Pain & Pain Management

NURS 380

Objectives

At the end of this presentation, learners will be able to:

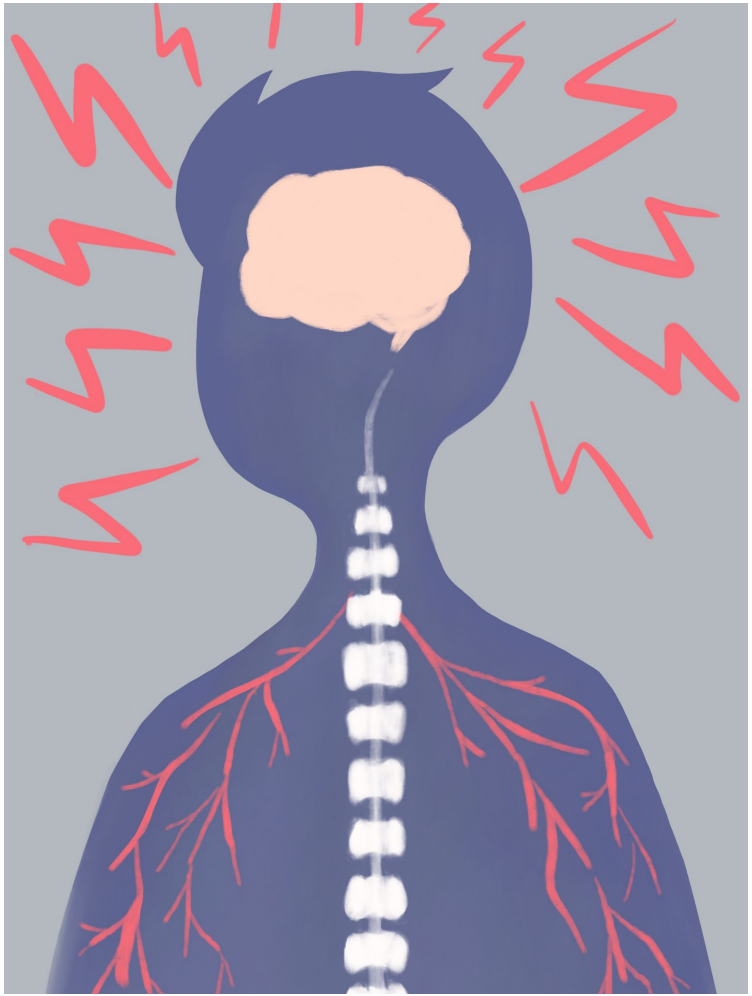
- Define pain
- Describe the types of pain
- Describe the presentation of pain commonly seen in individuals ofvarying gender, sex, race, and ethnicities
- Describe pharmacological methods to alleviate pain
- Describe non pharmacological methods to alleviate pain

We all think about pain differently

“Unpleasant experience (sensory or emotional) related to a potential or confirmed tissue damage” - IASP

“Pain is a complicated process that involves an intricate interplay of chemicals and signaling in the central nervous system.” - Sean Mackey, MD

“Whatever the experiencing person says it is, existing whenever he/she says it does.” - McCaffrey, RN



Why is Pain Bad?

