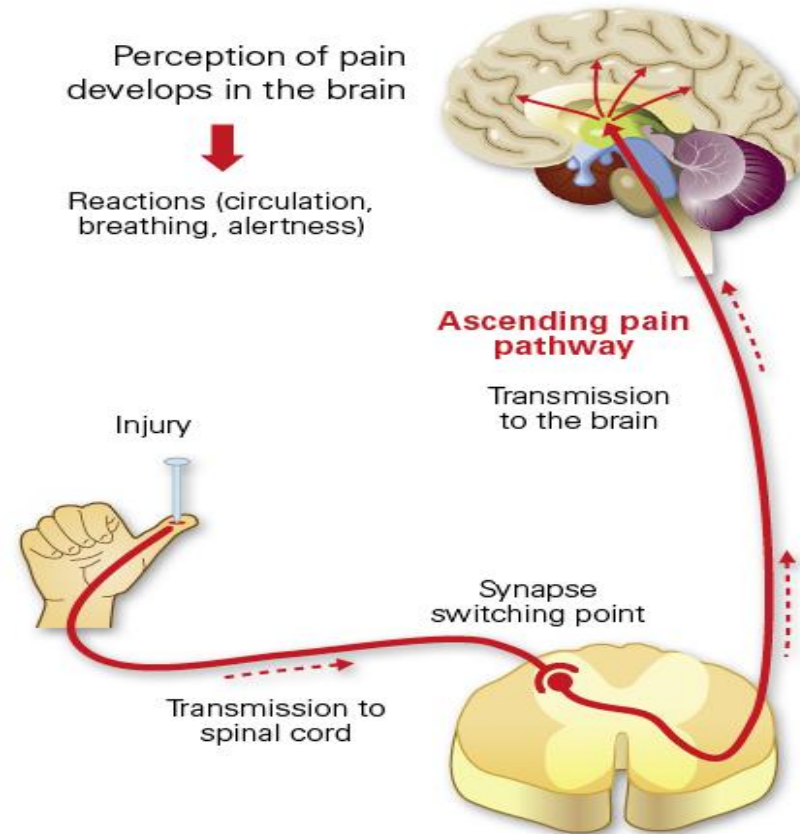


Confused Pain Messaging

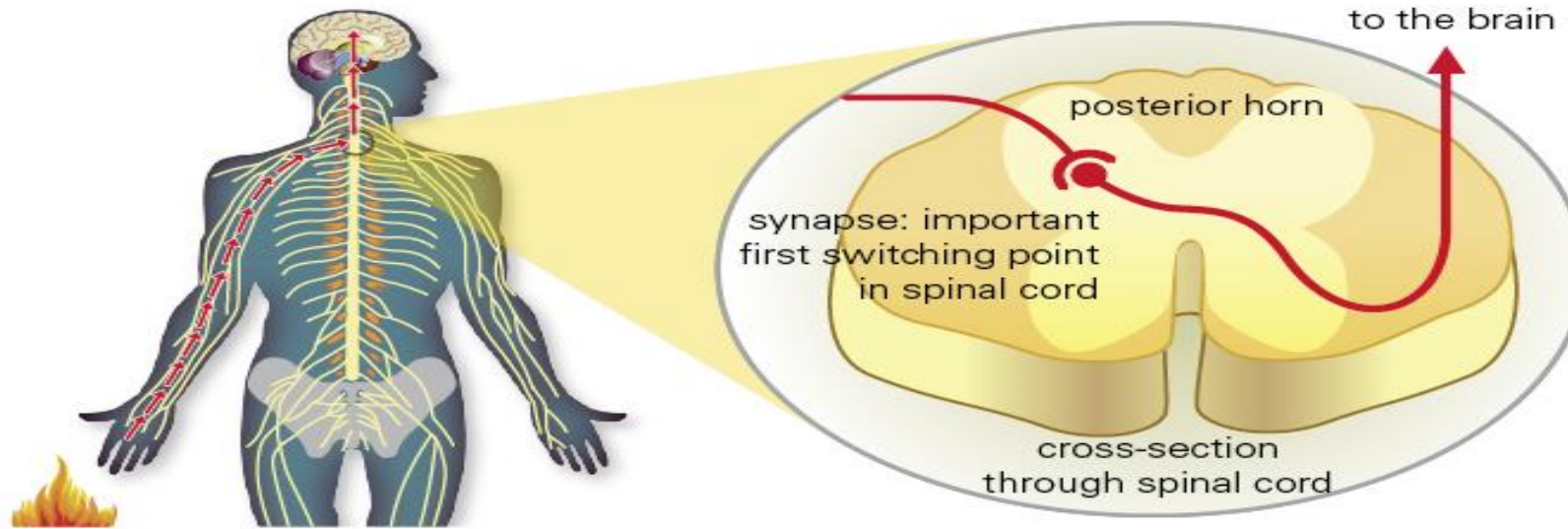


Interruption of Pain Transmission

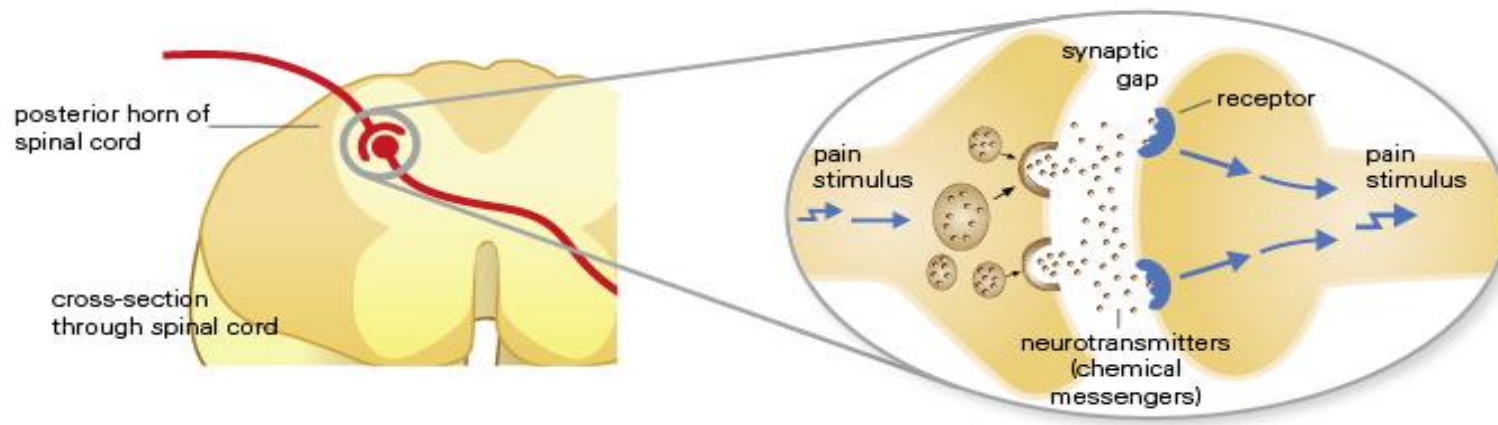
Development of the perception of pain



