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Prehospital Pain Management
Evidence-Based Guidelines for the Pharmacologic Management of Acute Pain by Emergency Medical Services



By the National Association of State EMS Officials (NASEMSO), The American College of Emergency Physicians (ACEP®), and the National Association of EMS Physicians (NAEMSP®)

Education Module

For the National Highway Transportation Safety Administration (NHTSA), Office of EMS

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One of the most frequent conditions encountered by EMS professionals in the field is pain. While appropriate use of controlled substances is within the standard of care for treating pain in the prehospital setting, the opioid crisis currently facing the nation has fueled an urgent need to develop evidence-based recommendations on the prehospital use of analgesics.

For full information see:

<https://nasemso.org/projects/prehospital-pain-management-ebg/>

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Disclaimer & Disclosure

This presentation was produced with support from the US Department of Transportation (DOT), National Highway Traffic Safety Administration (NHTSA) Office of Emergency Medical Services, and the US Department of Health and Human Services (DHHS) Maternal and Child Health Bureau's EMS for Children Program through cooperative agreement number 693JJ92050003.

The contents of this educational module are solely the responsibility of the authors and do not necessarily represent the official views of DOT or DHHS.

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The project was funded through support from the National Highway Traffic Safety Administration (NHTSA), Office of EMS, and the Health Resources and Services Administration (HRSA), Maternal and Child Health Bureau's EMS for Children Program, as well as in-kind support from NASEMSO, NAEMSP, and ACEP.

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Collaborating Organizations

PRINCIPAL INVESTIGATOR:
National Association of State EMS Officials (NASEMSO)

CO-INVESTIGATORS:
American College of Emergency Physicians (ACEP®)
National Association of EMS Physicians (NAEMSP®)

For more information:
<https://nasemso.org/projects/prehospital-pain-management-ebg/>




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Working collaboratively with the National Association of EMS Physicians (NAEMSP) and the American College of Emergency Physicians (ACEP), NASEMSO led a project to develop evidence-based guidelines (EBGs) for the pharmacologic management of acute pain in the prehospital setting. We have also included non-pharmacologic options for interventions in the educational materials.

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EMS is charged with providing person-centered evidence-based, and cost effective quality care that improves practice and patient outcomes

It can take years to integrate evidence into practice – and when it comes to pain mgt in our current environment, we don't have years to figure it out!



https://specialty.nims.com/


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Compelling needs based on multiple changes in the healthcare environment, patient populations, and transition to value-based care are demanding rapid adaptation to evidence-based practice. We seek the collective cooperation of EMS leaders and educators throughout the country to review this evidence and move the "needle" forward in a new and improved multimodal approach to pain management by EMS personnel.

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"It is easier to find men who will volunteer to die, than to find those who are willing to endure pain with patience."

Julius Caesar



How can EMS best assess and manage pain to reduce physical, psychological and emotional suffering?

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What is pain? Pain is a subjective and complex unpleasant sensory and emotional experience, often associated with actual or potential tissue injury and includes multiple dimensions. It is an early warning signal that something is wrong! The desire for pain relief often supersedes a patient's desire to identify and resolve the cause of the pain. Physical pain may not present as a primary disease but as a symptom of a disease or injury. Pain can exist even when no physical cause can be found.

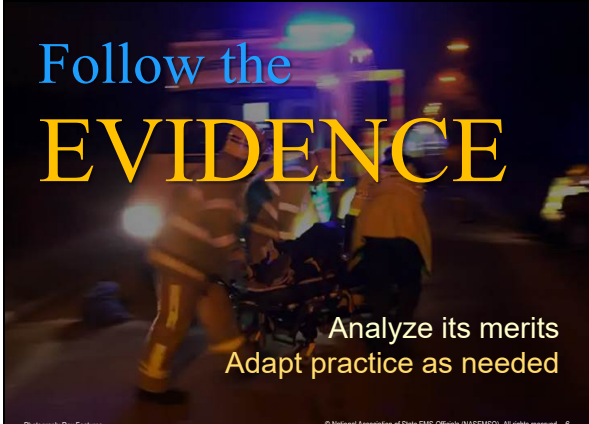
Ask participants to think of a time that they were in real pain, perhaps for a significant length of time. Would they agree with Caesar's statement?

While pain is a definite part of the EMS assessment, treatment is often placed as a lower priority. We have an opportunity to better address the experience of pain, its causes, presentations, and importantly, multimodal approaches to appropriate treatment across the spectrum of person-centered EMS care.

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Follow the EVIDENCE

Analyze its merits
Adapt practice as needed




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...and that is what the technical expert panel (TEP) has done and proposes to bring forward to the EMS community!

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Introductory remarks



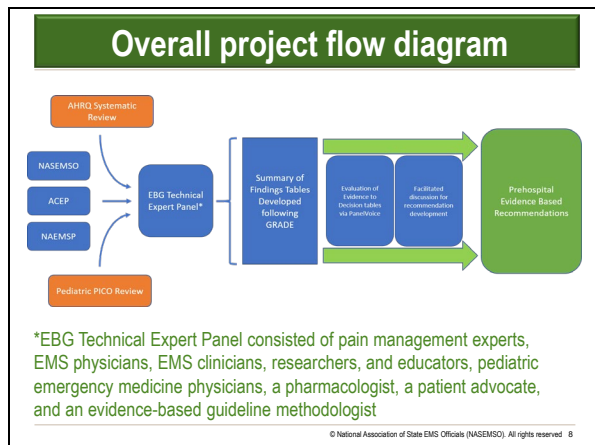
George Lindbeck, MD
State EMS and Trauma
Medical Director
Virginia Department of Health
Principal Investigator
NASEMSO

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The principal investigator was George Lindbeck, MD from NASEMSO. Dr. Lindbeck has 30 years of experience in academic and community emergency medicine and service in local, regional, state, and national EMS organizations. In addition to his professional duties in Virginia, he serves as Chair of the NASEMSO Medical Directors Council.

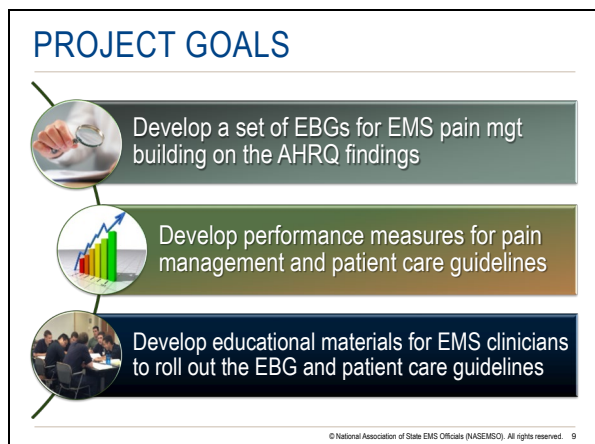
Co-investigators were Sabina Braithwaite, MD, representing ACEP, and Manish Shah, MD, of NAEMSP. Together they led a multi-disciplinary technical expert panel (TEP) comprised of an EMS clinician and EMS educator, as well as others with expertise in emergency medicine, pediatrics, pain mgt, pharmacology, trauma care, guideline development methodology, patient advocacy, and EMS data.

