Colorado ALTO Project

Pharmacy Training

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Pharmacy Training Objectives

- Discuss the historical context and current state of the "opioid crisis" facing the United States, and identify barriers to change
- Describe the appropriate use of alternatives to opioids for treatment of different types of pain in the ED
- Review the implementation of an opioid-reduction process and policy

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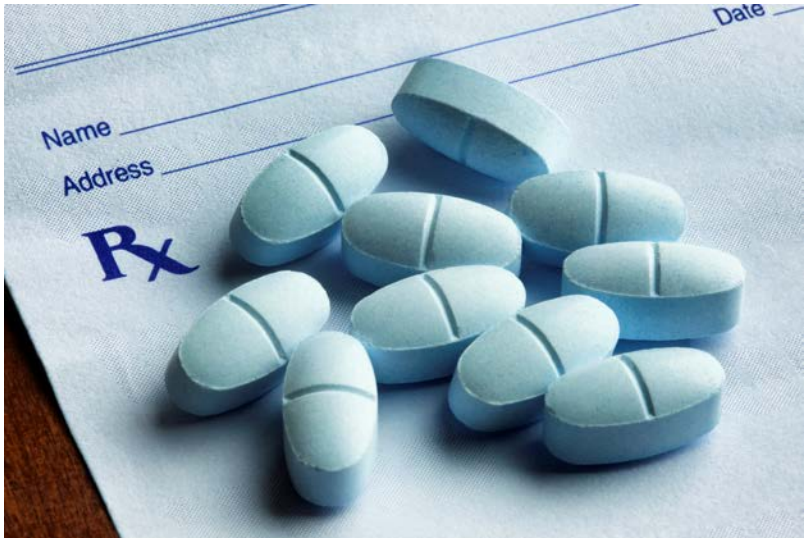
Alarming Statistics

- Pain is the most common reason for visit to the Emergency Department (ED).
- Colorado is at the center of the U.S. opioid epidemic with the 12th highest rate of misuse and abuse of prescription opioids across all 50 states.
- Four out of 10 Colorado adults admit to misuse of prescription medication: primarily pain killers.



- Overdoses: Two of every three from pharmaceuticals, to compared to one of three from heroin.
- EDs are in a strong position to reduce opioid use in a population at high risk for misuse and abuse through alternative pain management strategies.