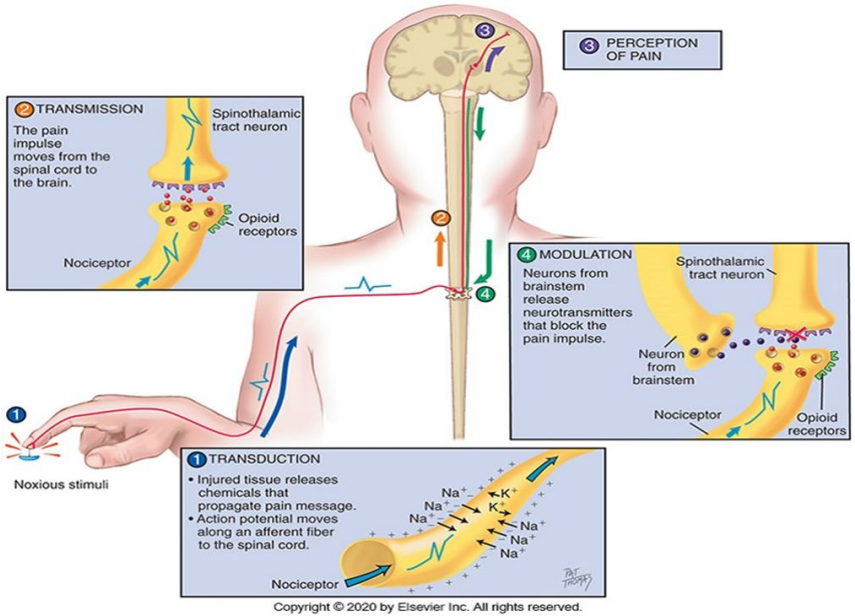
- Over 20% of US population report unrelenting chronic pain
- Over 75% of post-surgical patients report moderate to extreme pain following surgery
- Unrelieved acute pain results in increased LOS and > $230 billion/year
- Cost of chronic pain in the US between $560 and $635 billion/year

Development of Pathologic Pain

- Two main pathways
  - Nociceptive and/or neuropathic processing
- Patients present with different types of symptoms
- Accurate pain assessments important

Nociception Process

- Nociceptive pain
  - Develops when functioning and intact nerve fibers in the periphery and CNS are stimulated
- Four Phases:
  - Transduction
  - Transmission
  - Perception
  - Modulation
- Normal nociceptive processing is protective and can be a warning signal that injury is about to or has taken place
- Predictable and time limited



Neuropathic Pain

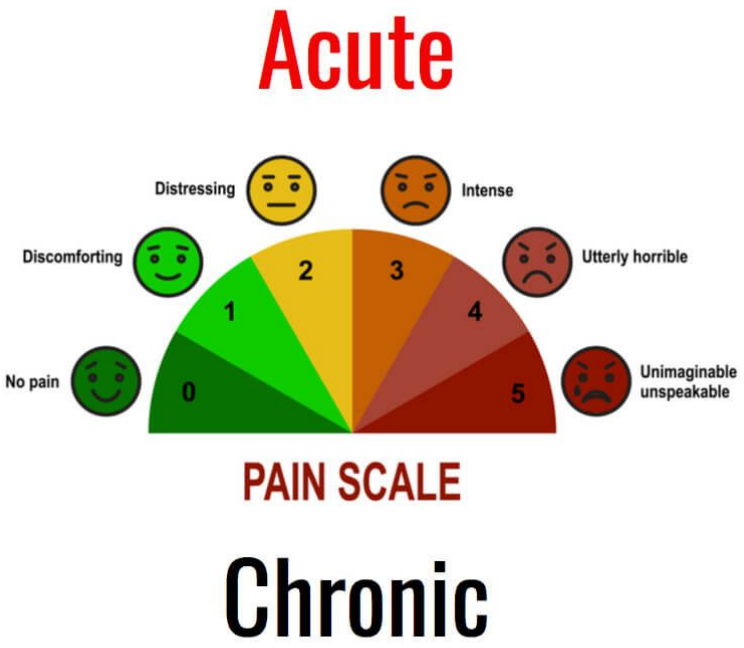
- Pain that does not adhere to typical and predictable pattern
- Due to a lesion or disease in the somatosensory system
- Very difficult to assess and treat
- Conditions that can cause neuropathic pain:
  - Diabetes
  - Herpes zoster (shingles)
  - HIV/AIDS
  - Sciatica
  - Trigeminal neuralgia
  - Phantom limb pain
  - Chemotherapy
  - Stroke
  - Multiple sclerosis

Sources of Pain

- Visceral pain
- Deep somatic pain
- Cutaneous pain
- Referred pain

Types of Pain

- Acute
  - Incident pain
  - Pathological/systemic effects?
- Persistent/Chronic
  - Malignant
  - Non-malignant
- Persistent/Chronic with Acute Episodes
- Breakthrough