Interruption of Pain Transmission

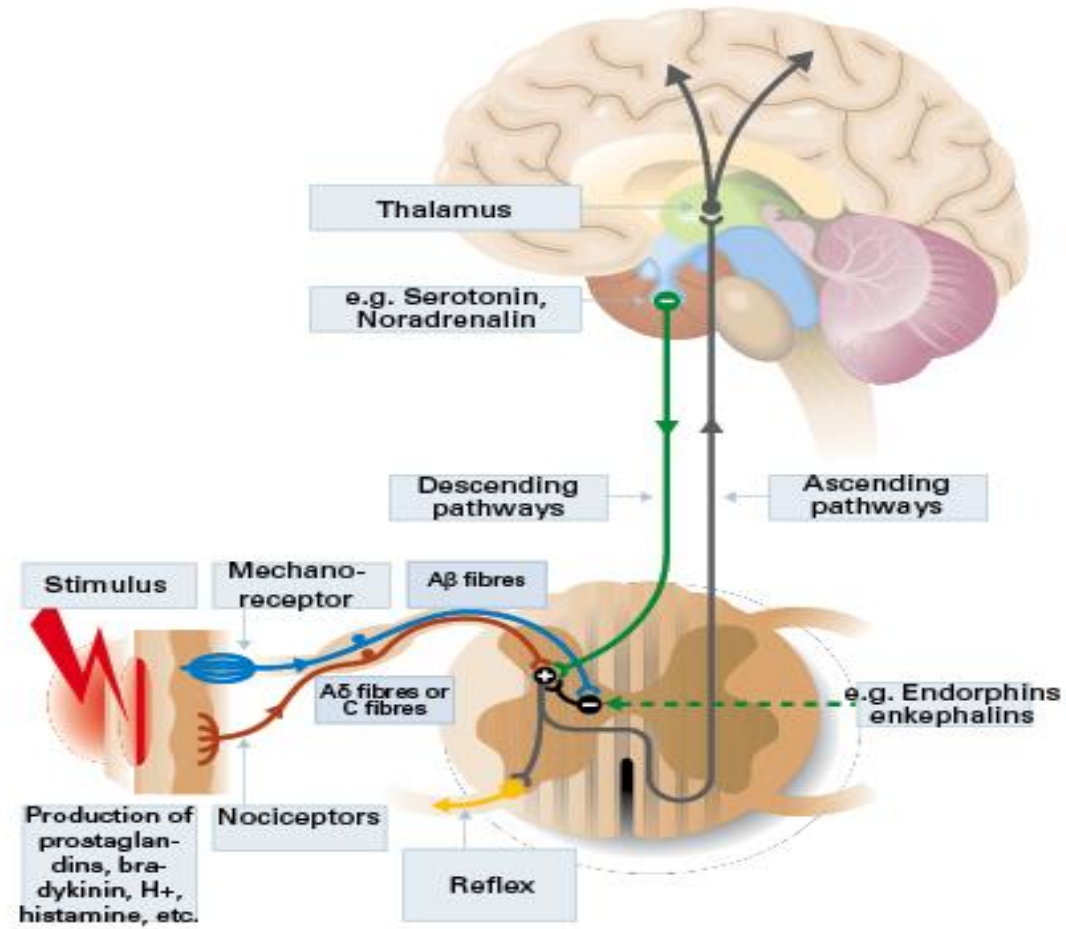


Interruption of Pain Transmission



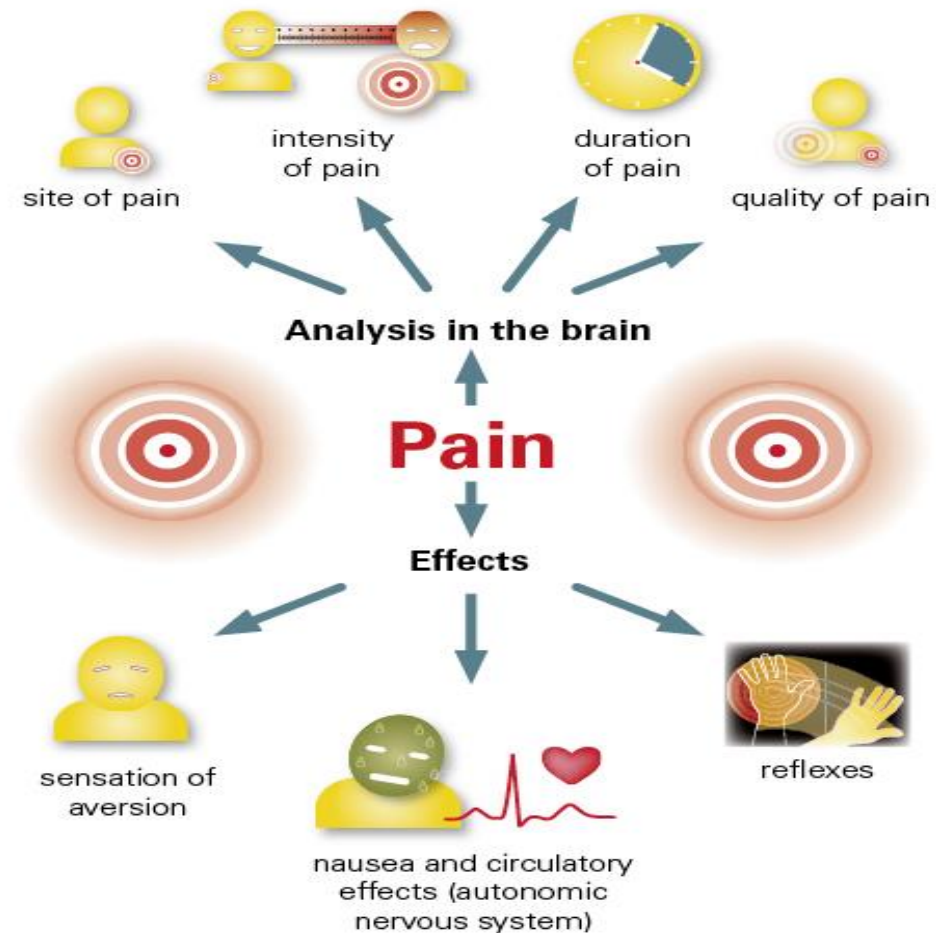
Central Nervous System

Nociceptive system ■

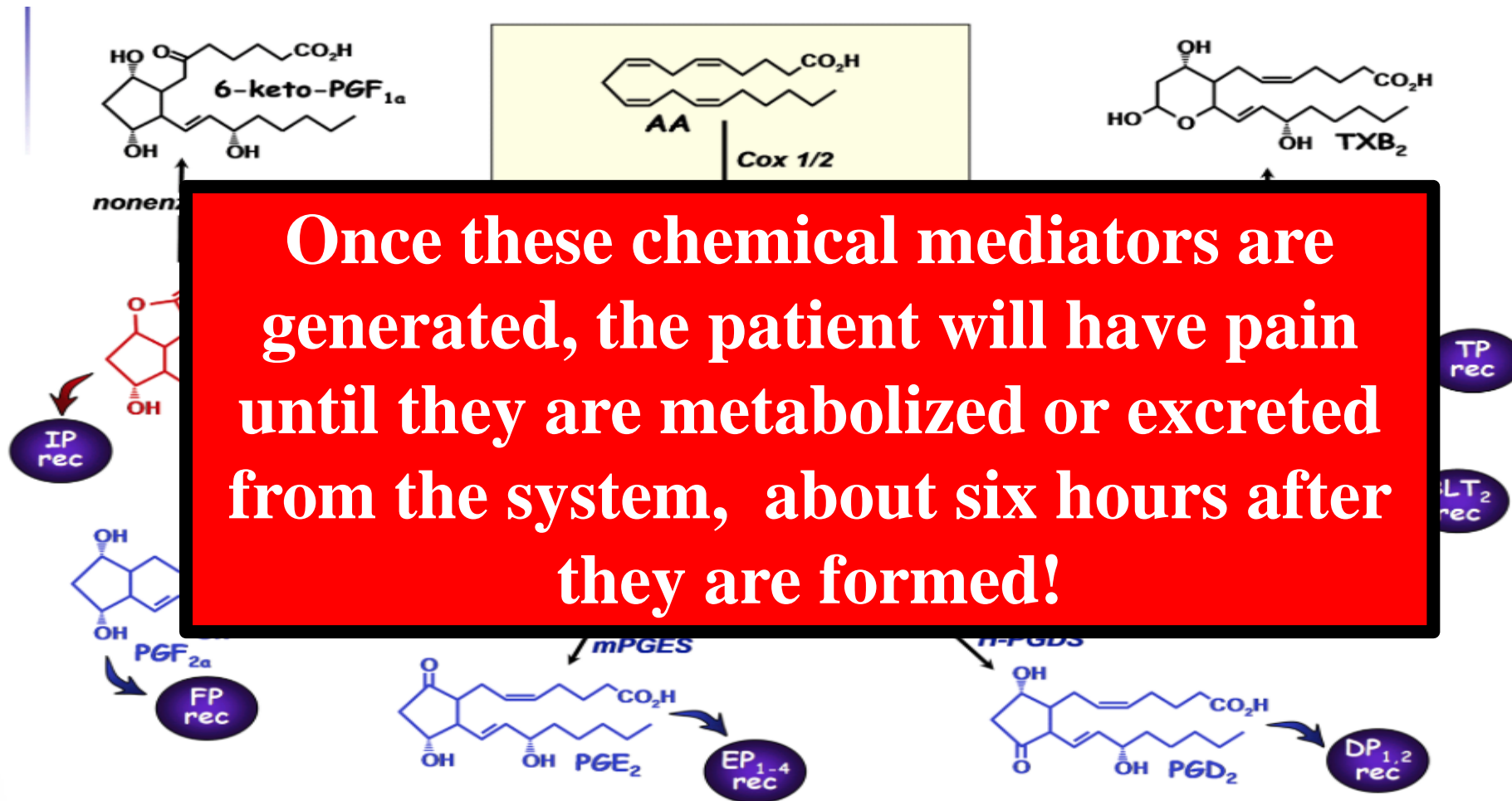


Central Nervous System Involvement

Pain components ■



Biosynthesis of Prostaglandins by Cyclooxygenases



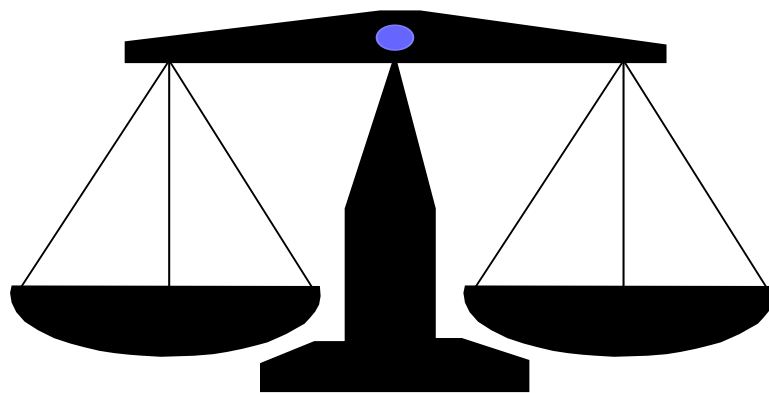
Welcome to the Pain Rollercoaster (alias: PRN Pain Therapy)