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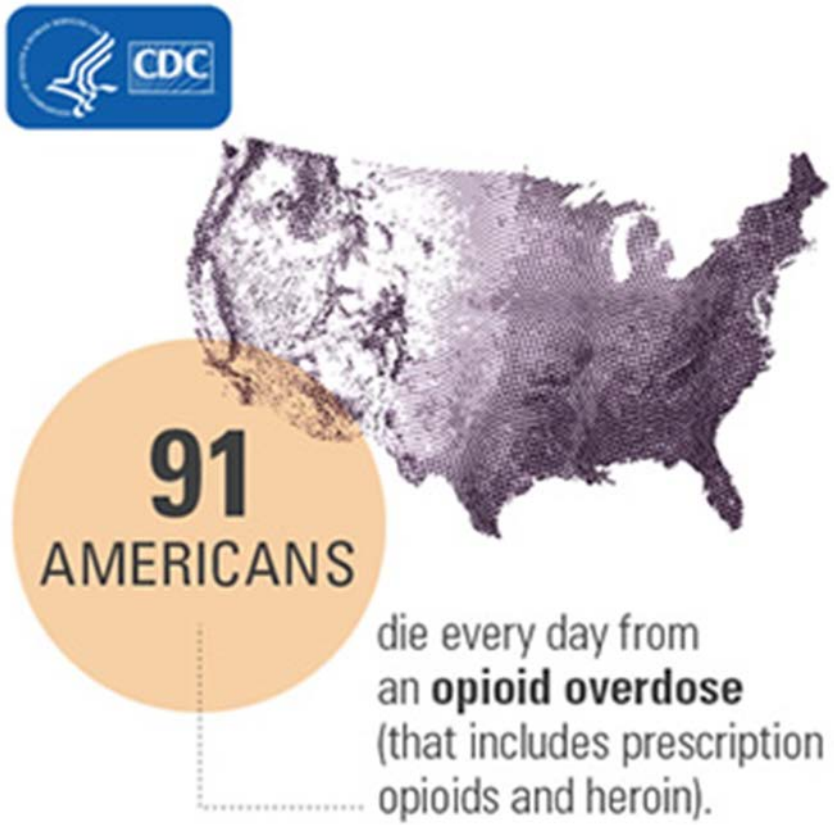
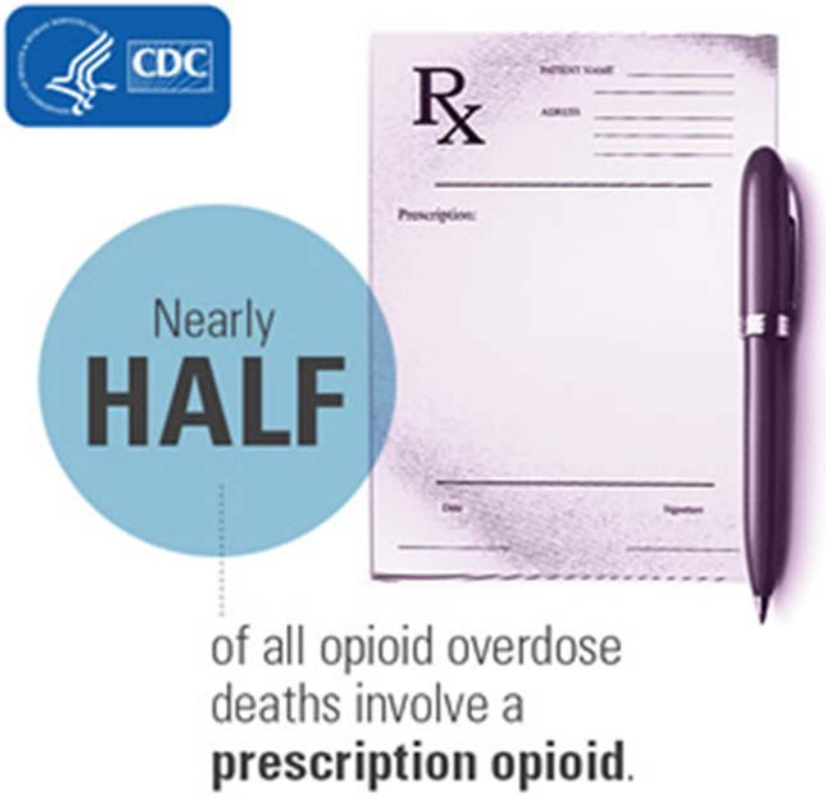
Background





www.CDC.gov/drugoverodse/epidemic/

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Background

- The United States has 10 percent of the world's population, yet consumes more than 80 percent of the world's opioids.
- In 2010, opioid consumption was 710 MME per person in the U.S. on a yearly basis.

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"Opioids DO NOT Cause Addiction"

- Study published in 1986:
  - Small (38 patients)
  - Unknown selection criteria
  - Not randomized, not blinded
  - 2/3 of patients received 20 MME (morphine milligram equivalence)/day or less

Conclusion:

Risk of addiction when treating chronic pain was less than 1 percent

Pain. 1986 May;25(2):171-86

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All Patients Have a Right to Pain Control

The Medical Minute. The Opioid Crisis: Solutions for Colorado.
1999 Veterans Health Administration Memorandum: Pain as the Fifth Vital Sign. March 1, 1999.