Developmental & Cultural Considerations

Infants and Pain

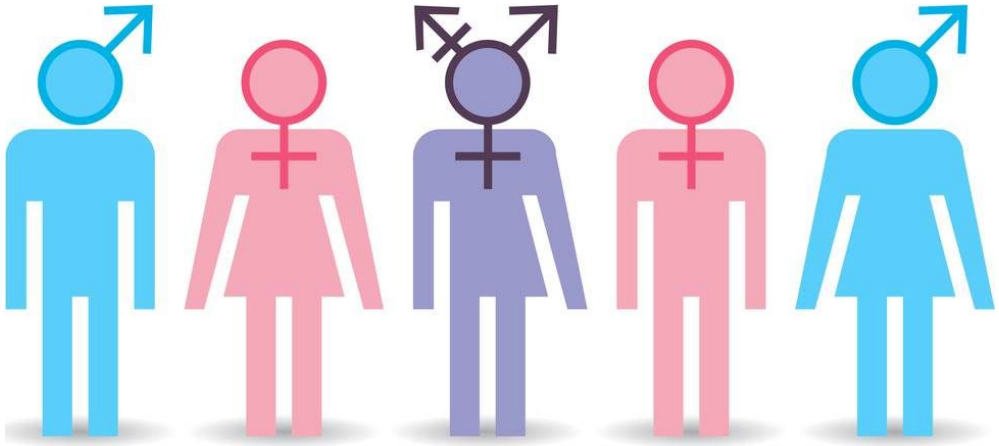
- Infants have the same capacity for pain as adults
- Fetal development
  - 20 weeks vs 30 weeks
  - Full-term vs preterm
- High risk for undertreatment of pain
- Research indicates that repetitive and poorly controlled pain in infants can result in lifelong adverse consequences

Older Adults & Pain

- Not a normal process of aging; indicates pathology or injury
- Less aggressive treatment
- Most common pain-producing conditions:
  - Arthritis
  - Osteoarthritis
  - Osteoporosis
  - PVD
  - Cancer
  - Angina
  - Chronic constipation
- Dementia and pain

Gender, Sex & Pain

- Differences influenced by societal norms, hormones, genetic makeup
- Society - men have been raised to be more stoic
- Hormonal changes strongly influence pain sensitivity for women
- Trans broken arm syndrome



Culture, Race, & Pain

- 2016: 40% of first and second year medical students held false beliefs about race and pain tolerances
- 2012: Pediatricians 22% less likely to prescribe pain medications to Black patients
- 2022: more research re: other racial and ethnic groups in US and pain management
- Fighting stereotypes and implicit biases

Pain Assessment

Pain Assessment Is Not...

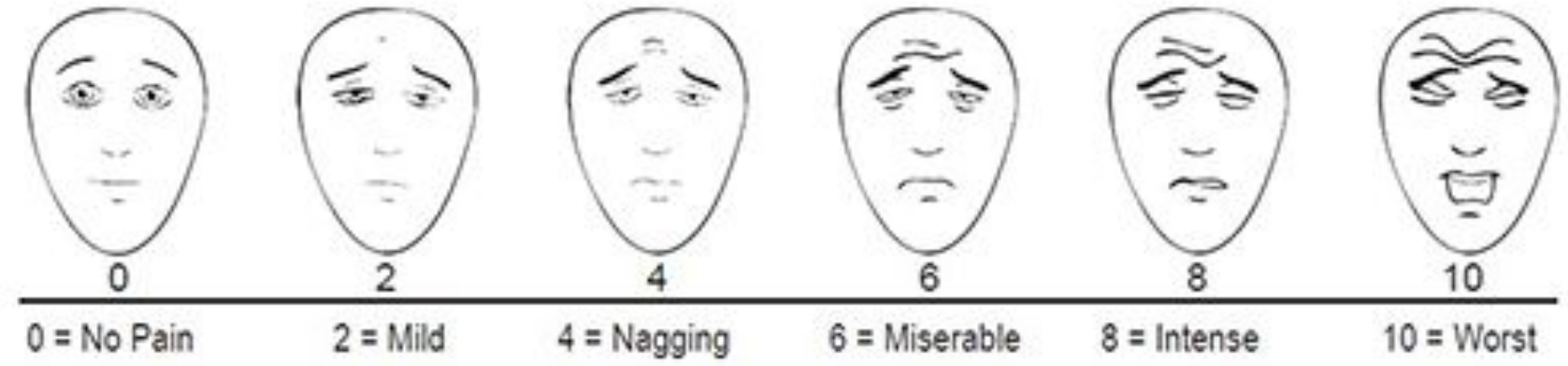
- Relying solely on changes in vital signs
- Patient “looks”
- Knowing how much a procedure should hurt
- Assuming a sleeping patient does not have pain
- “What’s your pain from 0-10?”

