Management and Assessment of Pain in the Emergency Department

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Who am I, why do I care about pain and why do I want you to care about pain?

- Pain researcher
- Pediatric EM physician
- Former hospice and palliative care medical director
- Numerous family members and friends with chronic medical problems, mismanaged pain, and adverse events
- PI for PAMI Grant
Objectives

• Describe different types of pain and barriers to pain management in the ED setting
• Identify patient safety aspects of pain assessment and management
• Understand appropriate pain treatment strategies
• Review pain management resources
PAM is an E-Learning and patient safety educational project funded through a grant by the Florida Medical Malpractice Underwriting Association. The overall goal of PAM is to improve the safety of patients of all ages by developing tools for healthcare providers to recognize, assess, and manage acute and chronic pain in acute care settings such as the Emergency Department. The tools and resources developed are designed to be used, adapted, and implemented by any healthcare facility or agency based on their specific needs. The PAM site will also provide pain-related resources and news updates.

The aims of PAM are to:

1. Develop a state and national multidisciplinary expert panel who will create a toolkit targeting physicians, nurses, physician assistants, pharmacists, paramedics, hospital patient safety officers, risk managers, and other providers.

2. Provide comprehensive education and resources for healthcare providers to improve pain management and patient safety.

3. Facilitate collaboration and sharing of information among healthcare professionals to enhance pain assessment and management practices.

4. Promote evidence-based practices and guidelines for effective pain assessment and management.

News about Pain

- **Pain Medicine News**
  - **Novel Compound Yields Long-Acting Anesthetic Effect**
    - April 10, 2015
    - The duration of sensory blockade was significantly prolonged by a novel small sodium channel blocker that belongs to the class of paralytic shellfish toxins.
  - **Pharmacist Survey Raises Concerns for Patient Access to Generic Pain Drugs**
    - April 6, 2015
    - Ultimately patients will be impacted if pharmacists cannot afford to fill prescriptions.

- **American Academy of Pain Management**
  - **You Can Treat Fibromyalgia and Chronic Fatigue Syndrome Successfully**
    - April 6, 2015
    - By Kenneth Mukhtar, DC For many allopathic physicians, fibromyalgia and, to a somewhat lesser extent, chronic fatigue syndrome (CFS) do not fall into the allopathic practice of relying on objective.

- **The Practice of Low-Level Laser Therapy**
  - April 6, 2015
  - By Bernard E. Filner, MD
  - Low-level laser therapy (LLT) has only been used in the United States since 2002, although it has been used widely in Europe and Asia for the past several decades. I admit to...
## PAMI Modules

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PAMI Stakeholders
ED Pain Scenarios- Huge Spectrum

• A 57 yo BF with breast cancer and bone metastases is in Florida on vacation. She presents to your ED in severe pain despite trying break thru medications…..

• A 22 yo WM s/p MVC one year ago after being hit by a drunk driver presents with severe low back pain, s/p several nerve blocks and RF ablation........

• A 39 yo WF presents with RA and severe hip pain

• A 70 yo BM assaulted while walking presents with rib fractures

• A 16 yo WM with Ewings sarcoma presents with a fracture after falling

• A hysterical 2 yo BF presents with a fishing hook stuck in ear lobe after fishing with Dad

• A 20 yo BM sickle cell patient presents with 10/10 pain........

• A 40 year old attorney presents with a “migraine”, E-FORCSE indicates he has recently had RXs filled for Norco, Xanax, and valium all from different providers
How Would you Treat These Cases?
Why Don’t We Treat Pain Like Any Other Chief Complaint or Abnormal Vital Sign?

• High BP or glucose example
• Differential diagnosis
• Treatment plan
• Reassess
• Discharge plan
Did You Know That.......  

• 100 million U.S. adults are burdened by chronic pain alone.

• The **estimated annual cost of chronic pain is $600 billion**, which exceeds the cost of each of the nation’s priority health conditions and excludes acute and cancer-related pain.

• Pain is the most common reason for seeking health care, and as a presenting complaint, **accounts for 78% of visits to the ED.**

• A survey of medical schools showed students received < 10 hours of pain education. When taught, it was often in context of a general requirement and only 4% reported a required course.

• 80% of adults experience low back pain at some point in their lifetimes and LBP is most common cause of job-related disability and leading contributor to missed work days.
Pain Management and Hospital Operations

Current standards for pain management, such as the national standards outlined by The Joint Commission, require that pain is promptly addressed and managed.

In 2002, The Joint Commission developed measures for evaluating the appropriateness and effectiveness of pain management including pain assessment as a 5th vital sign and the use of a consistent rating scale. The standards require hospitals to:

- recognize the right of patients to appropriate assessment and management of pain;
- screen patients for pain during their initial assessment; and
- when clinically required, during ongoing, periodic re-assessments educate patients/families about pain management.
Pain Management and Hospital Operations

• The Hospital Quality Alliance (HQA) was developed to publicly report data on the quality of patient care in US hospitals via the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey.

• This survey includes several questions related to pain management. Therefore, patient satisfaction is tied to experiences related to pain while in the hospital setting.

• These experiences often begin in the ED as many hospital admissions originate in the ED and patients often do not distinguish this setting from inpatient care.
Results from a prospective, multicenter study of 20 hospitals found that initial ED pain assessments were common but reassessments were uncommon.

Additionally only 60% of patients in pain received analgesics and this was usually after lengthy delays.

Even more concerning was the finding that 74% of patients were discharged home in moderate to severe pain.

Challenges in the Emergency Department Management of Pain
Pain Management Challenges in the ED Setting

Under-treatment of pain, *oligoanesthesia*, continues to be a major problem in the emergency setting. Pain management practices are often inadequate due to several factors:

- failure to recognize pain or to differentiate between pain and anxiety
- pressure to see patients rapidly
- fear of creating or encouraging addiction and narcotic safety concerns
- lack of fast ED oriented assessment and management tools especially for pediatric, non-English speaking, nonverbal, elderly or cognitively impaired patients
- difficulty in coordinating pain care from the ED especially in patients with limited or no funding sources
- tendency to focus on making the *diagnosis* rather than treating or defining the pain
Sound management of pain in the ED and post-discharge is important because:
• it reduces return visits;
• expedites return to normal activities and work;
• helps reduce risk of acute pain progressing to chronic pain; and
• patients who leave the ED with pain often take 4-6 weeks to experience pain reduction after injuries yet average prescriptions are for 3-4 days and follow-up care is rarely available that quickly.

Detailed discharge instructions are a key element of reducing risk for ED patients with painful conditions and pain medication prescriptions.
Defining and Classifying Pain
Defining Pain

• Determining the context, history of present illness and type of pain is complex and time consuming but is essential to developing a successful management plan.

• There are many types of pain and factors that affect a patient’s expression of pain and response to treatment.

• Assessing and evaluating the symptom(s) of pain must be done in a systematic fashion as would be done for any other chief complaint or abnormal vital sign (i.e., hemorrhage, hypertension, etc.)
Anatomic Components of Pain Transmission

1. **Noxious Stimulus**
   - May be chemical, thermal or mechanical

2. **Peripheral Transmission**
   - Nociceptors
   - Anterolateral tract
   - Spinal cord
   - Release of Substance P in dorsal horn

3. **Release of Substance P**
   - Brainstem
   - Thalamus axons project to other areas of the brain
   - Cortical association area
   - Interpretation of pain
   - Location of pain

4. **Emotional Reactions to Pain**
   - Limbic forebrain
   - Emotional reactions to pain
Pain Versus Nociception

- **Pain** is an experience that results from brain activity in response to a noxious stimulus and includes the sensory, emotional, and cognitive processes of the brain.

- **Nociception** is the process by which information about a noxious stimulus is conveyed to the brain. It is a sum of neural activity that occurs prior to the cognitive processes that enable humans to identify a sensation as pain.

**Question to consider:**

Does an unconscious patient who appears to be clinically unresponsive to pain still need to be treated for pain?