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Pharmaceutical Industry

$$ spent in marketing and advertising of products. For example:

2007—Purdue Pharma pled

- guilty to federal criminal
- charges for misleading
- advertisement regarding the safety of OxyContin time release

***Fined*:** $600,000,000

***Sales*:** $22,000,000,000 over the past decade

2010 – Reformulated OxyContin to make it more difficult to inject or snort

The New York Times. In Guilty Plea, OxyContin Maker to Pay $600 Million

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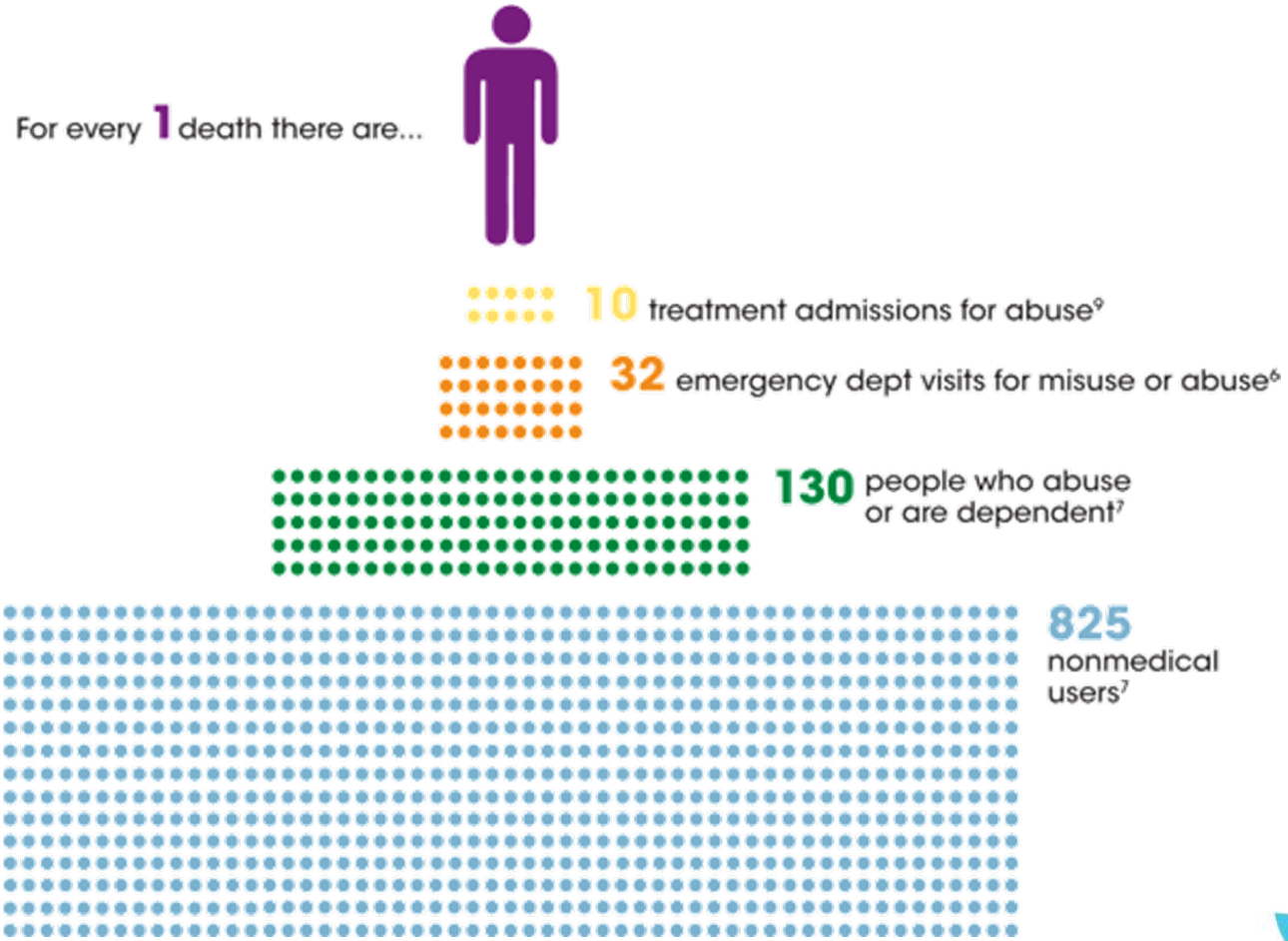
What is the answer?