Opportunities

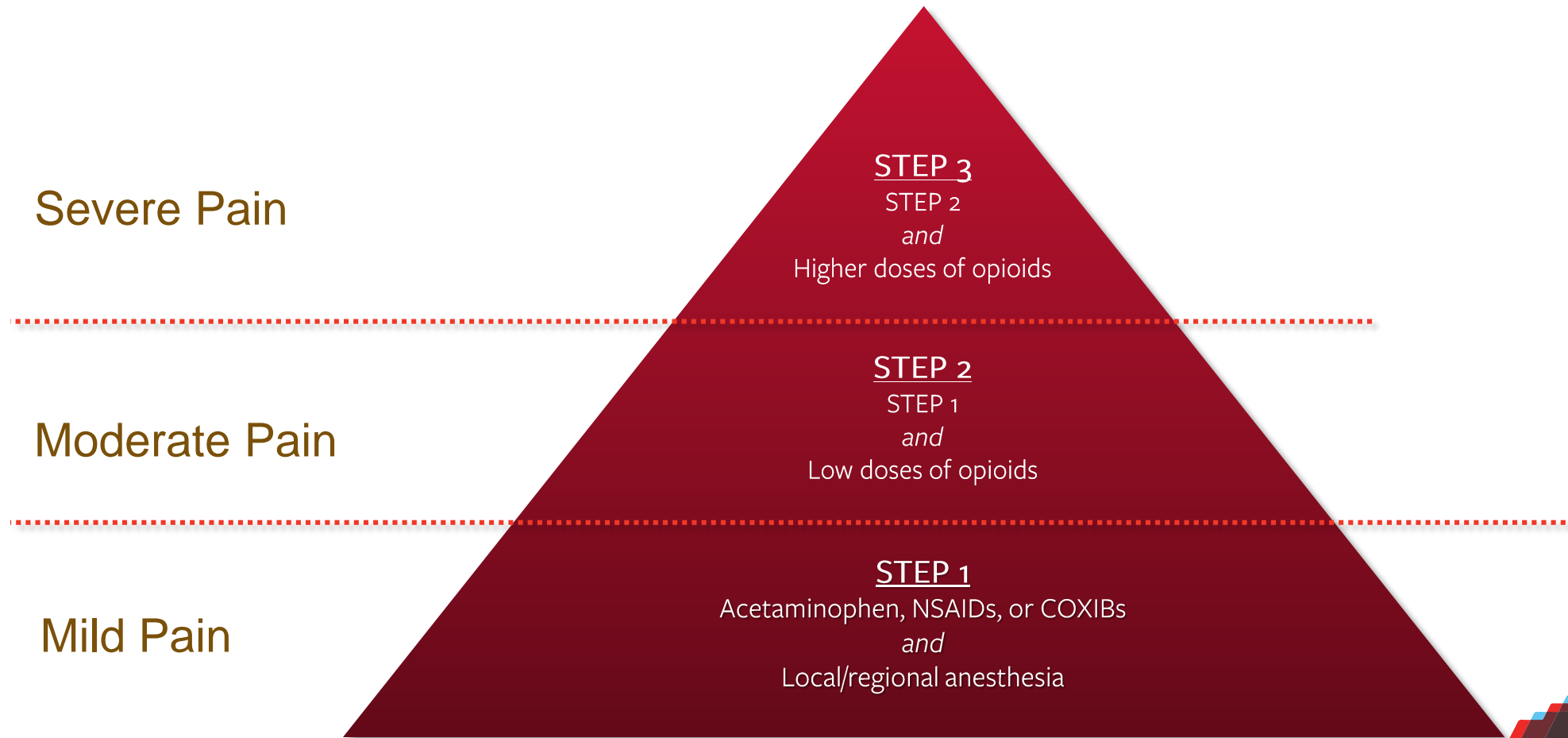
- With Multimodal Therapy, lower doses of each drug can be used therefore minimizing side effects
- With the **multimodal analgesic approach** there is additive or even synergistic analgesia, while the side-effects profiles are different and of small degree (Pasero & Stannard, 2012).

↓
↓
↓
Analgesia



Side-effects
↑ ↑ ↑

Multimodal Therapy

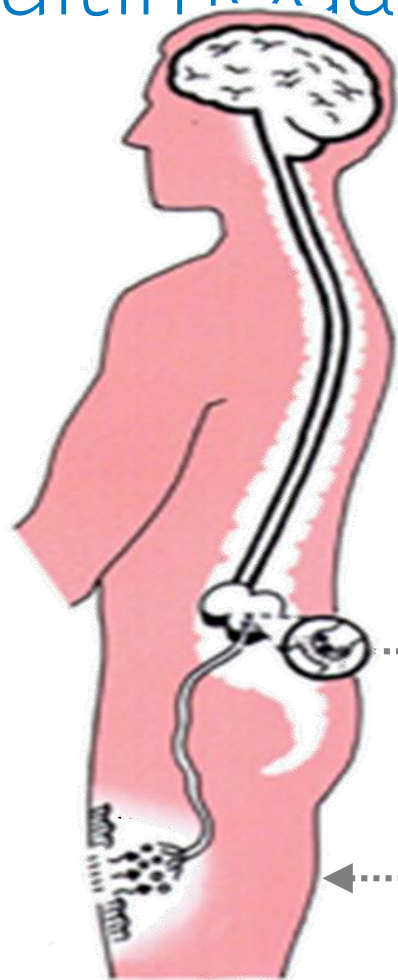


1. Crews JC. *JAMA*. 2002; 288: 629-632. 2. World Health Organization. Pain relief ladder. <http://www.who.int/cancer/palliative/painladder/en/>. Accessed September 10, 2014. 3. Ventafridda V, Tamburini M, Caraceni A, De Conno F, Naldi F. *Cancer*. 1987; 59: 850-856. 4. ASA Task Force. *Anesthesiology*. 2004; 100: 1573-1581.

Multimodal Paradigm Pain Management

- Multimodal: Two or more analgesic agents or techniques that **act by different mechanism**, providing superior analgesic efficacy

Multimodal Therapy



Opioids¹
 α 2-agonists¹
Acetaminophen²
NMDA antagonists³

Local anesthetics¹
Opioids¹
 α 2-agonists¹
NMDA antagonists³

Local anesthetics¹
NSAIDs¹
COXIBs¹

NMDA=N-methyl-D-aspartate.

1. Gottschalk A, Smith DS. *Am Fam Physician*. 2001; 63: 1979-1984 2. Smith HS. *Pain Physician*. 2009; 12: 269-280.
3. Sinatra RS, Jahr JS, eds. *The Essence of Analgesia and Analgesics*. New York, NY: Cambridge University Press; 2011.



The Joint Commission Sentinel Event Alert

- Joint Commission Sentinel Event Alert Entitled “Safe use of opioids in hospitals”
 - Focuses on the need for assessing and managing pain to help avoid accidental opioid overdose among hospital inpatients
 - Provides a number of actions that can be taken to avoid the unintended consequences
- Recommendations include advising clinicians who prescribe pain medications to use both non-pharmacologic and pharmacologic alternatives
 - Non-pharmacologic therapies: physical therapy, acupuncture, manipulation or massage, ice, etc.
 - Pharmacologic treatment: non-opioid analgesics, such as acetaminophen, NSAIDs, antidepressants, anticonvulsants, and muscle relaxants, can be used before prescribing an opioid
 - When used in combination with opioids, these non-opioid pharmacologic treatments may reduce the dose of opioids required to effectively manage pain

The Joint Commission Sentinel Event Alert. Safe use of opioids in hospitals. Issue 49; August 8, 2012. <http://www.jointcommission.org>.