- Yes: Treatment can help prevent sensitization of pain pathways which have been found to cause chronic pain syndromes.
Growth of the Specialty of Pain Medicine

Expanded Pain Research

New Pain Procedures
Pain

Underlying Etiology
- Nociceptive
- Inflammatory
- Neuropathic
- Psychogenic

Anatomic Location
- Somatic
- Visceral

Temporal
- Acute
- Chronic
- Acute on chronic

Intensity
- Mild
- Moderate
- Severe
• **Nociceptive Pain** is the result of direct tissue injury from a noxious stimulus. Examples include bone fracture, new surgical incision, or burn.

• **Inflammatory Pain** is the result of released inflammatory mediators that control nociceptive input and are released at sites of tissue inflammation. Examples include appendicitis, rheumatoid arthritis, and inflammatory bowel disease.

• **Neuropathic Pain** is the result of injury to nerves leading to an alteration in sensory transmission. It can be central or peripheral in nature. Examples include diabetic peripheral neuropathic pain, postherpetic neuralgia, chemotherapy induced pain, and radiculopathy.

• **Psychogenic pain**, a rare entity, is a somatic manifestation of a psychiatric illness such as depression.
  
  • A reported 30% of patients with depression complain of chronic pain that resolves with successful treatment of their depression.
  
  • This is clinically distinct from the more common situation in which the severity of experienced pain is influenced by psychological factors such as previous pain experiences, coping mechanisms, beliefs about condition or medical treatment.
Somatic
- Pain occurs from injury to skin, muscle, bone, joint, connective tissue and deep tissues
- Is also known as musculoskeletal pain
- Typically pain is well-localized, sharp and worse with movement
  Examples include lacerations, fractures, and pelvic pain.

Visceral
- Is internal pain and typically occurs from internal organs or tissues that support them
- Pain sensation is typically vague deep aches, colicky, and/or cramping
- Usually poorly localized
  Examples include appendicitis, peptic ulcer disease, diverticulitis, endometriosis, and ureteral stones.
Acute pain is defined as lasting less than 3 months.
- Examples include post-operative pain, fractured bones, appendicitis, smashing finger in door, labor pains.

Chronic pain is defined as lasting more than 3 months or beyond the expected course of an acute disease or after complete tissue healing.
- Chronic pain extends beyond the time of normal wound healing with the development of multiple neurophysiological changes.
- Examples include low back pain, neck pain, and chronic pancreatitis.

Acute on Chronic pain
- Refers to times of acute exacerbations of a chronic painful syndrome or new acute pain in a person suffering from a chronic condition.
- Examples include a sickle cell exacerbation in a patient with sickle cell disease and an abscess in a patient with SCD.
Pain assessment scores, history, and physical exam are used to determine intensity which is subjective and may vary from one provider to another.

*Remember that each scale has its own scoring range and levels for mild, moderate or severe pain intensity.*

- Multiple factors play a role in the patients’ response to pain. These factors range from age to genetics to culture.
Factors Affecting Patient Response to Pain

- Age, Gender, Ethnicity
- Socioeconomic and Psychiatric factors
- Culture and Religion
- Genetics
- Previous experiences
- Patient perceptions
- Patient expectations
- Catastrophizing

Consider the impact of age, gender and ethnicity on pain assessment and management but beware of labeling or stereotyping - treat the individual patient!
Patient **Response** to Pain and Treatment: **Genetics**

- **Genetic polymorphisms** play an integral role in how patients respond to painful stimuli and treatment.
  - For example, populations within certain ethnic groups are known to carry genetic mutations of the CYP450 enzymes in the liver responsible for drug metabolism.

- Some of these patients are “**ultra-rapid**” metabolizers of certain drugs such as codeine. This means they convert codeine to morphine more rapidly than other patients resulting in potential supra-therapeutic dosing. Conversely, some patients are “**slow metabolizers**” and therefore do not efficiently metabolize codeine and thus never achieve therapeutic levels.

- Caucasian and African American populations have approximately equal proportions of fast and slow acetylators, whereas oriental groups have almost 90% fast acetylators.
Patient Perceptions

A patient’s response to pain treatment can be influenced by factors unrelated to actual pharmacological treatments. These factors include:

• Perceived effective communication with physicians and nurses by the patient

• Perceived responsiveness by the treating team

• Perceived empathy by the treating team
  • Name some ways we can show empathy
Why do we leave patients oozing in blood? What are the consequences?
Patient Expectations

• Also inquire about and consider other related events that may influence the patient’s response to pain
  • recent stressful events (death of a spouse, car accident, job loss…)
  • previous family experiences with pain (death of a grandparent with chronic disease and untreated pain)
Get the Complete Picture

It is difficult to gain a comprehensive understanding of all the factors associated with a patient’s pain in one brief encounter. For example:

• The demanding patient in bed 10 wanting pain medication for her migraine may be anxious to get home to her mother who has end-stage cancer. She has been overwhelmed balancing work, childcare and her mother’s care and appointments and forgot to refill her own maintenance medications.

• The “whiner” in bed 3 with sickle cell pain is a UF honor student who has never called 911 before for pain and accidently left his medications in his dorm room while on a weekend visit home from college.

• The back pain patient you are seeing tried to get an appointment with his primary care doctor all week and has an important project due for work. He sustained a back injury 3 months ago in a motor vehicle accident. He was hit by a drunk driver with no insurance.
Components of the Pain History
Pain History Elements and Questions

Essential elements should include a detailed history of the current pain and, for those that suffer from chronic pain, their previous pain history.

Important elements to ask about include:

Basics
1. Onset of recent pain,
2. Aggravating and alleviating factors (is the pain better or worse with...)
3. Quality of pain experience,
4. Location of pain,
5. Severity of pain, and
6. Circumstances of original pain.

Functionality
1. How is pain affecting current level of function?
2. Is patient working?
3. How is patient coping with pain?
Pain History Elements and Questions

Additional important elements to ask about include:

**Co-morbidities**
1. Significant past medical and/or surgical history
2. Chronic diseases (obesity, hypertension, diabetes, etc.)
3. Psychosocial and/or psychiatric co-morbidities
4. Family history of substance abuse

**Psychosocial and psychiatric**
1. Depression
2. Suicidal ideation or past suicide attempts
3. Past psychiatric admissions
4. Physical, sexual and/or emotional abuse.

Consider using the mnemonics **OPQRST, SOCRATES and QISS TAPED** to assess pain.

Psychogenic pain and malingering are diagnoses of exclusion.
There are numerous mnemonics on how to obtain pain history: **OPQRST, SOCRATES** and **QISS TAPED**:

**OPQRST:**

**O – Onset of event**
- What was the patient doing when it started? Were they active, inactive, and or stressed?
- Did that specific activity prompt or start the onset of pain?
- Was onset of pain sudden, gradual or part of an ongoing chronic problem?

**P - Provocation and palliation of symptoms**
- Is the pain better or worse with:
  - **Activity.** Does walking, standing, lifting, twisting, reading, etc... have any effect of the pain?
  - **Position.** Which position causes or relieves pain? Provide examples to the patient-- sitting, standing, supine, lateral, etc...
  - **Adjuvant.** Which type of medication relieves the pain (Tylenol, Ibuprofen, etc.. )? Does the use of heat or ice packs alleviate pain? What type of alternative therapy (massage, acupuncture) have you used before?
  - Does any movement, pressure (such as **palpation**) or other external factor make the problem better or worse? This can also include whether the symptoms relieve with rest.
OPQRST continued

Q – Quality
- Ask the patient to describe the quality of pain – is it throbbing, dull, aching, burning, sharp, crushing, shooting, etc…?
- Questions can be open ended "Can you describe it for me?" or leading
- Ideally, this will elicit descriptions of the patient's pain: whether it is sharp, dull, crushing, burning, tearing, or some other feeling, along with the pattern, such as intermittent, constant, or throbbing.

R - Region and radiation. Identify the location of pain
- Where pain is on the body and whether it radiates (extends) or moves to any other area? Referred pain can provide clues to underlying medical causes.
- Location: body diagrams may help patients illustrate the distribution of their pain.
- Dermatome map – may help determine the relationship between sensory location of pain and spinal nerve segment (see figure next slide).
- Referred vs Localized: referred pain (also known as reflective pain) is feeling pain in a location other than the original site of the painful stimulus. Localized pain is when pain typically stays in one location and does not spread.
OPQRST continued

S – Severity

- Ask the patient to describe the intensity of pain at baseline and during acute exacerbations.
- The pain score (usually on a scale of 0 to 10) where Zero is no pain and Ten is the worst possible pain. This can be comparative (such as "... compared to the worst pain you have ever experienced") or imaginative ("... compared to having your arm ripped off by a bear"). If the pain is compared to a prior event, the nature of that event may be a follow-up question.