Colorado Consortium for Prescription Drug Abuse Prevention.

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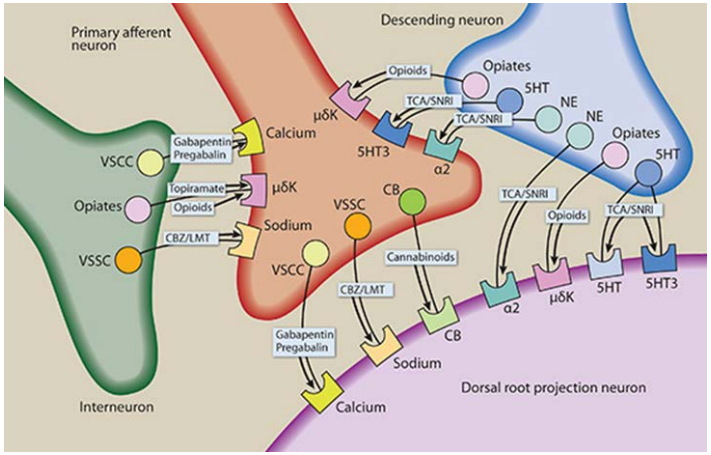
CERTA Approach

- **Channels/Enzymes/Receptors Targeted Analgesia (CERTA)**
- Shift from a symptom-based approach to a mechanistic approach
- Targeted, patient-focused analgesic approach utilizing combinations of non-opioid analgesics
- Results in:
  - Greater analgesia
  - Reduced doses of each medication
  - Fewer side effects
  - Shorter length of stay



http://www.propofology.com/infographs/certa-concept-of-analgesia

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Question

91 Americans die each day from an opioid overdose. Which of the following is due to prescription opioids?

A. < 10%

B. 50% nationally

C. 66% in Colorado

D. B and C

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Alternatives to Opioids (ALTOs)

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ALTO Pilot – Colorado ACEP Guidelines

- Non-opioid medications first
- Opioids as rescue therapy
- Multimodal and holistic pain management
- Pathways:
  - Kidney stones
  - Low back pain
  - Fractures
  - Headache
  - Chronic abdominal pain

www.coacep.org

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ALTO Approach

- Multi-modal non-opiate approach to analgesia for specific conditions
- **Goals:** To utilize non-opiate approaches as first-line therapy and educate our patients:
  - Opiates will be second-line treatment
  - Opiates can be given as rescue medication
  - Discuss realistic pain management goals
  - Discuss addiction potential and side effects of opioids

Examples

- **C**hannels:
  - Sodium (Lidocaine)
  - Calcium (Gabapentin)
- **E**nzymes:
  - COX 1,2,3 (NSAIDS)
- **R**eceptors:
  - MOP/DOP/KOP (Opioids)
  - NMDA (Ketamine/Magnesium)
  - GABA(Gabapentin/Sodium Valproate)
  - 5HT1-4(Haloperidol/Ondansetron/Metoclopramide)
  - D1-2(Haloperidol/Chlorpromazine/Prochlorperazine)

Lidocaine

- Acts on central and peripheral voltage dependent sodium channels, G protein-coupled receptors and NMDA receptors
- Used **topically**, **intravenously** or as **trigger point injections**
  - When used at low doses, IV lidocaine is generally benign
  - **Caution** should be used when giving IV to patients with a severe cardiac history
- MSK, migraines, renal colic, abdominal, neuropathic
- Lidocaine patches are great for pain!
- Lidocaine IV doses ≤ 1.5 mg/kg over 10-60 min may be given in non-ICU areas (max 200 mg/dose)

Question

What is the mechanism of action of Lidocaine?

