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/

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.

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.

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?

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.

Slide 6

Follow the EVIDENCE

Analyze its merits
Adapt practice as needed

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

Slide 7

Introductory remarks

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

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 mgmt, pharmacology, trauma care, guideline development methodology, patient advocacy, and EMS data.
Overall project flow diagram

*EBG Technical Expert Panel consisted of pain management experts, EMS physicians, EMS clinicians, researchers, and educators, pediatric emergency medicine physicians, a pharmacologist, a patient advocate, and an evidence-based guideline methodologist

PROJECT GOALS

- Develop a set of EBGs for EMS pain mgt building on the AHRQ findings
- Develop performance measures for pain management and patient care guidelines
- Develop educational materials for EMS clinicians to roll out the EBG and patient care guidelines

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.

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
Slide 12
The TEP developed 9 PICO* questions based on AHRQ review + 1 re: peds analgesia via fentanyl IN

Elements of a systematic review

- Frame questions
- Involve stakeholders
- Define what is to be examined and how
- Explicit questions
- Rigorous review methods
- Transparent
- Repeatable

Systematic evaluation of evidence

To stakeholders and decision-makers using appropriate formats for different end users

Active dissemination of results

Commitment to update


Slide 13
GRADE methodology

- Grading of Recommendations, Assessment, Development, and Evaluation
- Detailed methodology, summary findings, evidence-to-decision tables presented in companion paper

Strength of recommendation on a continuum

Strong against  Conditional  Strong for

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.

Slide 14
Evidence-Based Guidelines for Prehospital Pain Management: Recommendations


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


Education offering objectives

Upon completion, each participant will do the following with a level of proficiency that meets the standards for their scope of practice:

- Identify the major recommendations of the EMS Pain Mgt Guidelines and explain their rationales.
- Safely implement EBG for pain management within their local protocols.
- Defend the need for person-centered EMS pain management based on quality evidence.

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/
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.

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.
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?

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

An excellent reference is available from UpToDate® on the differential diagnosis of nausea and vomiting (2021).

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

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

PICO #4 - Conditional Recommendation

We suggest in favor of IV NSAIDS over IV APAP for the initial mgmt of moderate to severe pain in the prehospital setting

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

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.
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

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

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

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

SE with ketamine: (dizziness, increased BP & HR)
**Slide 32**

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

We suggest either IV ketamine or IV opioids for the initial mgmt 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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**Slide 33**

**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?

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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**Slide 34**

**Ketamine brain continuum**

Dosing important!

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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**Slide 35**

**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.
Slide 36

**PICO Questions & Recommendations**

Jonathan Powell, MPA, NRP
NREMT Research Fellow

Continuing the discussion...

Slide 37

**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 mgmt., 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

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

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

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?

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

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.
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.

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

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.

- 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...

Slide 51

We don’t always follow the EVIDENCE!

Slide 52

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.

Slide 53

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

<table>
<thead>
<tr>
<th>Opioid</th>
<th>392,148 (91.5%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSAID</td>
<td>20,529 (4.8%)</td>
</tr>
<tr>
<td>Ketamine</td>
<td>16,338 (3.8%)</td>
</tr>
<tr>
<td>Acetaminophen</td>
<td>9,425 (2.2%)</td>
</tr>
</tbody>
</table>

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 54

Model EMS Protocol for Prehospital Pain Management

Individualized Multimodal Multidisciplinary

www.ihs.gov/opioids/

Not part of study - included for completeness

Slide 55

Posted on the project website at

Slide 56

GOAL

Multimodal options are used by EMS to treat pain from various etiologies in a safe and effective way based on pain severity, patient history, hemodynamic status, & choice unless interventions are contraindicated or patient refuses.

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What's in your toolbox now? What could or should be?

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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.

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.

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.
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.

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.
Not all pain scores appear accurate

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.

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.

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.
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.

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.

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.

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?
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.

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 lone 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.
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.

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.

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

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.
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)

**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

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.

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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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.
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.

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.)

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?

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