T – Timing (history)

- Identify when the pain started, under what circumstances, duration, onset (sudden/gradual), frequency, whether acute/chronic.
- How long the condition has been going on and how it has changed since onset (better, worse, different symptoms)?
- Whether it has ever happened before, and how it may have changed since onset, and when the pain stopped if it is no longer currently being felt?
Pain Assessment: SOCRATES

The second pain history assessment that will be reviewed is SOCRATES:

S - Site - Where is the pain? Or the maximal site of the pain.
O - Onset - When did the pain start, and was it sudden or gradual? Include also whether if it is progressive or regressive.
C - Character - What is the pain like? An ache? Stabbing?
R - Radiation - Does the pain radiate anywhere? (See also Radiation.)
A - Associations - Any other signs or symptoms associated with the pain?
T - Time course - Does the pain follow any pattern?
E - Exacerbating/Relieving factors - Does anything change the pain?
S - Severity - How bad is the pain?
QISS TAPED:  
a mnemonic for pain history, assessment and exam

- **Q**uality
- **I**mpact
- **S**ite
- **S**everity
- **T**emporal
- **A**ggravating and alleviating
- **P**ast response and preferences
- **E**xpectations and goals
- **D**iagnostics and physical exam

<table>
<thead>
<tr>
<th>Q</th>
<th>Quality</th>
<th>What were your first symptoms? What words would you use to describe the pain? (achy, sharp, burning, squeezing, dull, icy, etc...) Besides sensations you consider to be &quot;pain,&quot; are there other unusual sensations, such as numbness?</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Impact</td>
<td>How does the pain affect you? How does the pain impact your sleep, activity, mood, appetite (other - work, relationships, exercise, etc.) What does the pain prevent you from doing? (Depression screen) Do you feel sad or blue? Do you cry often? Is there loss of interest in life? Decreased or increased appetite? (Anxiety screen) Do you feel stressed or nervous? Have you been particularly anxious about anything? Do you startle easily?</td>
</tr>
<tr>
<td>S</td>
<td>Site</td>
<td>Show me where you feel the pain. Can you put your finger/hand on it? Or show me on a body map? Does the pain move/radiate anywhere? Has the location changed over time?</td>
</tr>
<tr>
<td>S</td>
<td>Severity</td>
<td>On a 0-10 scale with 0 = no pain and 10 = the worst pain imaginable, how much pain are you in right now? What is the least pain you have had in the past (24 hours, one week, month)? What is the worst pain you have had in the past (24 hours, one week, month)? How often are you in severe pain? (hours in a day, days a week you have pain)?</td>
</tr>
<tr>
<td>T</td>
<td>Temporal Characteristics</td>
<td>When did the pain start? Was it sudden? Gradual? Was there a clear triggering event? Is the pain constant or intermittent? Does it come spontaneously or is it provoked? Is there a predictable pattern? (e.g., always worst in the morning or in the evening? Does it suddenly flare up?)</td>
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</tr>
<tr>
<td>A</td>
<td>Aggravating and Alleviating Factors</td>
<td>What makes the pain better? What makes the pain worse? When do you get the best relief? How much relief do you get? How long does it last?</td>
</tr>
<tr>
<td>P</td>
<td>Past Response, Preferences</td>
<td>How have you managed your pain in the past? (Ask about both drug and non-drug methods) What helped? What did not help? (Be specific about drug trials - how much and how long?) What medications have you tried? Was the dose increased until you had pain relief or side effects? How long did you take the drug? Are there any pain medicines that have caused you an allergic or other bad reaction? How do you feel about taking medications? Have you tried physical or occupational therapy? What was done? Was it helpful? Have you tried spinal or other injections for pain treatment? What was done? Was it helpful?</td>
</tr>
<tr>
<td>E</td>
<td>Expectations, Goals, Meaning</td>
<td>What do you think is causing the pain? How may we help you? What do you think we should do to treat your pain? What do you hope the treatment will accomplish? What do you want to do that the pain keeps you from doing? What are you most afraid of? (Uncovers specific fears, such as fear of cancer, which should be acknowledged and addressed.)</td>
</tr>
<tr>
<td>D</td>
<td>Diagnostics &amp; Physical Exam</td>
<td>Examine and inspect site Perform a systems assessment and examination as indicated Review imaging, laboratory and/or other test results as indicated</td>
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Pain Focused Physical Exam
# Pain Assessment: Physical Examination

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<th>General Exam</th>
<th>Example</th>
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<td><strong>Appearance</strong></td>
<td>obese, emaciated, histrionic, flat affect</td>
</tr>
<tr>
<td><strong>Posture</strong></td>
<td>splinting, scoliosis, kyphosis</td>
</tr>
<tr>
<td><strong>Gait</strong></td>
<td>antalgic, hemiparetic, using assisting devices</td>
</tr>
<tr>
<td><strong>Facial Expression</strong></td>
<td>grimacing, tense, diaphoretic, anxious</td>
</tr>
<tr>
<td><strong>Vital Signs</strong></td>
<td>sympathetic overactivity, temperature asymmetries</td>
</tr>
<tr>
<td>Examination of Painful Area</td>
<td>Example</td>
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<td>-----------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Inspection</strong></td>
<td>• Skin: color changes, hair loss, flushing, goose bumps, sweating&lt;br&gt;• Muscle: atrophy or spasm&lt;br&gt;• Edema</td>
</tr>
<tr>
<td><strong>Palpation</strong></td>
<td>• Demarcation of the painful area&lt;br&gt;• Detection of changes in pain intensity within the area&lt;br&gt;• Trigger points&lt;br&gt;• Changes in sensory or pain processing</td>
</tr>
<tr>
<td><strong>Examination of the musculoskeletal system</strong></td>
<td>• Flaccidity: extreme weakness (may be from paralysis)&lt;br&gt;• Abnormal movements: neurologic damage or impaired sense of proprioception, reduced sense of light touch&lt;br&gt;• Limit range of motion: disc disease, arthritis, pain</td>
</tr>
<tr>
<td><strong>Neurological exam</strong></td>
<td>• Cranial nerve exam&lt;br&gt;• Motor strength&lt;br&gt;• Spinal nerve function: deep tendon reflexes, pinprick, proprioception&lt;br&gt;• Coordination: Romberg’s test, toe-to-heal, finger-to-nose, rapid hand movement</td>
</tr>
</tbody>
</table>
Physical Examination **TIPS!**

Vital Signs:
- Elevations in BP and HR can occur secondary to pain and inadequate control of pain.
- Normal vital signs should not negate a patient’s reported pain.

Take cues from patient as they will often assume a position of comfort. Observe vocalizations (crying child), facial expressions, body posture and movements, and motor response (decreased movement).
- Observe physiological clues such as skin flushing, diaphoresis, along with vital signs.
- Perform a focused exam taking into account the information given by the patient. The exam should also assess the patient’s functionality.
- A sensory exam should always be conducted in patients with pain.
Pain Assessment Scales

Essential to know and understand which pain assessment tools and scales are used at your institution. **What do we use?**

- Pain scales are typically applied to all pain types. However chronic and cancer related pain may require more complex evaluation tools. Although pain is multi-factorial, the majority of pain scales assess pain **intensity**.