Pain Assessment: Subjective Data

- Pain is a subjective experience
- Self-report is the gold standard of pain assessment
- Understanding patient experiences with pain and their current expectations
- Questions:
  - Do you have pain? Where is your pain? Initiation? What does your pain feel like? How much pain do you have now? Aggravating/alleviating factors? Pain and ADLs? Pain reaction? What is your acceptable level of pain?
- Infants and Children
  - Dependent of behavioral and physiological cues

Pain Assessment: Additional Data

- Psychosocial assessment
- Personal and family history:
  - Response to analgesics
  - Substance use disorders
  - History of sexual abuse
- Comorbidities
- Anxiety/depression
- Spirituality
- Resources
- Coping



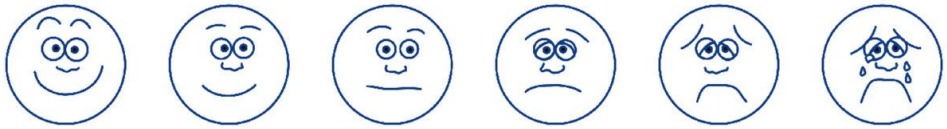
Interpreting the Behaviour Score

Each category is scored on the 0-2 scale, which results in a total score of 0-10.

0 relaxed and comfortable
1-3 mild discomfort
4-6 moderate pain
7-10 severe discomfort of pain or both

Categories	Score zero	Score one	Score two
F Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant quivering chin, clenched jaw
L Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking or legs drawn up
A Activity	Lying quietly, normal position moves easily	Squirming, shifting back and forth, tense	Arched, rigid or jerking
C Cry	No crying (awake or asleep)	Moans or whimpers, occasional complaint	Crying steadily, screams or sobs, frequent complaints
C Consolability	Content, relaxed	Reassured by occasional touching, hugging or being talked to, distractible	Difficult to console or comfort

Wong-Baker FACES™ Pain Rating Scale



Nonverbal Pain Scales
Neonatal Infant Pain Score (NIPS)

Parameter	Finding	Points
facial expression	relaxed	0
	grimace	1
cry	no cry	0
	whimper	1
	vigorous crying	2
breathing patterns	relaxed	0
	change in breathing	1
arms	restrained	0

Critical Care Pain Observation Tool

Indicator	Description	Score	
Facial expression	No muscular tension observed	Relaxed, neutral	0
	Presence of frowning, brow lowering, orbit tightening, and levator contraction	Tense	1
	All of the above facial movements plus eyelid tightly closed	Grimacing	2
Body movements	Does not move at all (does not necessarily mean absence of pain)	Absence of movements	0
	Slow, cautious movements, touching or rubbing the pain site, seeking attention through movements	Protection	1
	Pulling tube, attempting to sit up, moving limbs/ thrashing, not following commands, striking at staff, trying to climb out of bed	Restlessness	2
Muscle tension Evaluation by passive flexion and extension of upper extremities	No resistance to passive movements	Relaxed	0
	Resistance to passive movements	Tense, rigid	1
	Strong resistance to passive movements, inability to complete them	Very tense or rigid	2
Compliance with the ventilator (intubated patients)	Alarms not activated, easy ventilation	Tolerating ventilator or movement	0
	Alarms stop spontaneously	Coughing but tolerating	1
OR	Asynchrony: blocking ventilation, alarms frequently activated	Fighting ventilator	2
Vocalization (extubated patients)	Talking in normal tone or no sound	Talking in normal tone or no sound	0
	Sighing, moaning	Sighing, moaning	1
	Crying out, sobbing	Crying out, sobbing	2