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American Society of Anesthesiologists

- Multimodal analgesia combines two or more analgesic agents or techniques that act by different mechanisms to provide analgesia¹
- ASA, WHO, ASPMN, and The Joint Commission recommend use of a multimodal approach¹⁻⁴
- Opioid dose-sparing effects can be achieved via the use of non-opioid agents and regional blocks¹
- ASA Task Force recommendations:
 - Unless contraindicated, all patients should receive an around-the-clock regimen of a non-opioid agent
 - Non-steroidal anti-inflammatory drugs (NSAIDs)
 - Cyclooxygenase-2 specific drugs (COXIBs)
 - Acetaminophen
 - Consider supplemental regional anesthesia techniques

1. ASA Task Force. *Anesthesiology*. 2012; 116(2): 248-273. 2. World Health Organization. Pain relief ladder. <http://www.who.int/cancer/palliative/painladder/en/>. Accessed September 10, 2014. 3. Jarzyna D, et al. *Pain Manage Nurs* 2011; 12: 118-145. 4. The Joint Commission Sentinel Event Alert. Safe use of opioids in hospitals. Issue 49; August 8, 2012. www.jointcommission.org/assets/1/18/SEA_49_opioids_8_2_12_final.pdf.



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Non-Opioids Used in Multimodal Pain Treatment Plans

| Acetaminophen | Alpha-2 agonists | Gabapentinoids |
|--|------------------------------|-------------------------------------|
| IV Acetaminophen PO Acetaminophen | Clonidine dexmedetomidine | Gabapentin pregabalin |
| Local Anesthetics | NMDA Receptor antagonists | NSAIDS |
| Bupivacaine Lidocaine Liposomal bupivacain | ketamine | Celecoxib Ibuprofen ketorolac |

Note: The agents listed above are commonly employed in the perioperative management of acute pain. This list is not meant to be a comprehensive directory of all available analgesic agents.

NMDA = N-methyl-D-aspartate; NSAIDs = non-steroidal anti-inflammatory drugs
Wu CL, Raja SN. *Lancet*. 2011; 377: 2215-2225.



Preemptive Analgesia

- Local/Regional Anesthetics
- NSAIDS
- IV acetaminophen

- Gabapentinoid
 - Lyrica / Neurontin

Opioid Sparing Medications



- Central Prostaglandin Inhibitor
 - IV acetaminophen (moderate to severe pain, and mild pain while NPO)
 - PO acetaminophen (mild pain tolerating diet)

Opioid Sparing Medications



- NSAID COX inhibitor
 - Ketorolac load, then Celebrex

Opioid Sparing Medications



- Weak Mu opioid, Serotonin Reuptake Inhibitor
 - Ultram

Opioid Sparing Medications



- Methadone basal (5mg Q8)
- Oxycodone PRN

Moderate Pain (4-6)

- No PO methadone vs. oxycodone studies.
- Morphine vs. Methadone PCA (24 hour)
 - Methadone had less opioid consumption
 - Methadone had lower pain scores at rest and at motion.

J Anesth
DOI 10.1007/s00540-013-1785-3

ORIGINAL ARTICLE

Methadone patient-controlled analgesia for postoperative pain: a randomized, controlled, double-blind study

José Osvaldo Barbosa Neto · Maria Deneb Tavares Machado ·
Marta de Almeida Correa · Hamilton Alves Scomparim ·
Irimar Paula Posso · Hazem Adel Ashmawi

Received: 30 August 2013 / Accepted: 28 December 2013
© Japanese Society of Anesthesiologists 2014

Methadone



- Methadone basal PO (10 mg Q8)
- Oxycodone 10 mg PRN

Severe Pain (7-10)

- IV Methadone
- IV Hydromorphone
- IV Fentanyl
- IV Ketamine gtt
- IV Lidocaine gtt

Severe Pain (7-10) (Refractory)

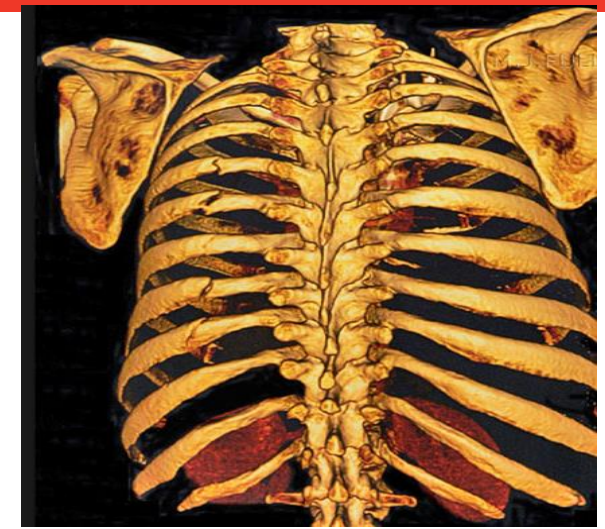
EXPAREL – Liposomal Bupivacaine

- AAOS 2014 (March)
 - Knee Replacement
 - N=72 retrospective (vs. continuous nerve block)
 - Opioid Sparing (82 mg for Exparel vs. 176.6 for nerve block)

Emerson R, et al. Poster presentation. American Academy of Orthopedic Surgeons. March 11-15, 2014 New Orleans, LA.