- There are different validated pain scales available for a variety of patient populations such as:
  - adults
  - pediatrics
  - elderly
  - non-verbal
## Examples of Pain Scales

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<th>Pain Scales</th>
<th>Verbal, Alert and Oriented</th>
<th>Non-verbal, GCS &lt;15 or Cognitive Impairment</th>
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<tr>
<td><strong>Adult</strong></td>
<td>• Numerical Rating Scale (NRS)</td>
<td>• Adult Non-Verbal Pain Scale (NVPS)</td>
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<td></td>
<td>• Defense and Veterans Pain Rating Scale (DVPRS)</td>
<td>• Assessment of Discomfort in Dementia (ADD)</td>
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<td></td>
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<td>• Behavioral Pain Scale (BPS)</td>
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<tr>
<td></td>
<td></td>
<td>• Critical-Care Observation Tool (CPOT)</td>
</tr>
<tr>
<td><strong>Pediatric</strong></td>
<td>• Wong-Baker Faces scale (ages 4 to 17 years)</td>
<td>• Neonatal Pain, Agitation, and Sedation Scale (N-PASS) (preterm and full term neonates)</td>
</tr>
<tr>
<td></td>
<td>• Numerical Rating Scale (ages 7 to 11 years)</td>
<td>• Neonatal/Infant Pain Scale (NIPS) (newborn to age 1)</td>
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<td></td>
<td></td>
<td>• Faces, Legs, Activity, Cry and Consolability (FLACC) (ages 1 to 17 years)</td>
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<td></td>
<td></td>
<td>• Children’s Hospital of Eastern Ontario Pain Scale (CHEOPS) (ages 1-7)</td>
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</table>
Pediatric or Adult: Verbal, Alert and Oriented

This is a commonly used pain scale that employs a 0-10 rating system that can be used in alert oriented adult patients.
Pediatric: Verbal, Alert and Oriented

**Wong-Baker FACES Pain Rating Scale**

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>0</td>
<td>VERY HAPPY, NO HURT</td>
</tr>
<tr>
<td>1</td>
<td>HURTS JUST A LITTLE BIT</td>
</tr>
<tr>
<td>2</td>
<td>HURTS A LITTLE MORE</td>
</tr>
<tr>
<td>3</td>
<td>HURTS EVEN MORE</td>
</tr>
<tr>
<td>4</td>
<td>HURTS A WHOLE LOT</td>
</tr>
<tr>
<td>5</td>
<td>HURTS AS MUCH AS YOU CAN IMAGINE</td>
</tr>
</tbody>
</table>

(Don’t have to be crying to feel this much pain)

Explain to the person that each face is for a person who feels happy because he has no pain (no hurt) or sad because he has some or a lot of pain. Face 0 is very happy because he doesn’t hurt at all. Face 1 hurts just a little bit. Face 2 hurts a little more. Face 3 hurts even more. Face 4 hurts a whole lot. Face 5 hurts as much as you can imagine, although you don’t have to be crying to feel this bad. Ask the person to choose the face that best describes how he is feeling.

Rating scale is recommended for persons age 3 years and older.

**Brief word instructions**: Point to each face using the words to describe the pain intensity. Ask the child to choose face that best describes own pain and record the appropriate number.

Pediatric: Non-verbal, GCS <15 or Cognitive Impairment

<table>
<thead>
<tr>
<th>CATEGORIES</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face</td>
<td>No particular expression or smile</td>
<td>Occasional grimace or frown; withdrawn, disinterested</td>
<td>Frequent to constant frown, clenched jaw, quivering chin</td>
</tr>
<tr>
<td>Legs</td>
<td>Normal position or relaxed</td>
<td>Uneasy, restless, tense</td>
<td>Kicking or legs drawn up</td>
</tr>
<tr>
<td>Activity</td>
<td>Lying quietly, normal position, moves easily</td>
<td>Squirming, shifting back and forth, tense</td>
<td>Arched, rigid, or jerking</td>
</tr>
<tr>
<td>Cry</td>
<td>No cry (awake or asleep)</td>
<td>Moans or whimpers, occasional complaint</td>
<td>Crying steadily, screams or sobs; frequent complaints</td>
</tr>
<tr>
<td>Consolability</td>
<td>Content, relaxed</td>
<td>Reassured by occasional touching, hugging, or being talked to; distractable</td>
<td>Difficult to console or comfort</td>
</tr>
</tbody>
</table>
Adult: Verbal, Alert and Oriented

Defense and Veterans Pain Rating Scale*

0: No pain
1: Hardly notice pain
2: Notice pain, does not interfere with activities
3: Sometimes distracts me
4: Distracts me, can do usual activities
5: Interrupts some activities
6: Hard to ignore, avoids usual activities
7: Focus of attention, prevents doing daily activities
8: Awful, hard to do anything
9: Can’t bear the pain, unable to do anything
10: As bad as it could be, nothing else matters

*MILDE (Green)
MILD (Green)
MODERATE (Yellow)
SEVERE (Red)

*The PMTF recommended a Department of Defense and VHA Pain Assessment Tool to improve actionable information for patient encounters across Military Treatment Facilities. (Line of Action 1, Standards and System Improvements)
Pain Assessment Using Pain Scales

• Once a pain scale is chosen, interpretation of the score is not so straightforward. There is no defined score or threshold for what score correlates to actual pain and to what intensity the pain is felt by the patient. Even using the same scale for two different patients doesn’t allow for comparison of pain intensity.

• Remember scales do not take into account:
  • patient genetics
  • past experiences
  • co-morbidities
  • other pain influencing factors

• In patients with preexisting pain determine baseline pain level.

• In a verbal adult it is best to ground the scale by providing context for the patient. For example, ask the patient at which level on the scale they would take an OTC pain medication? For those with chronic pain, what level of pain do they experience every day?

Tips
Select a scale and be consistent!
Pain Treatment Interventions

• Pharmacologic
  • Oral, IV, IN, topical, nerve blocks
  • NSAIDS
  • Opioids
  • Gabapentinoids
  • ...........................................

• Nonpharmacologic
Re-assessment of Pain
Re-assessment of Pain

• The same scale or scoring system used previously should be used on reassessment for consistency. Consider reassessing pain level 15 minutes after IV and 30 minutes after PO administration of a medication.
• All patients do not respond to identical treatment in the same manner due to genetic and other factors.
• Appropriate monitoring for respiratory depression should be used especially when using pain relievers with sedating effects.
• One of the most common mistakes made in pain management is failure of reassessment after initial triage or after an intervention. Pain should always be reassessed at time of discharge.

*The literature suggests that a 33% to 50% decrease in pain intensity is clinically meaningful from a patient's perspective and represents a reasonable standard of intervention efficacy for acute and chronic pain.*
The consequences of unrelieved acute pain are numerous and potentially serious.

Increased **mortality and morbidity** can result from unrelieved acute pain through increased oxygen demand, increased metabolic rate, cardiovascular and pulmonary complications, and impaired immune function.

The **psychological impact** of untreated pain can include post-traumatic stress disorder, anxiety, catastrophizing, and depression. Pain catastrophizing is a negative cognitive–affective response to anticipated or actual pain. It influences pain perception through alterations in anticipation of both pain and non-painful perceived threats as well as heightens emotional responses to pain.

**Chronic pain syndromes** can develop as a consequence of untreated acute pain mechanisms including spinal cord hyper-excitability.
Why is Rapid and Effective Treatment of Acute Pain Important?

Under-treatment of acute or traumatic pain may lead to:

- Autonomic instability with tachycardia, hypertension, and increased myocardial oxygen consumption
- Depression, anxiety, insomnia, irritability, or phobias
- Chronic fatigue
- Atelectasis, pneumonia, hypoxia
- Immobility with risk for DVT
- Muscle spasms
Why is Rapid and Effective Treatment of Acute Pain Important?

Clinical studies provide support of a link between **uncontrolled pain** and risk for post-traumatic stress disorder.

**Undertreated pain** may also lead to chronic pain or pain sensitization by the mechanism of neuroplasticity.

**Inadequate treatment** of pain may lead to loss of job or income and temporary disability.
Chronic Pain Syndrome

Chronic pain can affect sleep, mood, activity, and energy level.
Chronic pain has physical and psychological affects that can result in a detrimental cycle.
Overview of Stepwise Approach to Pain Management or PSA

Step 1. Situation Checkpoint
Step 2. Developmental or Cognitive Checkpoint
Step 3. Family Dynamic Checkpoint
Step 4. Facility Checkpoint
Step 5. Patient Assessment Checkpoint
Step 6. Management Checkpoint
Step 7. Monitoring & Discharge Checkpoint
Step 1: Determine the Situation: What are you trying to accomplish or treat?