A. Acts on centrally located voltage dependent sodium channels

B. Acts on central and peripheral voltage dependent sodium channels, G protein-coupled receptors and NMDA receptors

C. Agonizes dopamine and serotonin receptors

D. Antagonizes NMDA and dopamine receptors in the central nervous system

Trigger Point Injections

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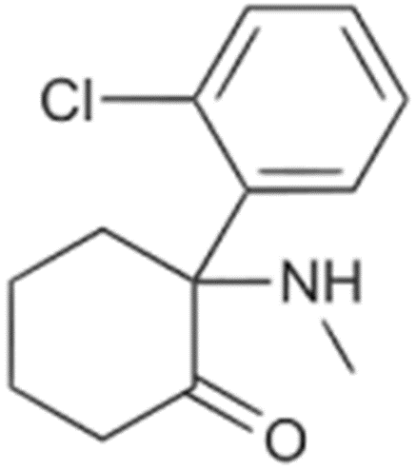
Studies

Author, Year Type of Study	Research Question	n	Comparator	Results
Soleimanpour, 2012 Randomized controlled trial	IV lidocaine vs morphine for ED patients with renal colic	240	Morphine	Pain score at 5 min lido vs morphine 65% vs 53% (p=0.0002) Successful treatment 90% vs 70% in lido vs morphine (p=0.0001)
Vahidi, 2015 Randomized controlled trial	IV lidocaine vs morphine in ED patients with critical limb ischemia	63	Morphine	At 15 and 30 min, the mean VAS score in the lido group was less than morphine group (5.7 vs 7, 95% CI 0.1 -2.4) and (4.2 vs 6.5, 95% CI 1.2 to 3.2)
Firouzian, 2015 Randomized controlled trial	Does lidocaine as an adjuvant to morphine improve pain relief in ED patients with acute renal colic?	89	Morphine+ NS	Median time to pain free in the lido vs NS group was 87 min vs 100 min (p=0.071) The median nausea free times in the lido vs NS group were 26 min vs 58 min (p<0.0001)

Ketamine

- Antagonizes NMDA receptors
- When used at low doses, it is generally benign
- Used **intranasally** or **intravenously**
- Should not be used in patients with PTSD



http://wiki.bluelight.org/index.php/Ketamine

Ketamine

- Ketamine use is dose-dependent
- May be used for analgesia at doses ≤ 0.2 mg/kg via slow IVP or 0.1 mg/kg/hr infusion
  - May be given in non-ICU areas
- Ketamine 50 mg can also be given
  - No IV access
- Can be used adjunctively with opioids to reduce opioid requirements

Question

In what patient should you avoid ketamine?

A. 26 year old male with joint dislocation

B. 36 year old male with severe PTSD

C. 38 year old female with a history of drug abuse

D. 64 year old male with a history of orthostatic hypotension

Studies

Author, Year Type of Study	Research Question	n	Comparator	Results
Motov, 2015 Randomized controlled trial	IV sub dissociative dose ketamine vs morphine for analgesia in the ED	45	Morphine	Change in mean pain scores not different in the ketamine vs. morphine (P=0.97) No difference in rescue fentanyl at 30 and 60 min
Shrestha, 2016 Cross sectional observational study	IN ketamine in the treatment of acute pain in the ED	39	None	IN ketamine 0.7 mg/kg = significant pain relief (>20 mm in VAS) at 15 min, which ↑ to 100% at 30 and 60 min
Lee, 2016 Systematic Review and Meta-Analysis	Effects of low dose ketamine on acute pain in the ED	6 trials n=438	None	Favorable effects of ketamine ≥ opioids Low dose ketamine = ↑ risk of neuro and psych events
Farina, 2017 Randomized controlled trial	IN ketamine vs IV morphine in pain reduction in ED patients w/ renal colic	53	Morphine	Difference in mean VAS score at 5 min, morphine > ketamine At 15 and 30 min, no difference between groups

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Other Options

Ketorolac (Toradol)