Potential for Treatment of Rib Fractures

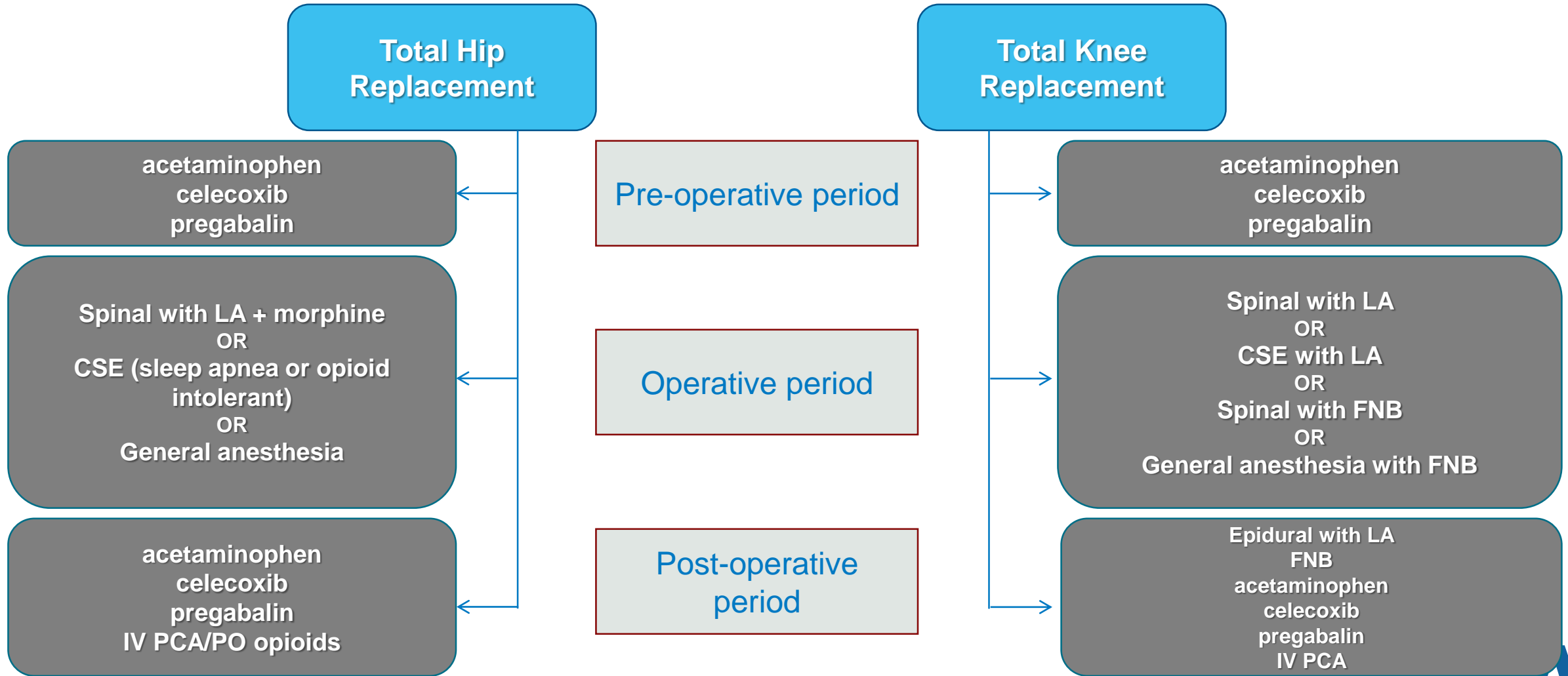


Multiple rib fracture causes severe pain that can seriously compromise respiratory mechanics and exacerbate underlying lung injury and pre-existing respiratory disease, predisposing to respiratory failure. **The cornerstone of management is early institution of effective pain relief..**

Analgesia could be provided using systemic opioids, transcutaneous electrical nerve stimulation or non steroidal anti-inflammatory drugs. Alternatively, regional analgesic **techniques such as intercostal nerve block**, epidural analgesia, intrathecal opioids, interpleural analgesia and thoracic paravertebral block have been used effectively. **Although invasive, in general, regional blocks tend to be more effective than systemic opioids, and produce less systemic side effects.**

J Trauma. 2003 Mar;54(3):615-25. Acute pain management of patients with multiple fractured ribs. Karmakar, Ho.

Example of Multimodal Approach



LA = local anesthetic; CSE = combined spinal-epidural; FNB = femoral nerve block; IV = Intravenous; GA = general anesthesia; PO = oral; PCA = patient-controlled analgesia.

Adapted from Parvizi J, Miller AG, Gandhi K. *J Bone Joint Surg Am.* 2011; 93(11): 1075-1084.

Example PolyTrauma Acute Pain Management

| | | | Hospital Day | | | | | | Home | |
|---|---|--|--------------|---|---|---|---|----------|----------|------------------------|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | - | |
| Baseline Opioid Sparing | NSAID & COX Inhibitor | Toradol IV 30 mg single dose | x | | | | | | - | |
| | | Celebrex PO 200mg Q12 | x | x | | | | | - | |
| | | Naproxen PO 500mg Q12 | | | x | x | x | x | <u>x</u> | |
| | Central Prostaglandin Inhibitor | IV acetaminophen 1gm Q6 | x | x | | | | | - | |
| | | PO acetaminophen 1gm Q6 | | | x | x | x | x | <u>x</u> | |
| | Gabapentinoid | Lyrica 100mg Q8 | x | x | | | | | - | |
| Neurontin 300mg Q8 | | | | x | x | x | x | <u>x</u> | | |
| Weak μ-Opioid Norepi & Serotonin Reuptake Inhibitor | Ultram 100mg Q6 | x | x | x | x | x | x | <u>x</u> | | |
| | | | | | | | | - | | |
| | | | | | | | | - | | |
| OPIOIDS | μ- Opioid NMDA antagonist | Methadone 5mg Q8 | x | x | x | | | | - | |
| | Weaning & Discharge Opioid Combos | Norco 5/325mg Q4 | | | | x | x | x | <u>x</u> | (D/C PO acetaminophen) |
| | | OR | | | | | | | | |
| | | Vicoprofen 7.5/200 Q6 AND Ibuprofen 200 mg Q6 | | | | x | x | x | <u>x</u> | (D/C PO Naproxen) |

Adapted from Ron Albarado MD
UT Health Science Center, Houston

Example Patient Cost for Trauma Multimodal Pain Management at Covenant

| | Hospital Day | | | | | | WAC* | Total Hospital | |
|------------------------------|--------------|---|---|---|---|---|---------|----------------|-------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | | Dose Costs | Total Costs |
| Toradol IV 30 mg single dose | x | | | | | | \$3.75 | \$3.75 | |
| Celebrex PO 200mg Q12 | x | x | | | | | \$10.07 | \$40.28 | |
| Naproxen PO 500mg Q12 | | | x | x | x | x | \$0.20 | \$1.60 | |
| IV acetaminophen 1gm Q6 | x | x | | | | | \$35.40 | \$283.20 | |
| PO acetaminophen 1gm Q6 | | | x | x | x | x | \$0.06 | \$0.96 | |
| Lyrica 100mg Q8 | x | x | | | | | \$7.50 | \$45.00 | |
| Neurontin 300mg Q8 | | | x | x | x | x | \$0.40 | \$4.80 | |
| Ultram 100mg Q6 | x | x | x | x | x | x | \$0.16 | \$3.84 | |
| Methadone 5mg Q8 | x | x | x | | | | \$0.31 | \$2.79 | |
| Norco 5/325mg Q4 | | | | x | x | x | \$0.38 | \$6.84 | |
| OR | | | | | | | | | |
| Vicoprofen 7.5/200 Q6 | | | | x | x | x | | | |
| AND Ibuprofen 200 mg Q6 | | | | x | x | x | | | |

GRAND TOTAL

\$393.06#

* Wholesale Acquisition Costs, #Actual Cost to Covenant is \$325



Demonstrated Benefits of Multimodal Therapy

- Reduced doses of analgesics in the treatment plan^{1,2,3}
- Opioid dose-reducing effects^{1,2,4}
- Better pain relief than is possible with a single analgesic, secondary to synergistic or additive effects of the various agents in the treatment plan^{1,2,5}
- Fewer “analgesic gaps”^{1,2}
- Less pain during rest and activity^{6,7}
- Improved functional outcomes^{1,2,8}
- Reduce LOS⁹
- Improved patient satisfaction¹⁰