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AHRQ: Agency for Healthcare Research and Quality
 NASEMSO: National Assoc. of State EMS Officials
 ACEP: American College of Emergency Physicians
 NAEMSP: National Association of EMS Physicians
 EBG: Evidence-based guidelines
 TEP: Technical Expert Panel
 PICO: Patient/population-intervention-comparison-outcome
 GRADE: Grading of Recommendations, Assessment, Development, and Evaluation

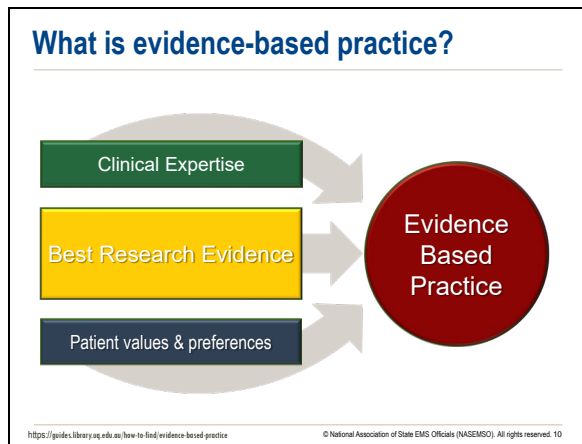
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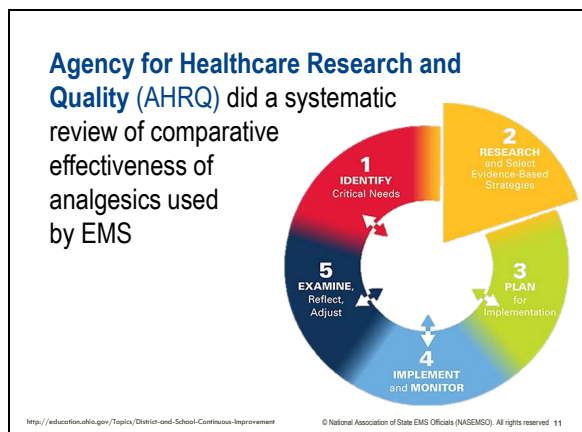
This project produced the following deliverables:

1. Two manuscripts published in Prehospital Emergency Care describing the methodology used to develop the EBG.
2. Model EMS treatment protocol on the management of pain incorporating the EBG, available at [Model Protocol](#);
3. Performance measures for evaluating adherence to the EBG, available at [Pediatric IN Fentanyl Performance Measure](#);
4. Educational materials for EMS professionals on the pain management EBG, including a [Slide Presentation-pptx](#) ([Slide Presentation PDF](#)), [Lesson Plan](#), and [Drug Profiles](#).

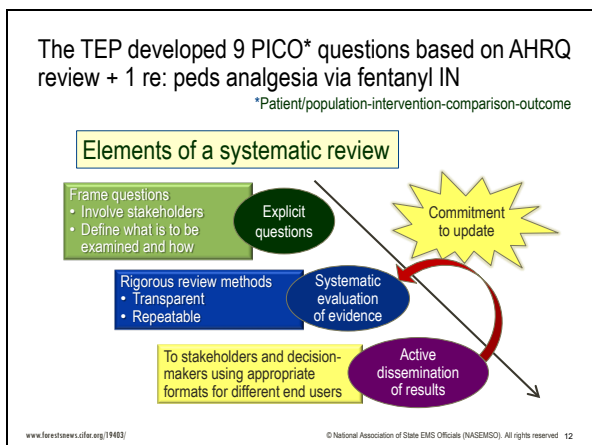
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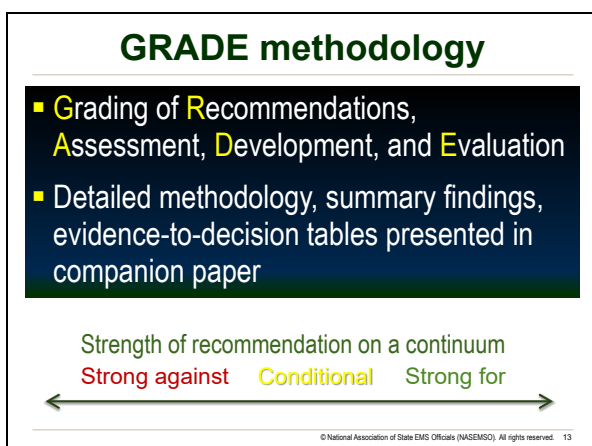
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For an overview of GRADE methodology, see: <https://nasemso.org/wp-content/uploads/Overview-of-GRADE-Methodology-for-Developing-Evidence-Based-Guidelines.pdf>

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PREHOSPITAL EMERGENCY CARE
<https://doi.org/10.1080/10903127.2021.2018073>

Two papers published Taylor & Francis

OPEN ACCESS Check for updates

Evidence-Based Guidelines for Prehospital Pain Management: Recommendations

George Lindbeck^a, Manish I. Shah^b, Sabina Braithwaite^c, Jonathan R. Powell^d, Ashish R. Panchal^e, Lorin R. Browne^f, Eddy S. Lang^g, Brooke Burton^h, Jeffrey Coughenourⁱ, Remle P. Crowe^j, Hannah Degen^k, Mary Hedges^l, James Gasper^m, Kyle Guildⁿ, Connie Mattera^o, Sandra Nasca^p, Peter Taillac^q, and Mark Warth^r

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PREHOSPITAL EMERGENCY CARE
<https://doi.org/10.1080/10903127.2021.2018074>

Evidence-Based Guidelines for Prehospital Pain Management: Literature and Methods

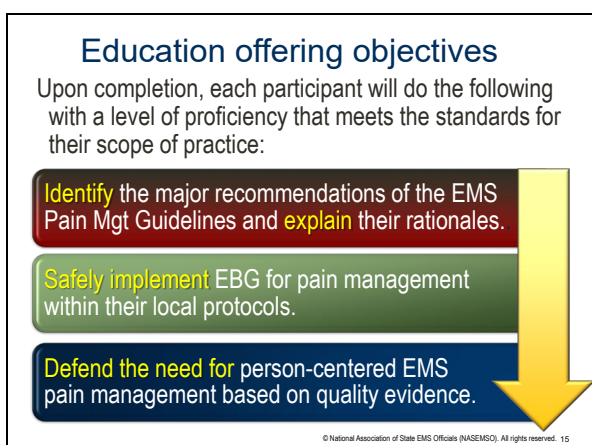
Jonathan R. Powell^{h,k}, Lorin R. Browne^e, Kyle Guildⁿ, Manish I. Shah^b, Remle P. Crowe^j, George Lindbeck^a, Sabina Braithwaite^c, Eddy S. Lang^g, and Ashish R. Panchal^{e,h}, On behalf of the Technical Expert Panel

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The articles are available at [EBGs for Pain Management: Recommendations](#) and [EBGs for Pain Management: Literature and Methods](#)

We strongly suggest that these are available to the educators and participants when local roll-out of these guidelines or this presentation occurs.


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Education on the project outcomes and deliverables is designed to meet local preferences and requirements. Ideally, participants will have access to the webinar recording, slide-deck handout, drug profiles, and local policies, drug administration procedures, and protocols. It could be presented as a virtual class or face-to-face with local EMS Medical Director and faculty enhancements. Educators have access to the slides + notes, this faculty storyboard and a sample lesson plan. Supporting information and materials are all available on the NASEMSO website <https://nasemso.org/projects/prehospital-pain-management-ebg/>

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PICO Questions & Recommendations



Ashish R. Panchal, MD, PhD
NREMT
The Ohio State University
Wexner Medical Center

Each question will be presented individually with the strength of the evidence, guideline recommendation, rationales, and caveats

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Dr. Panchal is the Director of Research for the National Registry of Emergency Medical Technicians. He oversees the NREMT's research and serves as mentor to the NREMT's research fellows. Dr. Panchal also works as an Associate Professor of Emergency Medicine at The Ohio State University Wexner Medical Center. He is the pre-hospital medical director for the Delaware County EMS and the Newark Fire Department.