- Pain only
- Pain and anxiety or agitation
- Anxiety only
- Agitation only
- Procedure that will induce pain or anxiety (PSA)
- Sedation only +/- topical, local, nonpharm intervention
- Exacerbation of a chronic pain condition
- Parents/family are a pain but patient is great

Determination accomplished after a brief history and PE or triage
Step 2: Perform a Developmental or Cognitive Checkpoint

- What is the developmental stage of patient
- Is development or cognitive level normal for age
  - Developmental delay
  - Autism
  - Special health care needs
  - Mental health
  - Recent traumatic events
  - Alzheimer's, stroke, etc.

- What are characteristics of this developmental stage in response to pain?
- How do you adapt your approach based on developmental level?
- Kids and teens don’t always follow the charts!
Step 3: Family Dynamic Checkpoint

- Who is there with the child/patient? - parents, caregiver, adult child, siblings, no one.....
- Who is the legal guardian?
- Who actually cares for the patient?
- Who do you want at the bedside?
- Culture, past experience
- What can they tolerate
- Time commitments
- Family personality
- Family stress level
A quick visual or peek in the door is invaluable. What is patient’s personality? What is caregiver’s personality? Is caregiver going to be a help or hindrance?
Step 4: Facility Checkpoint

- Staffing and setting
  - Community, rural, children’s hospital
- Experience
  - Pediatric
  - Sedation
  - Team capabilities and expertise
- Hospital policies on Pain and PSA
- Acuity of the ED
- Other priorities
- Equipment
- Monitoring
- Backup
Step 5: Patient Assessment Checkpoint

- Review risk factors from history and PE
- Genetic syndromes, sleep apnea ...
- Chronic illness
- History of failed sedation
- Psychiatric and mental considerations
- Injury severity
- Body habitus
  - Weight- ideal or real?
Step 6: Management Checkpoint: Choose Your “Recipe”

No magic recipe, must individualize and adjust “Ingredients”

Pharmacologic “ingredients”
  • Topical
  • Local anesthetics or blocks
  • Oral, nasal, IV preferred over IM/rectal for children

Non-pharmacologic “ingredients”
  • Everyone in ED needs a little child life 101 course- music, swaddling, etc
  • Engage caregivers, parents, volunteers, etc.
  • Lobby for child life specialist in your ED if ↑ pediatric volume

Usually need both pharmacological and non-pharmacological options
Step 7: Monitoring And Discharge Checkpoint

Step 7. Monitoring & Discharge Checkpoint

- Joint Commission standards
  - PSA
  - Pain management
- Document reassessments
- Patient condition at discharge or admission
  - Ambulation
  - Oral Intake
  - Following directions
Step 7: Monitoring During PSA

• Monitor vital signs **frequently** and at regular intervals especially during procedures
  • blood pressure
  • heart rate
  • respiratory rate

• Monitor **continuously:**
  • oxygen saturation (SpO2)
  • end-tidal carbon dioxide level (EtCO2) if applicable
  • cardiac rhythm

**Patient safety tip:** Complications from sedation such as respiratory depression are most likely to occur within 5 to 10 minutes after administration of IV medication and immediately after the procedure when stimuli associated with the procedure are removed. Thus, monitoring should be especially close during these periods.
Non-pharmacological Interventions

• Pain can sometimes be adequately treated using non-pharmacological options such as ice, splinting, distraction, etc.
  • Cold treatment may increase pain threshold, reduce edema, and control inflammation (ice bags/packs)
  • Elevate
  • Splint
  • Warm blankets in some chronic diseases

• Non-pharm options can be applied singly or as adjuncts along with pharmacological options.

• Outside of ED- yoga, massage, music, biofeedback, aromatherapy, pet therapy, acupuncture, TENS, etc.

• Don’t forget sprays, gels, topicals, nerve blocks
# Topical Anesthetic Overview

<table>
<thead>
<tr>
<th>Type</th>
<th>Onset</th>
<th>Ingredients</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMLA®</td>
<td>60 min</td>
<td>lidocaine 2.5% and prilocaine 2%</td>
</tr>
<tr>
<td>LMX4®</td>
<td>40 min</td>
<td>liposomal lidocaine 4%</td>
</tr>
<tr>
<td>LET</td>
<td>20 min</td>
<td>lidocaine, epinephrine, and tetracaine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(A gel form of TAC can be made by adding 150 mg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>of methylcellulose 4000 cps to 3 mL of LET</td>
</tr>
<tr>
<td></td>
<td></td>
<td>solution)</td>
</tr>
<tr>
<td>Synera®</td>
<td>20 min</td>
<td>lidocaine and tetracaine patch</td>
</tr>
<tr>
<td>Topical Anesthetic Skin Refrigerant</td>
<td>&lt; 5 min</td>
<td></td>
</tr>
<tr>
<td>(Pain Ease®):</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Safety Tip:** agents are cardiac depressants; maximum allowable safe dosage should be calculated *before* administration to avoid overdose in pediatric cases.
Tips for Selecting Pharmacological Treatments

For mild-moderate somatic-nociceptive pain consider non-opioids (acetaminophen or NSAIDs) unless contraindicated.

For intermittent or continuous moderate to severe pain not managed by nonpharmacological and/or nonopioid therapy, addition of an opioid might be indicated after weighing risks and benefits.

For neuropathic pain consider gabapentin/pregabalin, tricyclic antidepressants or serotonin-norepinephrine reuptake inhibitors. For localized pain like non-radicular sciatic pain consider topical anesthetics (EMLA cream or lidocaine patches).
Pharmacologic Pain Management

**By the Route**
- Promote use of least invasive, most effective agent
  - Oral or nasal
  - IV route is reserved for moderate to severe pain
- Avoid intramuscular and rectal routes if possible

**By the Clock**
- Promote pain relief with timely and routine dosing
- Start with dose that matches the pain assessment findings and pain score
- Titrate dose upward if relief is inadequate
- Modify intervals between doses in the presence of moderate and severe pain

**By the Child**
- Incorporates the child’s
  - Developmental status
  - Cultural influences
  - Religious beliefs
  - Personal preferences
  - Previous pain experiences

**By the Ladder**
- Originally created for guiding cancer pain treatment
- Uses a three-step ladder
- Uses least invasive administration route to provide needed analgesic
- Recommends use of adjuvants to manage side effects, minimize fear, and enhance pain relief
# Non-opioids: NSAIDs

## Non-Opioid Prescribing Guidelines

<table>
<thead>
<tr>
<th>Medication</th>
<th>Recommended Start Dose+ Adults</th>
<th>Max Daily Dose Adults</th>
<th>Recommended Start Dose Children (Age &lt;12)</th>
<th>Max Daily Dose Children</th>
<th>Common Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen (Tylenol®)</td>
<td>325 - 650 mg PO Q 4 - 6H PRN</td>
<td>4,000 mg/day</td>
<td>10 - 15 mg/kg PO Q 4H PRN</td>
<td>2,600 mg/day</td>
<td>Hepatotoxicity, Rash, Abdominal pain, Nausea, Vomiting</td>
</tr>
<tr>
<td>Ibuprofen* (Motrin®)</td>
<td>400 - 800 mg PO Q 4 - 6H PRN</td>
<td>3,200 mg/day</td>
<td>4 - 10 mg/kg PO Q 6 - 8H PRN</td>
<td>40 mg/kg/day or 2,400 mg/day</td>
<td>GI hemorrhage, Dyspepsia, Rash, Edema, Abdominal pain, Renal dysfunction, Headache</td>
</tr>
<tr>
<td>Ketorolac® (Toradol®)</td>
<td>15 - 30 mg IV Q 6H PRN</td>
<td>60-120 mg/day X 3 days</td>
<td>0.5 mg/kg/dose IM/IV Q 6H PRN</td>
<td>30 mg Q 6H x 5 days</td>
<td>Abdominal pain, Edema, Nausea, Vomiting</td>
</tr>
<tr>
<td>Naproxen* (Naprosyn®)</td>
<td>250 - 500 mg PO Q 8 - 12H PRN</td>
<td>1,500mg/day</td>
<td>5 mg/kg PO Q 12H</td>
<td>1,000 mg/day</td>
<td>Headache, Abdominal pain, Dyspepsia, Edema, GI hemorrhage</td>
</tr>
<tr>
<td>Meloxicam (Mobic®)</td>
<td>7.5 - 15 mg PO daily</td>
<td>15 mg/day</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*Consider patient’s weight, prior history, and degree of pain when selecting starting dose*
## Non-opioids: Neuropathic Agents