Pain Assessment In Advanced Dementia (PAINAD) Scale

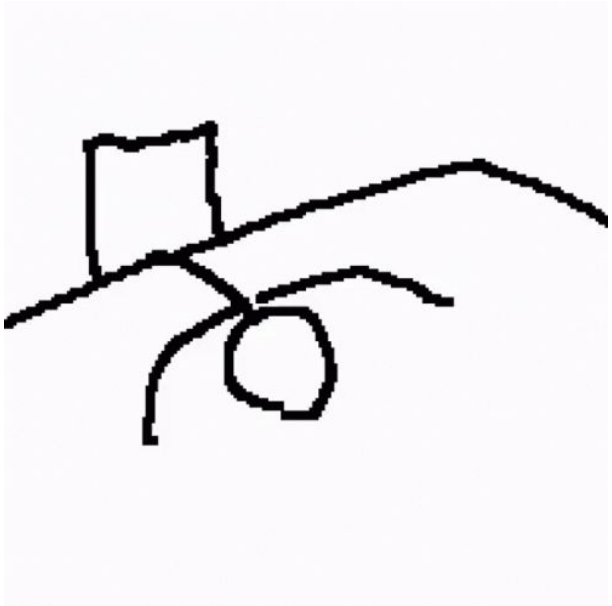
	0	1	2	Score
Breathing Independent of Vocalization	Normal	Occasional labored breathing, short period of hyperventilation	Noisy labored breathing, long period of hyperventilation, Cheyne-Stokes respirations	
Negative Vocalization	None	Occasional moan or groan, low level of speech with a negative or disapproving quality	Repeated troubled calling out, loud moaning or groaning, crying	
Facial Expression	Smiling or inexpressive	Sad, frightened, frown	Facial grimacing	
Body Language	Relaxed	Tense, distressed pacing, fidgeting	Rigid, fists clenched, knees pulled up, pulling or pushing away, striking out	
Consolability	No need to console	Distracted or reassured by voice or touch	Unable to console, distract or reassure	
			Total	

A score of 4 or greater should be reported to the RN for pain intervention.

Source: Warden V, Hurley A C, Volicer L. (2003). Development and psychometric evaluation of the Pain Assessment in Advanced Dementia (PAINAD) Scale. *Journal of the American Medical Directors Association, 4,* 9-15.

Pain Language and Behaviors

- Somatic pain
  - Superficial, raw, sharp
  - Aching, deep, dull, gnawing
  - Burning
- Visceral pain
  - Cramping, colicky
  - Squeezing, pressure
  - Throbbing
- Neuropathic pain
  - Numbness, tingling
  - Shooting, stabbing, electrical shock
  - “Strange vibrations”, “raw skin”, “crawling ants”
- Acute pain
  - Autonomic responses
  - Protective
- Chronic Pain
  - More variable
  - Adaptive responses
- Infants
  - Changes in facial activity and body movements



Challenges in Assessment

- Language barriers
- Medically complicated
- Fear, knowledge, expectations
- Prior exposure to opioids, benzodiazepines, muscle relaxants, etc
- Substance use disorder history
- Chronic pain
- “Difficult” personalities