- 15 mg for everyone
  - No difference in pain reduction with 30 mg vs 15 mg
- Great for many pain indications including musculoskeletal/pelvic pain and renal colic

Haloperidol(Haldol)

- Low dose (2.5 mg IV)
- Great for nausea, especially cannabinoid induced hyperemesis

Dicyclomine (Bentyl)

- MOA: antispasmodic and anticholinergic agent that acts to alleviate smooth muscle spasms in the GI tract
- 20 mg/kg PO or IM (IM only!!!)
- Great for abdominal pain (think cramps)

ED Pain Pathways

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Headache/Migraine

1st Line/Immediate

1 L 0.9% NS + high-flow oxygen

Ketorolac 15 mg IV

Dexamethasone 10 mg IV

Metoclopramide 10 mg IV

Trigger point injection with lidocaine 1%

2nd Line/Alternative

APAP 1000 mg PO + IBU 600 mg PO

Haloperidol 2.5 mg IV

Promethazine 12.5 mg IV OR prochlorperazine 10 mg IV

DHE 1 mg IV OR Sumatriptan 6 mg SC

Magnesium 1 g IV

Valproic acid 500 mg IV

Lidocaine 1.5 mg/kg IV

Musculoskeletal Pain

Non-IV Options	IV Options
APAP 1000 mg PO + IBU 600 mg PO	Ketamine 0.2 mg/kg IV + 0.1 mg/kg/hr gtt
Cyclobenzaprine 5 mg PO OR diazepam 5 mg PO	Ketorolac 15 mg IV
Gabapentin 300-600 mg PO	Dexamethasone 8 mg IV
Ketamine 50 mg IN	Diazepam 5 mg IV
Trigger point injections 1-2 mL lidocaine 1%	
Lidocaine Patches 5%	

Renal Colic

1st Line/Immediate	2nd Line	Alternative
Ketorolac 15 mg IV Acetaminophen 1000 mg PO 1 L 0.9% NS bolus	Lidocaine 1.5 mg/kg IV	DDAVP 40 mcg IN Ketamine 50 mg IN

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Question

A patient presents with renal colic. What are some opioid-free alternative treatment options?

A. Lidocaine 1.5 mg/kg IV over 10 min

B. Ketamine 50 mg IN

C. DDAVP 40 mcg IN

D. All of the above

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Implementation: Is this possible?

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Project Champions

- ED Nursing
  - Director, charge RNs, staff
- ED Physicians
  - Director, staff
- Hospital Leadership
  - CEO, CNO, CMO
- Other Support
  - Quality Improvement
  - IT/Data Support
  - Pharmacy
  - Communications/Marketing

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Policy Changes

- Procedural Sedation
  - Ketamine dosing – clearly define analgesia vs sedation doses
    - < 0.25 mg/kg slow IVP = analgesia

•≥ 1 mg/kg slow IVP = sedation = “timeout”

- High-Risk Medication Administration
  - Lidocaine administration
    - 1.5 mg/kg bolus over 10-60 min = non-ICU areas
    - Cardiac lidocaine = ICU
  - Ketamine administration
    - < 0.25 mg/kg slow IVP + 0.1 mg/kg/hr x 48 hrs max = non-ICU areas
    - 1-2 mg/kg IV + 5-30 mg/hr = CCU

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Pharmacy/IT Support

- Education
  - Nurses, physicians, pharmacists
- CPOE
  - Creation of pain treatment order set
  - Create order strings for unique entries – clearly label “for pain”

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Pharmacy/IT Support

- Smart Pumps
  - Addition of new medications – clearly label “for pain”
    - Lidocaine
      - Bolus = 1.5 mg/kg in 100 mL NS over 10 min
    - Ketamine
      - Bolus = 50 mg/5 mL prefilled syringe entry to infuse over 10 min
      - Gtt = 100 mg/50 mL NS max 0.1 mg/kg/hr

Pain Indications
Headache/Migraine
Musculoskeletal Pain
Joint Dislocation/Extremity Fracture
Abdominal Pain
Renal Colic