*Dosing may vary based on new literature, patient response, and comorbidities*

<table>
<thead>
<tr>
<th>MEDICATION</th>
<th>Recommended start dose ORAL</th>
<th>Max daily dose</th>
<th>Adverse effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amitriptyline (Elavil®)</td>
<td>25 mg QHS</td>
<td>200 mg</td>
<td>Suicidal ideation in young patients with concomitant MDD or psychiatric disorder.</td>
</tr>
<tr>
<td>Nortriptyline (Pamelor®)</td>
<td>25 mg QHS</td>
<td>150 mg</td>
<td>Anticholinergic effects</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sedation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Orthostasis</td>
</tr>
<tr>
<td>Duloxetine (Cymbalta®)</td>
<td>30 mg daily</td>
<td>60 mg/day</td>
<td>Headache</td>
</tr>
<tr>
<td>Venlafaxine (Effexor XR®)</td>
<td>37.5 mg daily</td>
<td>225 mg/day</td>
<td>Somnolence</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fatigue</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Orthostatic hypotension</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nausea</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Insomnia</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Xerostomia</td>
</tr>
<tr>
<td>Gabapentin (Neurontin®)</td>
<td>300 mg daily to TID</td>
<td>3,600 mg/day</td>
<td>Somnolence</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Seizure risk with abrupt withdrawal</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ataxia</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fatigue</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dizziness</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Peripheral edema</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Emotional distress and hostility – especially in children</td>
</tr>
<tr>
<td>Pregabalin (Lyrica®)</td>
<td>50 mg TID</td>
<td>450 mg/day</td>
<td></td>
</tr>
</tbody>
</table>
## Non-opioids: Skeletal Muscle Relaxants

<table>
<thead>
<tr>
<th>MEDICATION</th>
<th>Recommended start dose</th>
<th>Max daily dose</th>
<th>Recommended start dose</th>
<th>Max daily dose</th>
<th>Common Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ADULTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SKELETAL MUSCLE RELAXANTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cyclobenzaprine</strong></td>
<td>5 mg Q 8H PRN</td>
<td>30 mg/day</td>
<td>Not Recommended Age &lt; 15</td>
<td>30 mg/day</td>
<td>Drowsiness, dizziness, fatigue, Dry mouth (anticholinergic effects), GI upset, Headache</td>
</tr>
<tr>
<td><strong>Methocarbamol</strong></td>
<td>1 g IV/IM once or 1.5 g PO Q 6H for 48 - 72H</td>
<td>3 g/day IV/IM or 8 g/day PO</td>
<td>Not Recommended Age &lt; 16</td>
<td>8 g/day</td>
<td>Drowsiness, dizziness, vertigo, confusion, Amnesia</td>
</tr>
<tr>
<td><strong>Diazepam</strong></td>
<td>5 - 10 mg IV/IM 2 - 10 mg PO Q 6 - 8H PRN</td>
<td>40 mg/day</td>
<td>Not Recommended Age &lt; 12</td>
<td>40 mg/day</td>
<td>Dependence, Headache, Drowsiness, dizziness, confusion, Ataxia, Children can experience paradoxical hyperactivity or aggression</td>
</tr>
<tr>
<td><em><em>Carisoprodol</em> (Soma®)</em>*</td>
<td>250 mg Q 8H</td>
<td>1,400 mg/day PO</td>
<td>Not Recommended Age &lt; 16</td>
<td>1,400 mg/day</td>
<td>Drowsiness, vertigo, dizziness, Active metabolite, which can add to sedation (meprobamate), Use should be limited (2-3 weeks)</td>
</tr>
</tbody>
</table>

*Addiction potential with carisoprodol usage*
Opioid Therapy

There are three classic opioid receptors which are named based on Greek letters:

• **Mu** (all opioid agonists stimulate Mu receptors)
• **Kappa**
• **Delta**

<table>
<thead>
<tr>
<th>RECEPTOR</th>
<th>CLINICAL RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mu</td>
<td><strong>Mu-1:</strong> Analgesia</td>
</tr>
<tr>
<td></td>
<td><strong>Mu-2:</strong> Respiratory depression, sedation, miosis, euphoria, cardiovascular effects, pruritus, nausea, vomiting, decreased GI motility</td>
</tr>
<tr>
<td>Kappa</td>
<td>Spinal analgesia, dysphoria, miosis, respiratory depression, dyspnea, sedation</td>
</tr>
<tr>
<td>Delta</td>
<td>Analgesia, euphoria, dysphoria</td>
</tr>
<tr>
<td>MEDICATION</td>
<td>Recommended start dose</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td></td>
<td>ADULTS</td>
</tr>
<tr>
<td></td>
<td>Oral</td>
</tr>
<tr>
<td>Morphine IR (MSIR®)</td>
<td>15 - 30 mg</td>
</tr>
<tr>
<td></td>
<td>Q 4 - 6H</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydromorphone (Dilaudid®)</td>
<td>2 - 4 mg</td>
</tr>
<tr>
<td></td>
<td>Q 4 - 6H</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrocodone/Acetaminophen (Norco®)</td>
<td>5 - 10 mg</td>
</tr>
<tr>
<td></td>
<td>Q 4 - 6H</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxycodone IR (OxyIR®) *</td>
<td>5 - 10 mg</td>
</tr>
<tr>
<td></td>
<td>Q 4 - 6H</td>
</tr>
<tr>
<td>Tramadol (Ultram®)</td>
<td>50 - 100 mg</td>
</tr>
<tr>
<td></td>
<td>Q 6H</td>
</tr>
</tbody>
</table>

*With or without 325 mg acetaminophen (Max: 4g/day of acetaminophen)
+Consider patient’s weight, prior history, and degree of pain when selecting starting dose

Common side effects:
- Nausea
- Vomiting
- Constipation
- Pruritus
- Respiratory depression
- Sedation
- Seizure risk - even at recommended doses (tramadol)
Opioid Prescribing Considerations

When switching between opioids

- Begin with a 30% lower dose than the *equi-analgesic* dose when switching medications
- Titrate to a safe/effective dose to achieve adequate response

Special populations

- Use caution in:
  - Debilitated patients
  - Renal or Hepatic impairment
  - Elderly (lower starting dose due to sensitivity)
  - Neonates and infants

- Morphine has a renally eliminated active metabolite; **avoid** or use morphine with **extreme caution** when using this medication in the above patient populations
- **Hydromorphone** may be a better choice in the setting of renal insufficiency due to its short half-life and lack of active metabolites
- Avoid meperidine as safer opioids that are equally efficacious are available. Meperidine can cause neurotoxicity and serotonin syndrome.

Tips

Avoid or limit acetaminophen content of medications when treating patients with hepatic impairment
Equianalgesic Dosing

It is important to know that equianalgesic dosing charts do **NOT** account for patient factors

| Pharmacogenomics          | • CYP enzyme up/down regulation  
<table>
<thead>
<tr>
<th></th>
<th>• Ethnic variability</th>
</tr>
</thead>
</table>
| Organ system dysfunction  | • Hepatic: avoid acetaminophen products  
|                          | • Renal: avoid morphine |
| Opiate naïve vs. opiate tolerant | • Long acting preparations may be equivalent in morphine equivalents, but may accumulate in opiate naïve patient |
| Patient preference based on medication history | • Side effect profiles may vary within the same drug class |
| Drug Interactions         | • Combining opioids with other medications may increase or decrease opioid levels |
| Contraindications due to co-morbidities | • Tramadol in seizure patients  
|                          | • Meperidine in renal failure  
|                          | • Morphine accumulation in renal dysfunction |
| Adverse effects           | • Long-acting opiates may suppress respiratory drive in patients with sleep apnea |
OPIOID CONVERSION CHART

There are differences in the literature regarding opioid conversion ratios. The conversion ratios listed below are the conversion ratios commonly used in practice at Our Lady’s Hospice and Care Services (OLH&C). The information outlined below is intended as a guide only. All medication doses derived using the information below should be checked and prescribed by an experienced practitioner. The dosage of a new opioid is based on several factors including the available equal-agonist dose data, the clinical condition of the patient, concurrent medications and patient safety. It is recommended that the new dose should be reduced by 30-50% to allow for incomplete cross-tolerance. The patient should be monitored closely until stable when switching opioid medications.