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PICO #1: Should **INTRANASAL FENTANYL** vs. **IV/IM OPIOIDS** be used for acute onset of moderate to severe pain in children in the prehospital setting?



vs.


www.elsevier.com/locate/jajem.2017.05.001
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PICO #1 - Strong Recommendation

(Low certainty of evidence)

We recommend in **favor of IN fentanyl** over IM or IV opioids in the treatment moderate to severe pain in pediatric patients prior to vascular access or without (or no indications for) IV access



Conditional recommendation: Either **IN fentanyl** or **IV opioids** once IV access established

Pain mgt in peds challenging, priority of care


Advantages: Effectiveness; ease of use

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Evidence did not suggest a difference in pain severity scores at 5, 10, 15, 20, 25, and 30 minutes after IN administration vs. IM or IV opioids; no clinically significant differences in undesirable effects between the two options. No significant differences in therapeutic effects or adverse effects of fentanyl given IN when compared to IV or IM routes.

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PICO #2: Should **IV ACETAMINOPHEN** vs. **IV OPIOIDS** be used to treat moderate to severe pain in the prehospital setting?




vs.

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PICO #2 - Conditional Recommendation
(Low certainty of evidence)

We suggest in favor of **IV acetaminophen** over IV opioids alone if APAP is available, affordable, & easy to give



Rationale: Equivalent pain control, better tolerability
Possible disadvantages: Cost; given by infusion; EMS often prefers IVP or rapid delivery routes

Is this available where you work now?


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All studies on the use of IV acetaminophen done in EDs outside of the US

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Considerations re: nausea

APAP may produce less dizziness, nausea and/or vomiting than opioids
May avoid concurrent use of antiemetic



Etiologies of nausea:


- Pain; anxiety; GI disorders, infection, medications & toxins, CNS, endocrine & metabolic
- Opioids: direct stimulation medulla chemoreceptors
- Motion sickness in EMS vehicle (Weichenthal)

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An excellent reference is available from UpToDate® on the differential diagnosis of nausea and vomiting (2021).
www.uptodate.com/contents/image/print?imageKey=GAST%2F78422&topicKey=GAST%2F2537&source=see_link&search=

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PICO #3: Should IV NSAIDs vs. IV OPIOIDS be used for treatment of moderate to severe pain in the prehospital setting?



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PICO #3 – Conditional Recommendation
(Moderate certainty of evidence)

We suggest either **IV NSAIDS or IV Opioids** for the mgt of moderate to severe pain

Insufficient evidence to make a recommendation re: pain severity at 15 minutes, partial or full relief of pain, or time to analgesic effect


Concerns:
Sub-therapeutic dose of ketorolac in limited data

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Evidence did not demonstrate any clinical significance in pain severity at 30 or 60 minutes.

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PICO #3 - Considerations




- Cost differential: ketorolac more expensive
- Adverse events may be more common with opioid (morphine) (Rainer)
- IV NSAIDs attractive if patient is opioid tolerant or dependent, claims opioid allergy or intolerance, or prefers drug with lower risk profile

Which do you use now?

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PICO #4: Should IV ACETAMINOPHEN (APAP) vs. IV NSAIDs be used to treat moderate to severe pain in the prehospital setting?




VS.

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PICO #4 - Conditional Recommendation
(Low certainty of evidence)

We suggest in **favor of IV NSAIDs** over IV APAP for the initial mgt of moderate to severe pain in the prehospital setting




We also recommend in **favor of either PO NSAIDs or ACETAMINOPHEN** for the Initial mgt of pain in the prehospital setting



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PICO #4 - Rationale



- IV route:** Little difference in pain severity at 30 or 60 min or in partial or complete pain relief
- Adverse events:** Comparable
- Cost & feasibility:** Favors IV NSAIDs
- Consider oral, non-opioid analgesics

All evidence: Non-graded; ED based


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EMS is generally accustomed to using parenteral analgesics for rapid onset of action and ease of delivery. This is the only question that explored a PO delivery route.

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PICO #4 – Caveats



- All are candidates for pain mgt & comfort measures regardless of transport interval
- **Do not assume fast analgesic Rx at ED - may have significant delays** (Woolner, Patrick)
- Any EMS analgesics (including PO) may markedly improve pain relief well into ED stay



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PICO #5: Should **IV KETAMINE** vs. **IV NSAIDs** be used to treat moderate to severe pain in the prehospital setting?



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PICO #5 - Conditional Recommendation

(Very low certainty of evidence)



*We suggest **either IV ketamine or IV NSAIDs** for the initial mgt of moderate to severe pain in the prehospital setting*



Single study found significant pain relief at 30 min after ketorolac compared to ketamine, but no significant differences at 15 or 60 min, time to analgesic effect, pain relief, or pain memory



SE higher with ketamine – not clinically significant

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SE with ketamine: (dizziness, increased BP & HR)

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PICO #6: Should **IV KETAMINE** vs. **IV OPIOIDS** be used to treat moderate to severe pain in the prehospital setting?


VS.


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PICO #6 - CONDITIONAL RECOMMENDATION
(VERY LOW CERTAINTY OF EVIDENCE)

We suggest **either IV ketamine or IV opioids** for the initial mgt of moderate to severe pain

No clinically significant difference in pain at 15, 30, or 60 min, in partial or complete pain relief, or time to analgesia effect

Small sample size; difficult for pts to quantify



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Pico #6 - Rationale

Ketamine provides inconsistent but potentially rapid onset of pain relief and currently has a wide range of dosing strategies (IVP, IVPB, IM, IN)

Number of pts experienced mild-to-moderate side effects (dizziness, dysphoria, confusion) (Ghate)

Do you use ketamine?

Low-Dose Ketamine for Acute Pain in the ED: IV Push vs Short Infusion



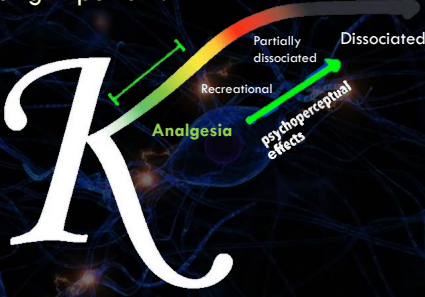
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Series of 500 patients given low dose ketamine (0.1-0.3 mg/kg) in ED found 3.5% experienced a psychomimetic or dysphoric reaction (Ahern –see published paper).

As an analgesic, ketamine may provide equal or better pain relief when compared with other available out-of-hospital medications and is associated with a lower incidence of nausea and vomiting (Fernandez et al, 2021).

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Ketamine brain continuum
Dosing important!



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Ketamine has become increasingly used by EMS for indications ranging from pain to sedation due to its potent effects, wide therapeutic window, and favorable risk profile (Fernandez et al, 2021). It produces a unique combination of hypnotic, analgesic, and amnestic effects based on dose.