Pharmacological Therapy

Non-Opioid Analgesics

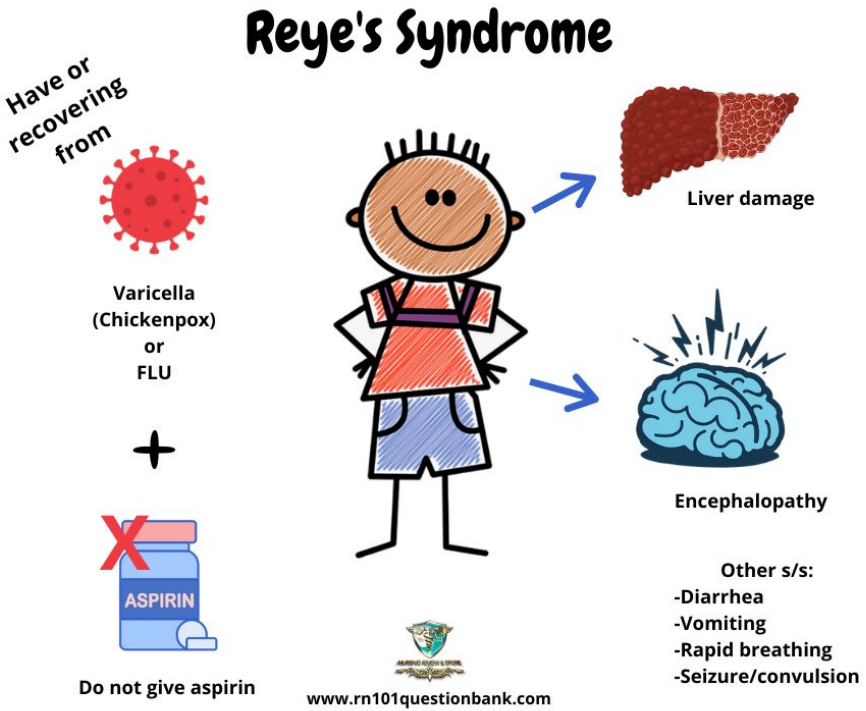
- Acetaminophen
  - Solo: mild to moderate pain
  - In conjunction with opioid analgesics: moderate to severe pain
  - Ineffective on neuropathic pain
  - Recommended dose:
    - Adult: 650-1000 mg q4-6 hours
    - Child: 15 mg/kg q6 hours
    - Max doses? Adverse effects?
- Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)
  - Mild to moderate pain
  - Pain associated with inflammation
  - Ineffective for neuropathic pain
  - **Aspirin, ibuprofen (Advil), naproxen (Aleve), celecoxib (Celebrex), ketorolac (Toradol)**
  - Recommended dose:
    - Aspirin: 325-650 mg q4-6 hours (adult), 10-15 mg/kg (child <60 kg)
    - Ibuprofen: 400mg q4-6h (adult), 5-10 mg/kg (child <60kg), 400-600 mg (child >60kg)
    - Ketorolac: 30mg q6 (adults) x 5 days, 0.25-0.5mg/kg (child <60kg) x 5 days, 15-30 mg (child >60kg) x 5 days

Stevens Johnson Syndrome

- Rare, but medical emergency
- Begins with flu-like symptoms
- Rash formation
- Blister formation
- Peeling skin

Reye's Syndrome (RS)

- Primarily affects children post viral infection
- Aspirin administration is major preventable risk factor
- Acute brain swelling and fat accumulation in liver and other organs
- Misdiagnosed often
- Symptoms: persistent vomiting, listlessness, personality changes, convulsions/seizures, loss of consciousness
- No cure/treatment: supportive care
- Recovery directly related to severity of swelling of brain and loss of organ function



Non-Opioid Analgesics

- Antidepressants
  - Effective in treating neuropathic pain
  - Prophylactic for migraines, chronic musculoskeletal pain
  - Especially effective in patients with depression as comorbidity
  - **SNRIs (duloxetine (Cymbalta) & venlafaxine (Effexor)) and TCAs (amitriptyline, nortriptyline)**
- Antiepileptic medications
  - Lower neurotransmitter release or neuronal firing
  - Effective for neuropathic pain
  - **gabapentin (Neurontin) and pregabalin (Lyrica)**
  - Recommended dose:
    - gabapentin: 300-1200 mg q8h
    - pregabalin: 300-600 mg qd