GOLDEN RULE: WHEN CHANGING FROM ONE OPIOID TO ANOTHER ALWAYS CONVERT TO MORPHINE FIRST.

<table>
<thead>
<tr>
<th>ORAL MORPHINE TO ORAL OPIOIDS</th>
<th>ORAL OPIOIDS TO PARENTERAL OPIOIDS</th>
<th>PARENTERAL MORPHINE TO OTHER OPIOIDS</th>
<th>TRANSDERMAL OPIOID TO ORAL MORPHINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO → PO RATIO</td>
<td>PO → IV/SC RATIO</td>
<td>IV/SC → IV/SC RATIO</td>
<td>TD → PO RATIO</td>
</tr>
<tr>
<td>Morphine → Oxycodone 1:5:1</td>
<td>Morphine → Morphine 2:1</td>
<td>Morphine → Oxycodone 1:5:1</td>
<td>Buprenorphine → Morphine 1:75</td>
</tr>
<tr>
<td>Morphine → Hydromorphone 5:1</td>
<td>Oxycodone → Oxycodone 2:1</td>
<td>Morphine → Hydromorphone 5:1</td>
<td>Fentanyl → Morphine 1:100</td>
</tr>
</tbody>
</table>

(Note: This table does not incorporate recommended dose reductions of 30-50%.)

<table>
<thead>
<tr>
<th>MORPHINE</th>
<th>OXYCODONE</th>
<th>HYDROMORPHONE</th>
<th>FENTANYL</th>
<th>ALFENTANIL</th>
<th>BUPRENORPHINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 hour dose</td>
<td>24 hour dose</td>
<td>24 hour dose</td>
<td>12 micrograms/hour</td>
<td>25 micrograms/hour</td>
<td></td>
</tr>
<tr>
<td>oral</td>
<td>IV/SC</td>
<td>oral</td>
<td>IV/SC</td>
<td>TRANSDERMAL</td>
<td>IV/SC</td>
</tr>
<tr>
<td>5mg</td>
<td>2.5mg</td>
<td>3.33mg</td>
<td>1.66mg</td>
<td>1mg</td>
<td>0.5mg</td>
</tr>
<tr>
<td>10mg</td>
<td>5mg</td>
<td>6.66mg</td>
<td>3.33mg</td>
<td>2mg</td>
<td>1mg</td>
</tr>
<tr>
<td>14.4mg</td>
<td>7.2mg</td>
<td>9.6mg</td>
<td>4.8mg</td>
<td>2.88mg</td>
<td>1.44mg</td>
</tr>
<tr>
<td>20mg</td>
<td>10mg</td>
<td>13.33mg</td>
<td>6.66mg</td>
<td>4mg</td>
<td>2mg</td>
</tr>
<tr>
<td>28.8mg</td>
<td>14.4mg</td>
<td>19.2mg</td>
<td>9.6mg</td>
<td>5.76mg</td>
<td>2.88mg</td>
</tr>
<tr>
<td>30mg</td>
<td>15mg</td>
<td>20mg</td>
<td>10mg</td>
<td>6mg</td>
<td>3mg</td>
</tr>
<tr>
<td>50mg</td>
<td>25mg</td>
<td>33.33mg</td>
<td>16.66mg</td>
<td>10mg</td>
<td>5mg</td>
</tr>
<tr>
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<td>40mg</td>
<td>20mg</td>
<td>12mg</td>
<td>6mg</td>
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<tr>
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<td>33.33mg</td>
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<td>24mg</td>
<td>12mg</td>
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<td>100mg</td>
<td>50mg</td>
<td>30mg</td>
<td>15mg</td>
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<td>90mg</td>
<td>120mg</td>
<td>60mg</td>
<td>36mg</td>
<td>18mg</td>
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<tr>
<td>200mg</td>
<td>100mg</td>
<td>133.33mg</td>
<td>66.66mg</td>
<td>40mg</td>
<td>20mg</td>
</tr>
<tr>
<td>240mg</td>
<td>120mg</td>
<td>160mg</td>
<td>80mg</td>
<td>48mg</td>
<td>24mg</td>
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</tbody>
</table>

*Transdermal fentanyl and buprenorphine patches are prescribed in micrograms [mcg]/hour. Equivalent doses are based on the 24 hour dose of fentanyl or buprenorphine received from a patch.

*Based on buprenorphine to morphine ratio of 1:10-60.

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Prepared August 2012
Review August 2011
Side Effects

Opioid analgesics are among the top medications associated with adverse drug events.

Side effects may include:

- Constipation
- Bowel ileus
- Central nervous system sedation
- Respiratory depression
- Dizziness
- Drowsiness (continues for the duration of medication)
- Nausea
- Urinary retention
- Itching

Over-sedation (CNS depression) and respiratory sedation can be serious side effects and may require the reversal agent naloxone.
Characteristics of patients who are at higher risk for oversedation and respiratory depression

- Sleep apnea or sleep disorder diagnosis
- Morbid obesity with high risk of sleep apnea
- Snoring
- Older age; risk is
  - 2.8 times higher for individuals aged 61-70
  - 5.4 times higher for age 71-80
  - 8.7 times higher for those over age 80
- No recent opioid use
- Post-surgery, particularly if upper abdominal or thoracic surgery
- Increased opioid dose requirement or opioid habituation
- Longer length of time receiving general anesthesia during surgery
- Receiving other sedating drugs, such as benzodiazepines, antihistamines, diphenhydramine, sedatives, or other central nervous system depressants
- Preexisting pulmonary or cardiac disease or dysfunction or major organ failure
- Thoracic or other surgical incisions that may impair breathing
- Smoker
- Congenital airway abnormalities
Opioid Induced Constipation
Opioid Induced Constipation

• A recent study reported the number of constipation-related ED visits in the U.S. increased by nearly 42% (from 2006 to 2011).

• In 2011, $1.6 billion was spent on ED care for constipation.
  • One causative factor for constipation are opioids.

• A 2015 ED study found that laxatives were not routinely prescribed to adults discharged with prescriptions for opioid pain medications and concluded that routine prescribing of laxatives may improve the safety and effectiveness of outpatient opioid pain management.

• Opioid induced constipation (OIC) is the most common side effect of opioids impacting 15-90% of patients. OIC has been associated with:
  • higher healthcare costs
  • hospital admissions and readmissions
  • longer inpatient stays

Tips

Providers must assess, treat, and educate all patients for the possible development of OIC to prevent complications.
Treatment of Opioid Induced Constipation

• The first step to managing opioid induced constipation is **Prevention**
  • Prophylactic treatment can be used in any patient regardless of opioid regimen
  • The most common prophylactic regimen consists of a stool softener and a stimulant
  • Addition of an osmotic laxative such as polyethylene glycol may be considered for patients who do not get relief with a stool softener and stimulant alone

• Non-pharmacological options include:
  • Increased exercise
  • Fluids
  • Dietary soluble fiber
  • Encourage defecation promptly after feeling the urge

The following table provides treatment options for OIC
Newer agents approved for the treatment of opioid induced constipation

• There are several new therapies available for OIC
  • Naloxegol (Movantik)- a peripheral acting mu opioid receptor antagonist
  • Methylnaltexone bromide (Relistor)- a peripheral acting mu opioid receptor antagonist
  • Lubiprostone (Amitiza)- a locally acting chloride channel activator.
Medication Safety in the Elderly

Decreased Renal Function

- Renal function may be reduced 50% or greater leading to increased risk of accumulation
- Changes in renal function may not be evident in the patients serum creatinine level due to the loss of muscle mass accompanied by aging
- Use special caution in opioid naïve patients

Medication Considerations

- Pregabalin/ gabapentin
  - Reduce dose to avoid sedation
- Anti-cholinergic
  - Avoid due to concerns of delirium
- Muscle relaxers (i.e., cyclobenzaprine)
  - Should be avoided
- Long acting benzodiazepines (i.e., diazepam)
  - Undergo hepatic oxidation which reduces with aging potentially leading to over sedation and increased fall risk.
# Inappropriate Medications in the Elderly

Table 3. Adapted from 2012 AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults

<table>
<thead>
<tr>
<th>MEDICATION</th>
<th>RECOMMENDATION AND RATIONALE</th>
</tr>
</thead>
</table>
| Meperidine                        | Avoid  
Not an effective oral analgesic in dosages commonly used; may cause neurotoxicity; safer alternatives available |
| Non-COX-selective NSAIDs (oral)   | Avoid  
Avoid Chronic use unless other alternatives are not effective and patient care can take gastroprotective agent (PPI or misoprostol). Increase risk of GI bleeding/PU in high-risk groups, including those >/=75 years old or taking oral or IV steroids, anticoagulants, or antiplatelet agents. PPIs or misoprostol reduces but does not eliminate risk |
| Indomethacin, ketorolac (Including IV) | Avoid  
Increases risk of GI bleeding/PUD in high risk groups (see above), Indomethacin has the most adverse effects |
| Pentazocine                        | Avoid  
Higher risk for CNS adverse effects such as confusion and hallucinations compared to other opioids |
| **Skeletal muscle relaxants**      | **Avoid**  
Most muscle relaxants are poorly tolerated by older adults 
Risk of anticholinergic adverse effects and sedation |
| Carisoprodol                      |                                                               |
| Chlorzoxazone                     |                                                               |
| Cyclobenzaprine                   |                                                               |
| Metaxalone                        |                                                               |
| Methocarbamol                     |                                                               |
| Orphenadrine                      |                                                               |
Pharmacologic Safety in Pediatric Patients

• Many medications are metabolized in the liver via cytochrome P450 subtypes which are not fully developed in newborns
  • Hepatic enzymes reach full maturity at varying rates but generally at 1-6 months of age
• Newborns have a higher percentage of body water compared to adults resulting in a higher volume of distribution for water soluble drugs
• Newborns also have reduced albumin which may alter drug binding in the plasma, or increased drug levels
• Glomerular filtration rates typically do not reach normal clearance rates until 2 weeks of age leading to decreased elimination of medications
• Due to immature respiratory symptoms infants may develop apnea or periodic breathing when given even small opioid doses
  • monitor frequently
Pharmacogenomic Considerations
Understanding Opioids and the Cytochrome P450 Enzyme System

• It is essential to understand that drug metabolism can be affected by the numerous pharmacogenomic variations in the patient population.

• When considering the metabolism of opioids, it is important to know which opioids undergo Phase I or Phase II metabolism.
  • For example, codeine undergoes Phase 1 metabolism and morphine undergoes Phase 2 metabolism.

<table>
<thead>
<tr>
<th>Phase I</th>
<th>Drug metabolism that occurs via CYP 450 enzymes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase II</td>
<td>Drug metabolism that occurs via conjugation</td>
</tr>
</tbody>
</table>
Key Points of Pharmacogenetics

• Realize that some patients may not achieve adequate analgesia from certain pain medications because of insufficient drug metabolism and not because they are drug seekers.

• Still others may develop symptoms of overdose even with therapeutic doses

An understanding of opioid metabolism can guide dose adjustments or the selection of a different opioid when analgesia is insufficient or adverse events are intolerable.
Prescription Drug Monitoring Programs (PDMP)

• What is a PDMP?
  • A state specific electronic database which collects data on controlled substances dispensed
  • PDMPs currently do not have interstate communication
  • PDMPs distribute data to individuals who are authorized under state law to receive the information for purposes of their profession
    • Allows for continuity of care through various healthcare settings
    • Increased patient safety
      • Provides awareness of all active controlled substance medications on file for a patient
      • Alerts prescribers to suspected “doctor shopping”
Prescription Drug Monitoring Program (PDMP)

- Florida has the Electronic-Florida Online for the Reporting of Controlled Substances Evaluation (E-FORCSE)
  - E-FORCSE can be viewed by registered healthcare providers
  - All controlled substances *dispensed* by pharmacies **MUST** be registered in database
    - Veteran’s Affairs is exempt
    - Methadone clinics are exempt
  - Pharmacies are required to submit dispensing information within a short time period. In Florida, pharmacies are required to submit information within 7 days of dispense date.

**Tips**

The PDMP is useful in verifying a patient’s current or past controlled medication regimen.
Prescription Drug Monitoring Program (PDMP)

All entries of the PDMP are in chronological order and include the following information:

1. Name of medication
2. Strength of medication
3. Prescriber’s name
4. Date medication prescribed and dispensed
5. Quantity and days supply of medication dispensed
6. Name of pharmacy that dispensed the medication
7. Number of refills prescribed
Discharge Planning, Transition to Care, Patient Safety and Risk Considerations in Pain Management
Discharge Planning

• The majority of patients treated for acute pain will go home. Ensuring their safety upon discharge is extremely important.

Consider:

• *Is it safe to discharge the patient?* For example, have the administered medications incapacitated the patient? Are they able to safely ambulate? Patients who appear intoxicated or impaired following treatment cannot be discharged on their own and must not be allowed to drive.

• *How will the patient arrive home?* Does the patient have transportation and a caregiver?

• *Has follow up been arranged if applicable?*
Caregivers and family members should be included in discharge planning as they often are dispensing medications to pediatric and elderly patients. Educate them about the prescribed medication name-- both generic and trade names-- to avoid confusion and potential duplication of medications.

When discharging or transferring patients recognize that pain medication drug levels may peak during transport times.
An important consideration is whether the patient will be able to safely take the prescribed medications at home. Patients should be educated on the proper use of their prescribed medications, potential side effects, interactions with other prescribed medications and adverse effects.

• Has the patient been advised not to:
  • drive while taking their prescribed opioid
  • combine their medication with alcohol or
  • take more than prescribed especially for acetaminophen containing products
Transition to Care-Medications

• For patients being transferred to a group setting or care facility, the receiving facility needs to know the last dose of pain medication that the patient received as well as the plan for further use.

• In Florida, there are guidelines regarding medication reconciliation in ED patients discharged to nursing homes.

Department of Elder Affairs

Completing the “Medical Certification for Nursing Facility/Home- and Community Based-Services form”

http://elderaffairs.state.fl.us/doea/cares_3008ppp.php

Institute for Healthcare Improvement

How-to Guide: Improving Transitions from the Hospital to Home Health Care to Reduce Avoidable Rehospitalizations

http://www.ihi.org/resources/Pages/Tools/HowtoGuideImprovingTransitionsfromHospitaltoHomeHealthCareReduceAvoidableHospitalizations.aspx
Access to Medication Post Discharge

• Ensure that the medications prescribed are affordable for the patient

• Consider the addition of the patients diagnosis code for narcotic prescriptions to prevent complications or delays at retail pharmacies

• Some pain medications such as oxycodone or morphine may be kept in limited quantities at retail pharmacies

• Most retail pharmacists are available to communicate with hospital staff regarding medication inventory and pricing
  • Make sure the phone number on patient prescriptions leads to an appropriate person and not a general hospital number
Recent Pain News You Need to Know

• Codeine- restrict use under age 12 years and in pregnant or nursing patients
• Benefit of NSAIDS as equal to morphine and usually with less side effects and risks in mild pain management of children (tonsillectomy, post-fracture pain)
• Prescription access issues
• Changing landscape of ketamine
• Intranasal fentanyl and ketamine
Summary
Pain is complex and multifactorial. There are several different classifications of pain depending on location and etiology.

Successful treatment of pain relies on a thorough pain history and exam, timely re-assessments, and appropriate selection of pharmacological and non-pharmacological treatment(s).

There is no test that can adequately identify or measure pain.

Chronic pain is a potential outcome of untreated acute pain.

Manage a patient’s pain in parallel with seeking a definitive diagnosis or at least while eliminating the dangerous diagnoses.

There is a time and place for opiates, but NSAIDs, regional blocks, physical therapy, repositioning and alternative therapies should all be considered.

Discharge planning must take into account several safety concerns and should be centered on patient education.
The PAMI website offers access to learning module handouts, pain tools, resources, websites, and recent pain news. We welcome your feedback on all PAMI materials and are interested in how you use them to improve patient safety and clinical care. Please email emresearch@jax.ufl.edu.

For more information please visit http://pami.emergency.med.jax.ufl.edu/
What can we do at UF Health Jacksonville to Improve Management of Pain in the ED? I need your cases and feedback!

Questions?