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PICO #6 - Conclusions

- IV opioids used more commonly now, but both drugs likely acceptable to stakeholders
- Ketamine:** Viable alternative for pain if patient is opioid tolerant or dependent, claims opioid allergy or intolerance, or has experienced adverse events with opioids
- Non-opioid option may increase health equity, but not addressed in this evidence base

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PICO Questions & Recommendations





Jonathan Powell, MPA, NRP
NREMT Research Fellow

Continuing the discussion...

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PICO #7: Should **IV morphine** vs. **IV fentanyl** be used to treat moderate to severe pain in the EMS setting?





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PICO #7 - Conditional recommendation
(low certainty of evidence)

If opioids are selected for pain mgt., we suggest **either IV morphine or IV fentanyl** for the treatment of moderate to severe pain in the prehospital setting



No significant differences in pain scores, resolution of pain, or time to analgesia

- Morphine:** Associated with higher rates of nausea
- Fentanyl:** More route options (IN)

Conflicting results in EMS vs. hospital-based trials

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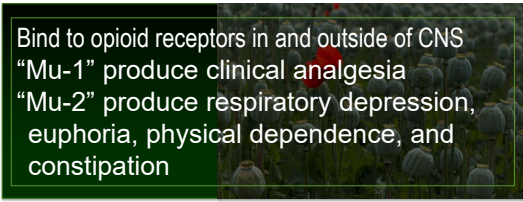
IN option for fentanyl may make it attractive, particularly in pediatric patients.

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PICO #7 – Rationale

Opiates have been the cornerstone of pain management for centuries

Natural + Synthetic Agents



Bind to opioid receptors in and outside of CNS

- "Mu-1" produce clinical analgesia
- "Mu-2" produce respiratory depression, euphoria, physical dependence, and constipation

Theoetherson

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Natural opioids (morphine) produce histamine that can make the patient itch and cause vasodilation and hypotension.


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PICO #7 – Rationale cont.

Other receptors: delta, sigma, kappa, and epsilon
Kappa produces analgesia, sedation and miosis

Select an opioid based on pain severity, route options, previous responses to opioids, SEs, how drug may interact with a patient's disease state(s) & local protocols

Which do you prefer?



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PICO #8: Should a combination of weight-based IV OPIOID + KETAMINE vs. weight-based IV OPIOID alone be used to Rx moderate-severe pain in the prehospital setting?

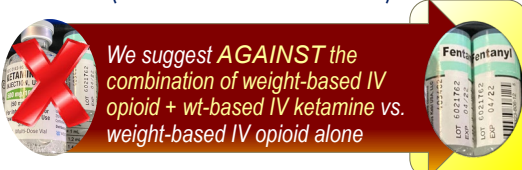


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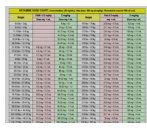
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PICO #8 - CONDITIONAL RECOMMENDATION (VERY LOW CERTAINTY OF EVIDENCE)

We suggest AGAINST the combination of weight-based IV opioid + wt-based IV ketamine vs. weight-based IV opioid alone



Rationale: Lack of clinical improvement in pain control, slight increase in undesirable SE, and desire to avoid complexity in administration




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Dizziness was more common in the combination therapy group; but insufficient evidence is related to other reported adverse events. There was no increase in respiratory depression in the combination therapy group. Possibly, multiple drugs allow for lower and safer doses of analgesics (Helander).
Monotherapy avoids complexity (and possibly drug errors) in preparation and delivery.
Weight-based dosing regimens are an identified challenge, especially when dealing with medications that have two different doses for two different indications and in pediatric patients.

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PICO #9: Should a combination of IV OPIOID + IV KETAMINE vs. IV KETAMINE alone be used to treat moderate to severe pain in the prehospital setting?




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PICO #9 - NO RECOMMENDATION
(VERY LOW CERTAINTY OF EVIDENCE)

NO recommendation made at this time on the combination of IV KETAMINE + IV OPIOID vs. IV KETAMINE alone due to significant uncertainty of the evidence and incomplete information concerning the comparison

Need more



<https://www.youtube.com/watch?v=56DeuudUDU>

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No significant differences in pain control at 15, 30, or 60 minutes; in partial or complete pain relief, or time to analgesic effect between the two medications. Dizziness was more common in the combination therapy group, but insufficient evidence is related to other reported adverse events. No increase in respiratory depression in the combination therapy group. Possibly, multiple drugs allow for lower and safer doses of analgesics (Helander). Monotherapy avoids complexity (and possibly drug errors) in preparation and delivery. Weight-based dosing regimens are an identified challenge, especially when dealing with medications that have two different doses for two different indications and in pediatric patients.

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PICO #10: Should NITROUS OXIDE vs. IV OPIOIDS be used to treat moderate to severe pain in the prehospital setting?



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PICO #10: NO RECOMMENDATION
(Very low certainty of evidence)

NO recommendation made on the comparison between nitrous oxide vs. IV opioids for the initial management of moderate to severe pain in the prehospital setting

Potential cons: Cost, gas replacement; needs responsive patient who can follow instructions; contraindicated in pneumothorax/bowel obstructions



www.porterinstrument.com

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Nitrous oxide has been used by EMS for decades – but little published on it, so could not make a recommendation

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DISCUSSION



Pain management is a core competency for EMS practitioners


<https://medline.com/sports>

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Why is this important?

- Pain is a frequent complaint of EMS patients
- Historical reliance on IV opioids



Growing opioid epidemic and expanding medical options opened door to exploring evidence-based guidelines (EBGs) with choices identified

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America's opioid epidemic continues unabated. Federal data released in April 2021 showed that 87,000 Americans died of drug overdoses in the 12 months through August 2020, with opioid-related fatalities being a primary driver in those numbers. That's more than any 12-month period since the opioid epidemic began, according to the Centers for Disease Control and Prevention (CDC).

Opioids accounted for ~75% of all overdose deaths during the early months of the pandemic; about 80% of those included synthetic opioids like fentanyl.


The final 2020 overdose death total in the U.S. could exceed 90,000, compared with 70,630 in 2019. That would be the highest annual number on record and the largest single-year percentage increase in the last 20 years.

AHA expert recommendations:

- Isolation and social distancing are risk factors for opioid abuse.
- Areas to improve in the fight against opioids include awareness, harm reduction, and decreasing stigma.
- Comprehensive screening can help keep a pulse on substance use in your community.
- **Pay attention to pain management protocols and support alternatives to opioids programs.**

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Current EMS Data



- Challenges persist in providing adequate analgesia in the field
- Pain frequently undertreated
- Disparities accentuated based on patient demographics

Remle Crowe, Ph.D., NREMT
ESO Solutions

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Dr. Crowe is an expert in quality improvement and research. As a research scientist at ESO and faculty member of the NAEMSP Quality and Safety Course, Dr. Crowe routinely uses data to improve community health and safety.

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What are the barriers to effective pain management by EMS?