Pain is complex and multifactorial; thus appropriate management requires a “balanced” therapeutic approach¹

1. Kehlet H, Dahl JB. *Anesth Analg*. 1993; 77(5): 1048-1056. 2. White PF. *Curr Opin Investig Drugs*. 2008; 9(1): 76-82. 3. Jo CH, Shin JS, Huh J. *Eur J Orthop Surg Traumatol*. 2014; 24(3):315-322. 4. Mathiesen O, Dahl B, Thomsen BA, et al. *Eur Spine J*. 2013; 22(9):2089-2096. 5. Hanna MH, Elliott KM, Stuart-Taylor ME, et al. *Br J Pharmacol*. 2003; 55(2):126-133. 6. Fu PL, Xiao J, Zhu YL, et al. *J Int Med Res*. 2010; 38(4): 1404-1412. 7. Sivrikoz N, Koltka K, Guresti E, et al. *Agri*. 2014; 26(1): 23-28. 8. Larson DW, Lovely JK, Cima RR, et al. *Br J Surg*. 2014; 101(8):1023-1030. 9. Michelson JD, Addante RA, Charlson MD. *Foot Ankle Int*. 2013; 34 (11): 1526-1534. 10. Skinner HB. *Am J Orthop*. 2004; 33(5S): 5-9.

Call to ACTION!

How do we implement?



Incentives and Support for Change

- The Joint Commission (TJC):
 - SEA Safe Opioid Administration, 2012
 - Standard PC.01.02.07: Multimodal, 1/1/15
- Centers for Medicare & Medicaid Services (CMS):
 - Broad assessment and monitoring recommendations
 - HCAHPS and other surveys: Correlation
- Institute for Safe Medication Practices (ISMP)

Implementation of Practice Changes

- Requires a system-wide paradigm shift
 - Revisit the hospital mission statement
- Multidisciplinary input, buy-in, commitment

| | |
|--------------------------|---------------------|
| Physicians | Pain Service |
| Advanced Practice Nurses | Quality and Safety |
| Front-line Nurses | Risk Management |
| Pharmacists | Rapid Response Team |

Implementation of Practice Changes

- Establish standardized pain treatment plans for high-risk patients, e.g., ED, older adults, children, critically ill, multiple co-morbidities
- Provide practical nonpharmacologic methods
 - Comfort measure on admission
- Establish **order sets** that provide a balance between safe, evidence-based prescriptive direction and practitioner autonomy
 - Mandatory multimodal analgesia (TJC)
- EMR modifications to support practices

Preliminary Results (unpublished)

Multimodal Pain Management Order Set (MMP OS) Quick Summary

3/23/16 First Use of the Pre Op MMP OS

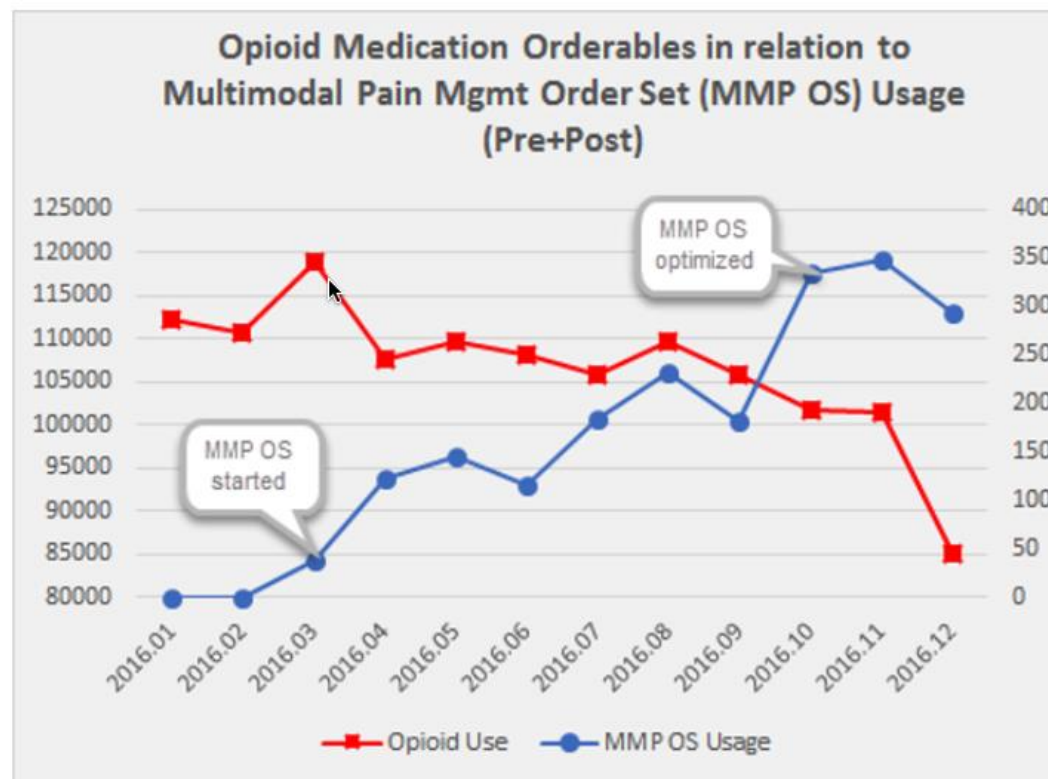
3/30/16 First Use of the Post Op MMP OS

The Opioid Medication Orderable indicator (displayed on graph in Red) includes medications names with the following:

- Hydrocodone
- Oxycodone
- Morphine
- Codeine

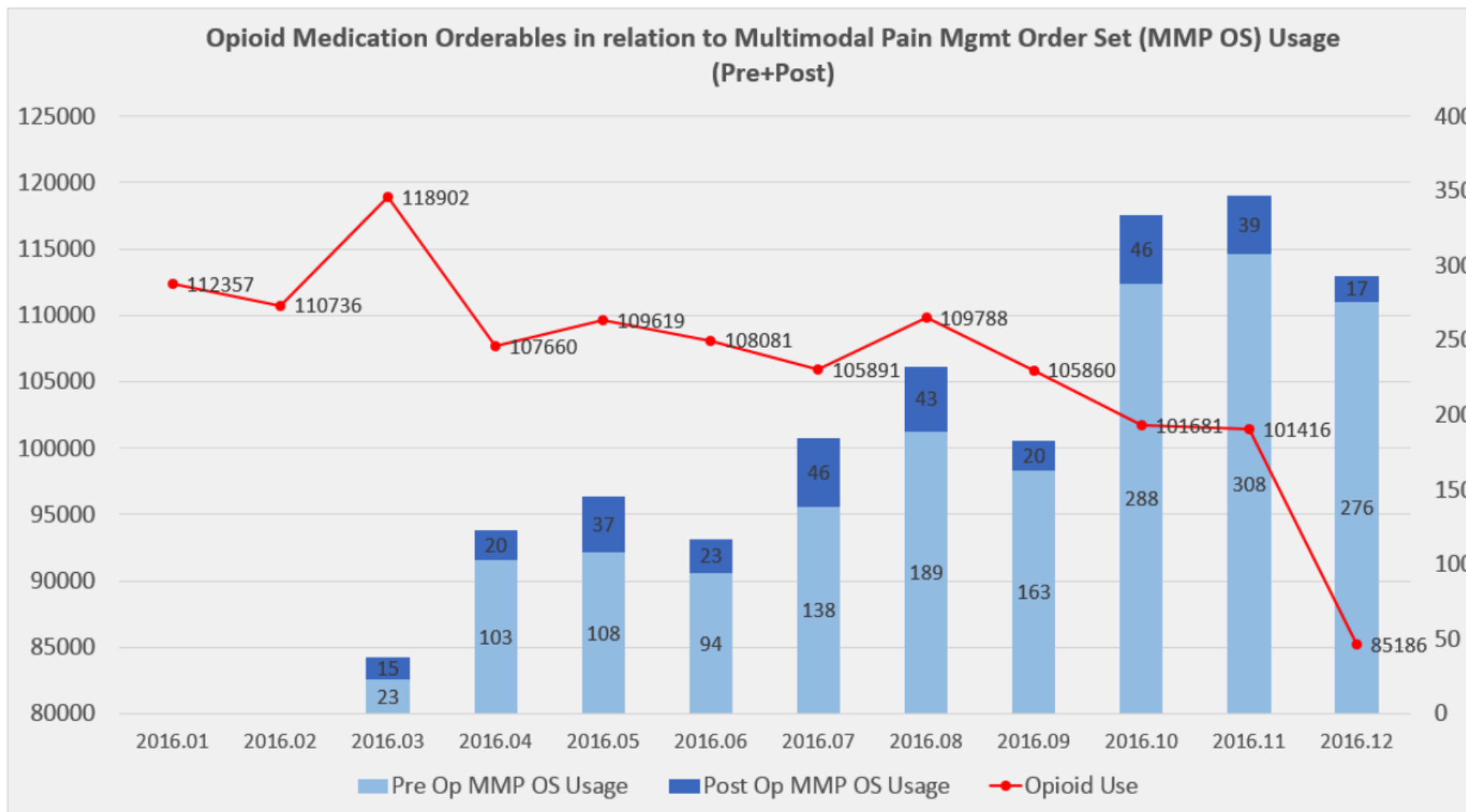
Approximately a 15% reduction in Opioid medication orderables since March 2016.

October 4, 2016 Multimodal Pain Management Order Sets were optimized and released in Production



Slide 3 in this deck offers this graph with data point values

Preliminary Results (unpublished)

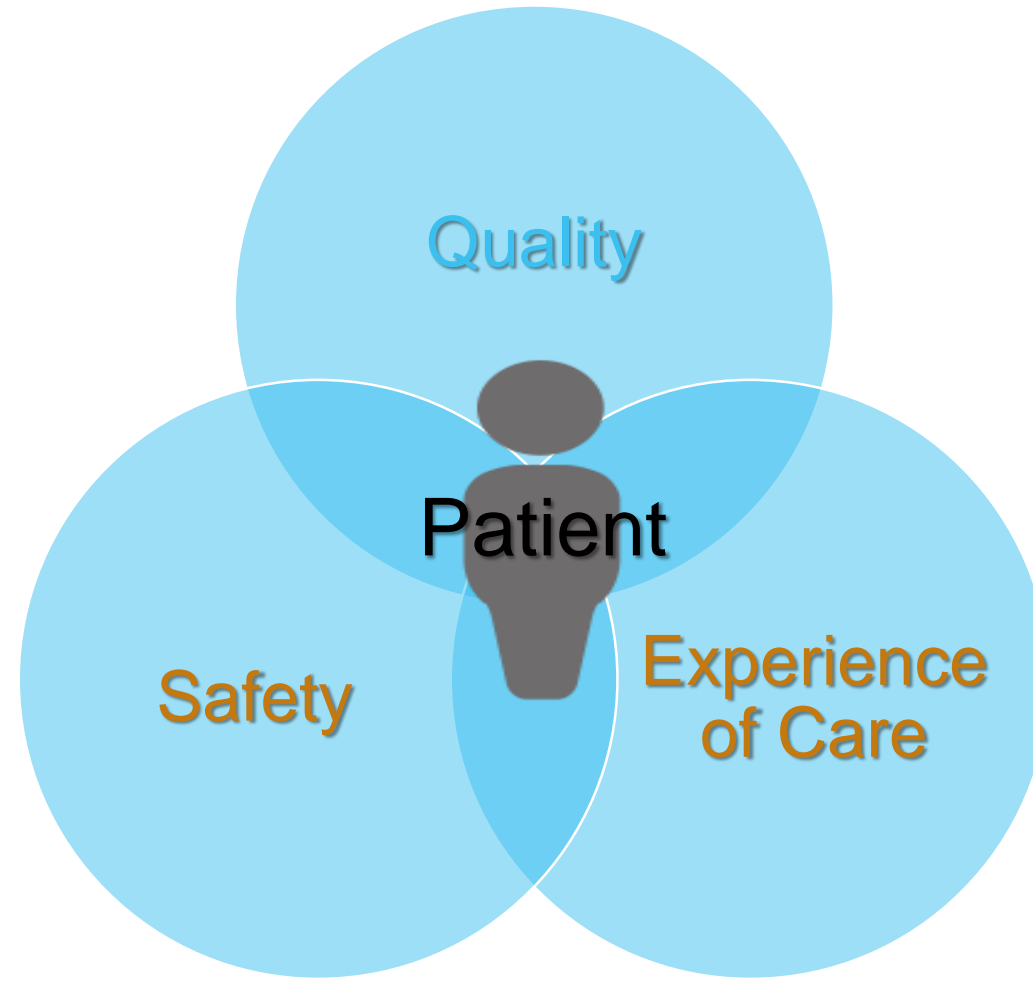


Beware the man with a series of “one”!



But I'm just say'in.....

New Paradigm for Patient Care



Thank You