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Timeline for Success

4 months prior:

- ☐ Read and understand Colorado ACEP *2017 Prescribing & Treatment Guidelines,* focusing on the ALTO section.
- ☐ Facilitate product acquisition and availability to nursing staff – goal is to stock all medications in the order set in ED automated dispensing machines to facilitate quick delivery.
  - Any medication that cannot be stocked in automated dispensing machines (i.e., must be made in IV room, lidocaine gtts) – treat as STAT orders and make and take immediately to ED.
- ☐ Work with ED director, anesthesia, P&T committee, nursing, regulatory and all other key stakeholders to facilitate appropriate administration of medications.
  - High Risk Medication Administration policy should reflect that low-dose ketamine bolus/drips and IV lidocaine at the appropriate dose can be transferred to a non-ICU area.
  - Procedural Sedation policy should reflect dosing cutoffs for when ketamine administration requires a "timeout."

3 months prior:

- ☐ Collaborate with organization and/or system IT champion and data champion to create order entries in the Computerized Physician Order Entry (CPOE) that will facilitate easy ordering of medications. This mean clearly labeled individual order entries vs. creating an order set.

2 months prior:

- ☐ Secure medication approval and stock medications for use in the ED for the following medications:
  - Ketamine pain dose IV and drip – IV push may require less concentrated product (50mg/5 ml prefilled syringes)
  - Lidocaine IV and patches
  - Haldol
  - Toradol
  - Capsaicin topical
  - Gabapentin
- ☐ Update smart pump medication libraries to reflect offered medication therapies including standard drip concentration, dosages and maximum dose limits.
- ☐ Educate pharmacy staff on ALTO therapies.

1 month prior:

- ☐ Test process, tools, order sets.
- ☐ Ensure all necessary supplies and equipment are ready and available.
- ☐ Work with organization and/or system IT Champion and Data Champion to beta test reports.

2 weeks prior:

- ☐ Ensure smart pumps are updated and working.
- ☐ Ensure nurse education is complete.
- ☐ Ensure provider questions are answered.
- ☐ Ensure stocking is complete.

1 week prior:

- ☐ Attend final planning meeting.
- ☐ Check for and remove remaining barriers.
- ☐ Attend final quality improvement readiness meetings.

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Data Collection

- **Primary outcome:** Change in ED opioid use pre- and post-implementation
  - Measured in morphine dosing equivalents
  - Per ED patient visit
- **Secondary outcome: Patient satisfaction (**Press Ganey Scores)
  - How likely are you to recommend this facility?
  - How well was your pain controlled?

**All data organized by month*

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Partners


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CONSORTIUM
for Prescription Drug Abuse Prevention


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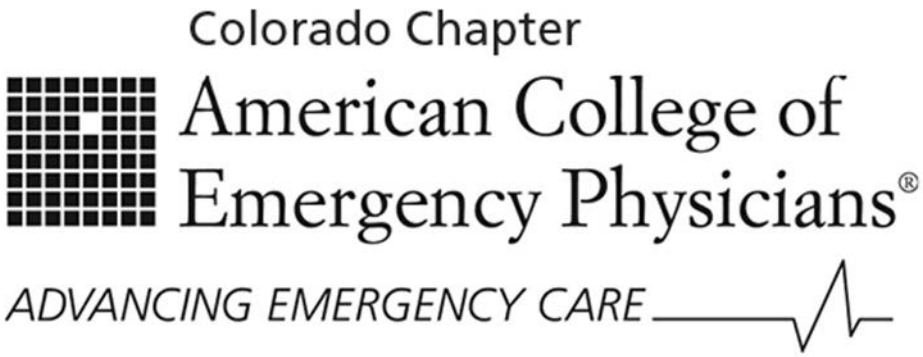
Colorado State Council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Questions?

Resources

www.cha.com/opioid

Contact Information

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You save lives every day … Thank you.

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