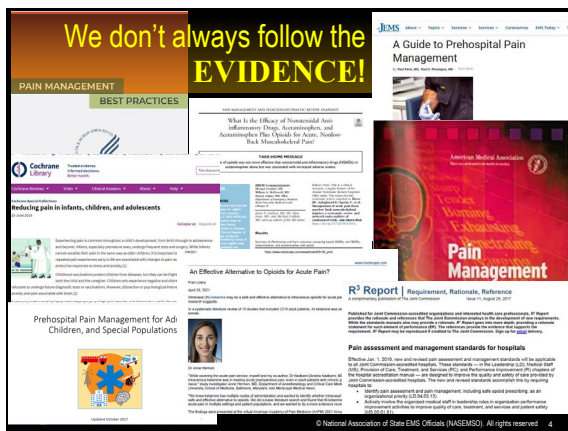


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- Clinicians' attitudes, beliefs, and behaviors; bias may contribute to under-treatment of pain
- Do not accept pt's self-report as reliable; disparity between clinician and patient rating; suspicion of drug-seeking behavior
- Insufficient or improper assessment and/or failure to recognize that patient is in moderate to severe pain due to many reasons: denied access to completing a physical exam due to sincerely held religious or cultural traditions
- Communication challenges; language barriers; cognitive abilities
- Coexisting physical/psychological illness; reluctance to report pain (stoicism, fear)
- Traditional reliance on opioids that pt dissents to receiving due to substance use disorders or addiction concerns
- Other emergent treatment priorities at the moment delay pain interventions

- Difficult or unobtainable vascular access
- Need for short scene time; or short transport time
- Concerns regarding accurate medication dosing (peds, elderly, obese); side effects; and/or inadequate monitoring ability.
- May be compounded by drug shortages with rapid formulary substitutions or concentration changes in known medications.
- Denial of order from online medical control or anticipation of criticism from receiving hospital

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What meds were used for EMS pain mgt by Eagle Systems? (2/15)

- Fentanyl (60%)
- Morphine (43%)
- Ketamine (16%)
- Ketorolac (16%)
- Nitrous Oxide (6%)
- Dilaudid (6%)
- IV Acetaminophen (1 system)

Used for historical reference only.

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2019 NEMSIS public use research database

N total: 26,501,968 records for 911 responses
N Pain subset (initial pain score documented at ≥6): **3,206,755** pts
 Received prehospital analgesics: **428,562 (13%)**


Drugs used	
Opioid	392,148 (91.5%)
NSAID	20,529 (4.8%)
Ketamine	16,338 (3.8%)
Acetaminophen	9,425 (2.2%)

Sum >100% as one person could receive ≥2 classes of meds

At the time of project writing, the latest National EMS Information System (NEMSIS) data was from 2019. The pain management protocol wasn't used very frequently in the NEMSIS dataset, so an alternate query was run on patients with an initial pain score of 6 or higher as a proxy for patients with moderate to severe pain. While this poses limitations, it's an OK patient-centered starting place. (BLS only agencies were retained in the dataset because it's not the patient's fault if a BLS agency shows up when they fracture their femur).




Slide 58



Pediatric Pain Assessment

How did this happen?



Lorin R. Browne, DO, FAAP
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Associate Medical Director, Pediatrics
Milwaukee County Office of Emergency Management EMS

<https://www.mycorrespondence.com/>

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As a board certified pediatric emergency medicine specialist, Dr. Browne is invested in improving the emergency medical care of children through quality clinical research focused on prehospital pediatric care and competent education of emergency medicine providers. Dr. Browne is focused on high-quality, priority-based research to improve the care delivered to children prior to hospital arrival.

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Myths about pain in children



- Infants can't feel pain
- Children experience less pain than adults
- Children will admit to pain
- Children recover more quickly from pain
- Opiates always cause respiratory depression in children

<https://www.apa.org/monitor/2021/07/ice-corner-developmental-trauma>

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Generally speaking, any injury or condition that would cause severe pain in an adult will also cause severe pain in a child, even if they are unable to communicate that perception.

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Assessment: Pain by the numbers




Photo by Matt Duncan on Unsplash

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Due to its subjective nature, EMS personnel must start with the assumption that pain is "Whatever the experiencing person says it is, existing where and when they say it does, and is the stated level of severity." How pain is perceived or tolerated is impacted by clinical, cultural, and/or personal factors and is not limited by age, economic class, ethnic group, or social status.

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Pain assessment in children



Requires careful observation of key behaviors appropriate for their age & development

<https://www.pomper.com/>

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Revised FLACC Scale: Birth to 7 yrs or unable to communicate their pain Scores range: 0–10 (0 = no pain)			
Categories	0	1	2
Face	No particular expression or smile	Occasional grimace or frown; withdrawn, disinterested. <i>Sad, appears worried.</i>	Frequent to constant quivering chin, clenched jaw; <i>disinterested looking face; expression of fright or panic.</i>
Legs	Normal position or relaxed; <i>usual tone an motion to limbs</i>	Uneasy, restless, tense; <i>occasional tremors</i>	Kicking or legs drawn up; <i>marked increase in spasticity; constant tremors/jerking</i>
Activity	Lying quietly, normal position, moves easily; <i>reg. rhythmic respirations</i>	Squirming, shifting back & forth, tense; <i>guarded movements, mildly agitated; shallow, splinting respirations, intermittent sighs</i>	Ached, rigid, or jerking; severe agitation, <i>head banging; shivering, breath holding, gasping, severe splinting</i>
Cry	No cry (awake or asleep)	Moans or whispers, occasional complaint; <i>occasional verbal outbursts, constant grunting</i>	Crying steadily, screams or sobs, frequent complaints; <i>repeated outbursts, constant grunting</i>
Consolability	Content, relaxed	Reassured by occasional touching, hugging or being talked to, distractible	Difficult to console or comfort; <i>pushing caregiver away, resisting care or comfort measures</i>

The pain scales presented are only some of the many options available. Participants are encouraged to look to the literature to determine those that work best for EMS. Pain scales typically assess patients with all types of pain but may not be fully accurate in those with severe chronic or breakthrough pain (cancer or severe inflammatory reaction-related), those who are non-verbal or do not perceive pain in usual ways. Patients with autism spectrum disorder may have a heightened or reduced sensitivity to pain or experience it in unusual ways. They may not be able to express their distress due to communication and social difficulties.

Most scales try to assess pain severity or intensity and are modified for adults, children, the elderly, those with dementia, or those who have language fluency challenges. In patients with chronic pain, determine their baseline and where they rate the pain now in comparison.

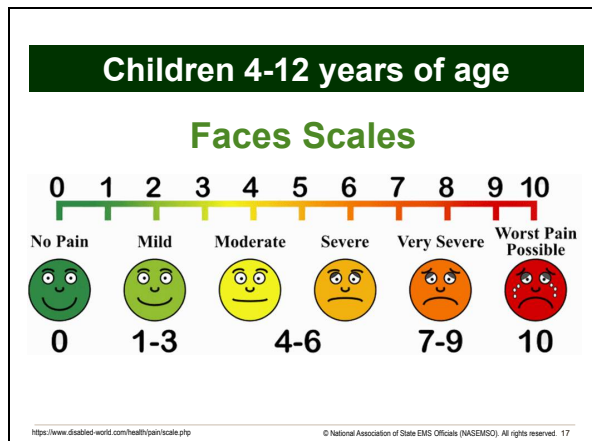
Options: Verbal Rating Scales (VRS); Visual Analogue Scales (VAS), and Numerical Rating Scales (NTS). The Wong-Baker Faces scale and Faces Pain Scale-Revised (FPS-R) and observational-behavioral scales are also helpful tools.

Malviya, S., Vopel-Lewis, T., Burke, C., Merkel, S., Tait, A.R. (2006). The revised FLACC observational pain tool: improved reliability and validity for pain assessment in children with cognitive impairment. *Pediatric Anesthesia*, 16(3), 258-265. (Red font indicates the newer additions)

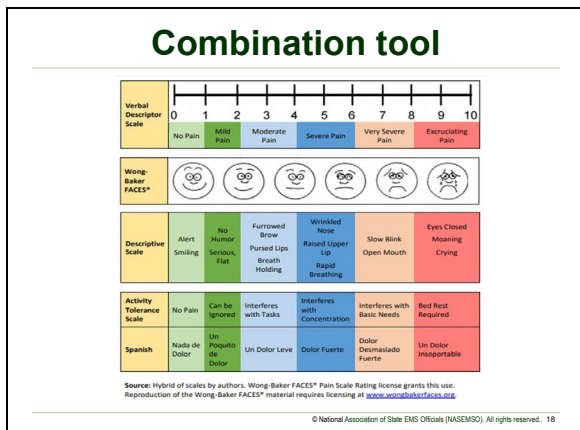
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Children's Hospital of Eastern Ontario Pain Scale (CHEOPS)			
Variables	Score 0	Score 1	Score 2
Cry	No	Crying, moaning	Scream
Facial	Smile	Neutral	Grimace
Verbal	Positive statement	Negative statement	Suffering from pain
Torso	Neutral	Variable, upright	Stretched
Legs	Neutral	Cont. moving, kicking	Stretched

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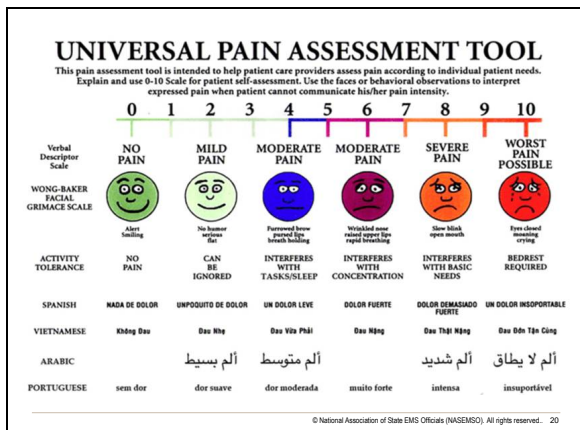


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Rating	Impact on the patient
10	Worst pain you can imagine
7-9	Severe pain Pain is so bad, normal activities are impacted, including talking or sleeping
4-6	Moderate pain Pain makes it hard to concentrate You can't ignore the pain but you can still work through some activities
1-3	Mild pain: Noticeable, but tolerable
0	No pain

<https://www.allinahealth.org> © National Association of State EMS Officials (NASEMSO). All rights reserved. 19

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It is helpful to have multiple languages on the pain assessment tool for those that can read descriptors in their primary or preferred language. Whatever scoring system is used, stay consistent with that tool. While not absolutely accurate, they do provide a basis for trending and ongoing monitoring. We would hope for an improvement of at least 20% (2 points on a 10 point numeric scale) after EMS comfort/analgesia interventions if possible.

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Not all pain scores appear accurate

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Context can influence pain perception: How a patient perceives and rates their pain can be influenced by age, gender, condition, culture, social/emotional factors, environment, and motivation to over or under estimate pain; the meaning ascribed to pain, level of anxiety, fatigue, previous experience with pain, and support system.

Symptom amplification: Consider that some complaints may be amplified or minimized by a patient. Obtain as much information as possible about previous injury/illness and what was done to diagnose or treat them at that time. Some patients have hypochondriacal preoccupations or may fear aging and death. Exaggeration of S&S may also stem from environmental factors traced to childhood experiences.

Factitious disorders: Some deliberately fake illness as they have a wish to gain attention or be treated as if they are ill. Some have a Cluster B disorder, substance use, or mood disorder.

Malingering: Feigned S&S may be motivated by a desire to avoid life situations (military duty, work, school, criminal prosecution), to gain financially, or seek drugs. Both malingering and factitious disorders involve the active use of conscious deceit to obtain personal ends. In some instances, the symptoms are consciously produced and in others, they are unconsciously caused. There is a continuum between exaggeration (amplification) and malingering.

Slide 69

What else should EMS assess?

www.marca.com/en/football/barcelona/2018.html

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Look for physiologic and behavioral cues as to pain severity. Vital signs (patient may be in severe pain and not have grossly altered VS); skin exam (look for analgesic patches, evidence of inflammation, injury, or hypoperfusion); and patient's facial expression, sweat patterns, body language, position, movement, and the ability to talk.

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Abbey Pain Scale

For measurement of pain in people with dementia who cannot verbalize.

How to use scale: While observing the resident, score questions 1 to 6.

Name of resident: _____

Name and designation of person completing the scale: _____

Date: _____ Time: _____

Label pain relief given was _____ at _____

Q1. Vocalization eg. screaming, groaning, crying Absent 0 Mild 1 Moderate 2 Severe 3	Q1	<input type="checkbox"/>
Q2. Facial expression eg. frowning, frown, frowning, grimacing, looking frightened Absent 0 Mild 1 Moderate 2 Severe 3	Q2	<input type="checkbox"/>
Q3. Change in body language eg. Moaning, moaning, grunting, part of body withdrawn Absent 0 Mild 1 Moderate 2 Severe 3	Q3	<input type="checkbox"/>
Q4. Behavioral Change eg. Increased restlessness, refusing to eat, alteration in usual pattern Absent 0 Mild 1 Moderate 2 Severe 3	Q4	<input type="checkbox"/>
Q5. Physiological change eg. Irritability, either or blood pressure outside normal limits, perspiring, flushing or pale Absent 0 Mild 1 Moderate 2 Severe 3	Q5	<input type="checkbox"/>
Q6. Physical changes eg. Abnormal, pressure areas, arthritis, contractions, abnormal vital signs Absent 0 Mild 1 Moderate 2 Severe 3	Q6	<input type="checkbox"/>

Add scores for 1 - 6 and record here → Total Pain Score

Now tick the box that matches the Total Pain Score

0-3 No pain 4-7 Mild 8-10 Moderate 11+ Severe

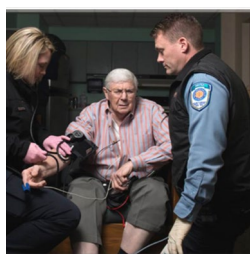
Finally, tick the box which matches the type of pain

Chronic Acute Scale not Chronic

Downloaded from www.jerms.com/

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Pain assessment tool in patient with dementia



May need to have a surrogate of a non-verbal person provide information on behavior or activity changes that may suggest that they are in pain. The surrogates should be a reliable historian such as a caregiver or loved one that knows their baseline well.

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Shared decision-making and patient preferences



Eddy S. Lang, MDCM, CCFP (EM), CSPQ
University of Calgary
Alberta Health Services



<https://www.ams1.com/pain-management/> © National Association of State EMS Officials (NASEMSO). All rights reserved. 1

Dr. Lang is a Professor and Department Head for Emergency Medicine at Cumming School of Medicine- U of Calgary and Alberta Health Services, Calgary Zone. He is a member of the GRADE working group and has led the development of GRADE-based clinical practice guidelines in pre-hospital care in the US as well as with the International Liaison Committee for Resuscitation.

First acknowledge that there are interventions provided by EMS that CAUSE pain: Palpation during an exam, splinting/immobilization; vascular access; blood glucose reading; undressing patients; eye irrigation; pacing/cardioversion; and wound care. Warn patients in advance; use a gentle touch, and offer proactive choices when appropriate.

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What is a person-centered approach to pain mgt?



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Advocate for active involvement of the patient in decisions about their treatment. The Institute of Medicine (IOM) defines patient-centered care as providing care that is respectful of and responsive to individual patient preferences, needs, and values, and ensuring that patient wishes guide all clinical decisions.

Pain management strategies should consider the patient's current presentation and wishes, the health care providers' clinical judgment, and the risks and benefits associated with intervention options, including the potential risk of dependency, addiction, and abuse.

Slide 73



Patient choice is important!

What else should be considered?
Underlying pathology, pain intensity, scope of practice

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Consider patient factors: genetics, culture, age, previous pain experiences, comorbidities; plus responder scope of practice, and risks/benefits of each strategy.

Establish realistic pain goals.

Provide individualized pain management tailored to patient needs regardless of transport interval or receiving facility. There is frequently a delay in getting pain medications ordered and administered at many emergency departments.

Slide 74

Obtaining Past Medical History is Critical



www.verywellhealth.com/rheumatoid-arthritis-pain-medications-0113004 © National Association of State EMS Officials (NASEMSO). All rights reserved. 4

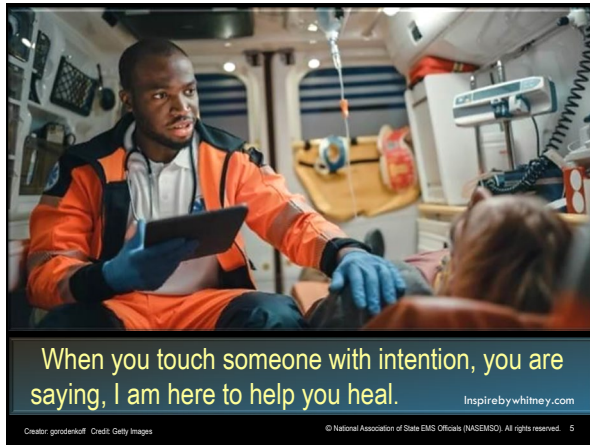
Get as much information as possible about causes and nature of the pain now compared to baseline or similar past episodes.

Pain is generally caused by:

- Inflammation, swelling, distention, or dilation
- Low blood flow to a tissue /organ d/t obstruction/perfusion restriction
- Excessive stimulation of a sensory organ
- External pressure on a nerve or nerve damage
- Exceeding thresholds of cold, heat, pressure
- Extended contraction of a muscle; muscle spasm

History all current meds – especially those for pain (NSAIDs, opioids, over the counter, herbal or homeopathic approaches); any meds or substances that could potentiate or alter EMS interventions (sedatives, or CNS depressants); time and amount of last dose. What has worked or not worked in the past? Any known allergies/adverse reactions to pain meds?

Slide 75



Empathy and caring go a long way to relieving patient distress. A pat on the shoulder, forearm, or hand may bring comfort to those in distress.

Be alert to non-verbal cues and patient wishes or sensitivity to being touched. Gain their consent for therapeutic touch.

Slide 76



There are at least 10 factors that lead to pain complaints in the absence of a medical diagnosis. These should also be considered by EMS. Psychiatric Times, October 2020:

Somatoform pain: Pain persists past the point of adaptive reaction to injury. Patients may have feelings of isolation, worthlessness and depression. High health anxiety; long-standing or more severe pain; reduced capacity to cope with stress; lower pain threshold; perhaps a more sensitive autonomic nervous system (ANS); greater sympathetic activation.

Psychiatric illness: Chronic pain may lead to depression and anxiety; mood changes are a reaction to an alteration in function; altered life choices can occur due to dysfunctional coping strategies; chronic pain becomes associated with reduced activity which reinforces pain and adds to health hazards such as obesity; psychiatric disorders alone render one more prone to chronic pain

Psychosocial factors: Stress increases the perception of pain. Pain intensity may be higher in those with recent adverse life events who have lower socio-economic status, poor education and limited ability to explain symptoms putting them at a psychosocial disadvantage.

Patients in pain want to be heard – and for caregivers to acknowledge their distress; and provide options for mitigating their suffering. Verbal engagement may be good distraction for them. Allow them to assume a position of comfort if possible. Splinting musculoskeletal injuries reduces movement and may reduce muscle spasm, thus impacting the pain-spasm cycle. However, do not elevate a pulseless extremity or apply a cold pack to a cold and/or cyanotic limb.

Slide 77

Non-pharmacologic Considerations in children

Use distraction (bubbles, Buzzy, music, electronics, toys)
Consider need for caregiver presence; holding, pacifier



www.nasemso.org/prehospital-pain/children-drugs/
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Cognitive coping strategies

Children can close their eyes and picture a happy place, experience, or memory. Encourage them to tell you about a party, pet, favorite toy, game, or music they like; friends, family, or sport they play. Can use small toys, blown up gloves with faces on them, stress/squeeze balls, storytelling; games, electronic devices, keys, penlight, or stethoscope to distract them. Have a distraction toolkit!

Buzzy® Mini Healthcare is like a TENS unit. When placed over a cold pack, allows for pain-free injections or IV starts. Approach: Calm, non-threatening manner. They often become very anxious when in pain. Speak to the child by name and in a steady gentle voice, on their level...kneel or sit during the interview.

Slide 78

Considerations in Pharmacologic pain treatment options



Sabina Braithwaite, MD, MPH
Associate Professor of Emergency Medicine and EMS Fellowship Director
Washington University in St Louis
<https://www.wustl.edu/emergency>



Options presented are not carried by all EMS agencies and do not replace protocols approved by your EMS Medical Director

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Dr. Braithwaite has extensive experience as an EMS medical director and in EMS education at all levels. She has been active in leadership of several national organizations and projects, including the NAEMSP, ACEP, International Trauma Life Support, and the EMS Culture of Safety Strategy Project. In particular, she was one of the key participants in the development of the original NASEMSO National Model EMS Clinical Guidelines Project. Sabina is board certified in Emergency Medicine and is subspecialty certified in Emergency Medical Services. She also holds an MPH with a specialty certificate in Disaster Management.

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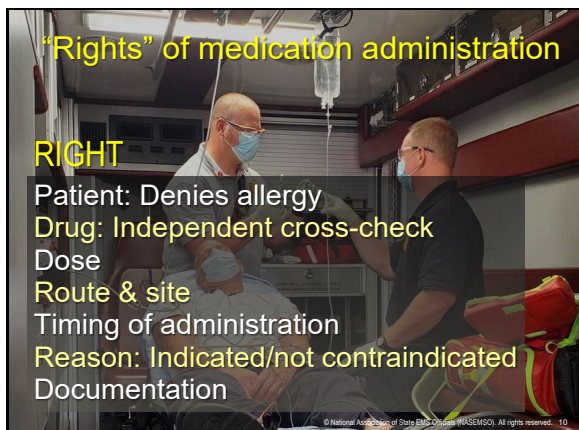
So let's do a fast fly over of multiple pharmacologic options...

Slide 80

"Rights" of medication administration

RIGHT

- Patient: Denies allergy
- Drug: Independent cross-check
- Dose
- Route & site
- Timing of administration
- Reason: Indicated/not contraindicated
- Documentation



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First, let's get it **"Right"**. Check package/container for drug name, amount, concentration, integrity, and expiration date. Inspect the packaging for intact seals and no signs of tampering. Check the drug solution for discoloration, cloudiness or precipitation. Verify sterility of parenteral meds. Prepare accurate dose based on patient age, size, condition and protocols. Controlled substances and high risk meds (peds dosing/others per protocol) require a cross check with another qualified practitioner per local protocols.

Slide 81

If non-pharmacologic interventions are insufficient -
Consider use of **pharmacologic analgesics**

PO options for milder pain –
onset of action slower; desire to avoid
parenteral meds or opioids

- **Acetaminophen** 15 mg/kg PO
(max dose 1 gram)
- **Ibuprofen** 10 mg/kg PO if older than
6 months (max dose 800 mg)

<https://www.aep.org/>
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Contraindications to oral NSAIDs:

- Inability to swallow or take meds by mouth
 - Respiratory distress w/ possible aspiration
 - Persistent vomiting
 - Allergy to NSAIDs
 - History of peptic ulcer disease or GI bleeding;
renal failure, liver disease, younger than 6
months without OLMC order
- Use with caution in elderly patients; determine if
they are on blood thinners or already take NSAIDs

Slide 82

**Why is pain management a
challenge in children?**

Needle phobia!

Strongly consider intranasal options

Photo by: REUTERS/Lindsey Wasson
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Difficulties stem from a child's age and
developmental level, ability to self-report, relying
on behavioral and physiological indicators of pain,
and selecting the appropriate pain assessment
scale. Add to this the alterations in the
pharmacokinetics and pharmacodynamics of
medications used for pain management in
children; a child's fear of needles, the difficulty in
placing IV catheters, and the influence of
parents/caregivers.

Slide 83

Intranasal route (IN) using the
Mucosal Atomizer Device (MAD)

Preferred for initial dosing
(for pain) if no IV access

- **FENTANYL** 1 mcg/kg IN
- **KETAMINE** 0.5 mg/kg IN (max initial
dose 25 mg; max cumulative dose 100 mg)

Photo: Jon Lee
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These are suggested doses based on
literature and guidelines. The TEP recognizes
and supports the authority of each EMS
Medical Director to determine their local
protocols and drug dosing based on their
discretion, medical opinion, state, and local
factors.

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INTRAMUSCULAR (IM) OPTIONS ☹️

KETOROLAC (one-time dose only)

- Adult (non-pregnant): 30 mg IM
- Pediatric (2-14 years old): 1 mg/kg IM
(max dose 30 mg)

MORPHINE sulfate: 0.1 mg/kg IM
(max initial dose 15 mg)

FENTANYL 1 mcg/kg
(max initial dose 100 mcg)

KETAMINE 0.3 mg/kg IM
(max initial dose 25 mg)

<https://www.gettyimages.com/detail/stock-photo/1804100000>
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These are suggested doses based on
literature and guidelines. The TEP recognizes
and supports the authority of each EMS
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protocols and drug dosing based on their
discretion, medical opinion, state, and local
factors.

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NAEMSP published a position paper on EMS use of nitrous oxide in 1990.

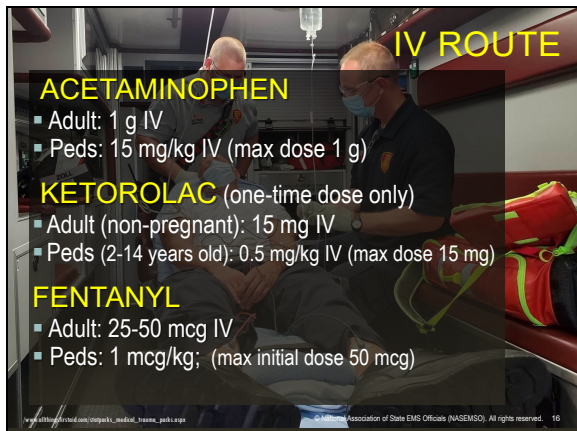
Nitrous oxide is a CNS depressant. It dulls the senses, blunts perception of painful stimuli, and produces a carefree attitude.

It also potentiates the release of endogenous endorphins that react with opioid receptors in the CNS to elevate the pain threshold & create a feeling of relaxation and euphoria.

Advantages: Little effect on CV system – mild vasodilation; no direct effect on skeletal muscle

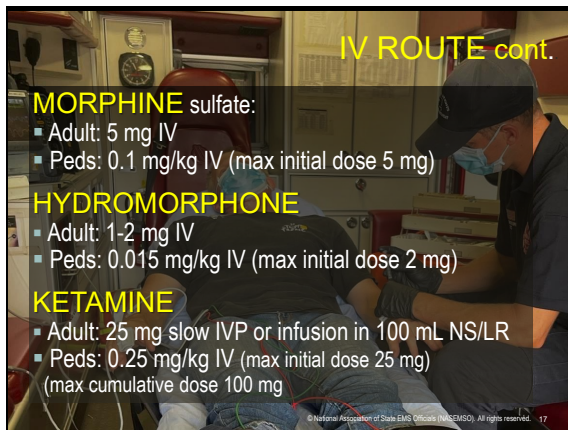
Does not require an IV; Onset & duration: 2-5 minutes; metabolized & excreted in the lungs

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These are suggested doses based on literature and guidelines. The TEP recognizes and supports the authority of each EMS Medical Director to determine their local protocols and drug dosing based on their discretion, medical opinion, state, and local factors.

Slide 87



These are suggested doses based on literature and guidelines. The TEP recognizes and supports the authority of each EMS Medical Director to determine their local protocols and drug dosing based on their discretion, medical opinion, state, and local factors.

Slide 88

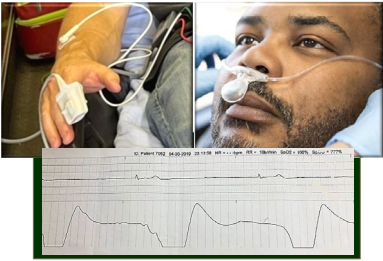


Nausea is a well-documented side effect of opioid administration for acute pain. Anticipate this side effect and prepare ondansetron slow IVP or rapid oral dissolve tablet per local protocol.

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Reassess q. 5 minutes! Repeat doses per protocol (if not contraindicated) until pain is tolerable, max dose is given, patient refuses, or SE evident

Careful/diligent ongoing reassessment



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Monitor for desired effects, but also for adverse reactions (AMS, hypotension, bradycardia, hypoventilation, hypoxia, hypercarbia, and S&S of allergy or anaphylaxis).

Should have a full set of VS + oximetry readings (SpO₂ & ETCO₂) if a potential for respiratory depression + pain reassessment after all pain medication administration.

Slide 90

BRING IT ON HOME –
There's no going back! Our course is set straight to the future using the evidence as our guide....

RULE NUMBER 1:



NEVER SET IT TO 2020

https://www.memegenerator.com/photos/2020/Back-to-the-Future
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We never want to see 2020 again! (Nor go back to old ways of doing things that did not achieve EB care or optimal outcomes.)

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What practice changes will you make moving forward?


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One definition of learning is “changed behavior”. What change in approach, policy, procedure or protocol do you anticipate making based on this new body of evidence?

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Questions regarding this education module should be directed to:

NATIONAL ASSOCIATION OF STATE EMS OFFICIALS
201 Park Washington Court
Falls Church, VA 22046-4527
www.nasemso.org
info@nasemso.org
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fax 703-241-5603



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If you have specific questions on the educational materials, please feel free to reach out to:

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