Non-Opioid Analgesics

- Local Anesthetics
  - Effective in neuropathic pain
  - **Lidocaine**
- Ketamine
  - NMDA-receptor antagonist
  - Provides analgesia without other neuro effects at low doses
  - Antidepressant effects
  - No risk for respiratory depression or hypotension
  - Psychomimetic effects - somnolence, agitation, euphoria, hallucinations
  - Recommended dosing:
    - 0.1-0.3 mg/kg/hr (8-20 mg/hour)

Opioid Analgesics

2016: “clinicians should consider opioid therapy only if expected benefits for both pain and function will outweigh risks to patient. When using opioids, it should be in combination with nonpharmacologic therapy and nonopioid pharmacologic therapy”

“...when opioids are used for acute pain, clinicians should prescribe the lowest effective dose of immediate release opioids and should prescribe no greater quantity than needed for the expected duration of pain severe enough to require opioids. Three days or less will often be efficient, more than seven days will rarely be needed.”

Opioid Analgesics

- “Gold standard” pain relief
- Various methods of administration
- Extended release vs immediate release
- Naturally occurring or synthetic
- Affinity for multiple receptors
- Diminish pain perception and alter emotional response to pain

Opioid Analgesics

- Morphine
  - Acute or chronic moderate to severe pain
  - Palliative/end-of-life care, vaso-occlusive pain during sickle cell crisis
  - Recommended dose:
    - 2-10 mg (adults), 0.02-0.03 mg/kg/hr (child <50 kg), 5-8 mg/kg bolus, 1.5 mg/kg/hr (child >50 kg)
- Fentanyl
  - Synthetic opioid
  - 50-100x more potent than morphine
  - Pain, sedation, seizure prevention
  - Dosing dependent on situation; max single dose for adults 100mcg
  - 0.5-1 mcg/kg q1-2hr, 0.5-2 mcg/kg/hr (child <50 kg), 25-50 mcg q1-2h, 25-100 mcg/hr (child > 50kg)

Opioid Analgesics

- Hydromorphone
  - Severe pain, cough suppression (off-label)
  - Recommended dose:
    - 0.2-1 mg q2-3 hours (adults)
    - 0.2 mg q2-4 hour bolus, 0.006mg/kg/hr (child <50kg)
    - 1 mg q2-4h, 0.3mg/hr (child >50kg)

Opioid Analgesics

- Methadone
  - Analgesia, manage/treat opioid use disorder (not FDA approved for neonatal abstinence syndrome)
  - Synthetic opioid agonist
  - Recommended dose:
    - Pain: 2.5 -10 mg q8h
    - Opioid use disorder: 30-40 mg/day with upward titration by 10-20 mg/week to optimal dose of 80-150 mg/day for at least 14 months
    - Withdrawal: 10-20 mg and increased by 10 mg increments until symptoms are controlled for 2-3 days, then decrease dose 10-20% daily
    - 0.1 mg/kg (child <50 kg), 5-8 mg q4-8hr (child >50kg)

Drug	Equivalent dosage of Opioids				
	Intra-venous (IV)	Oral (PO)	IV: Oral dosing ratio	Equianalgesic dose ratio with morphine	
Morphine	10 mg	30 mg	1:3	N/A	
Hydromorphone	1.5 mg	7.5 mg	1:5	IV morphine: IV hydromorphone PO morphine: PO hydromorphone	7:1 4:1
Fentanyl	0.1 mg (100 mcg)	N/A	N/A	PO morphine: IV fentanyl	300:1
Oxycodone, long acting Oxycontin	N/A	20 mg	N/A	PO morphine: PO oxycodone	1.5 :1
Oxymorphone	1 mg	10 mg	1:10	PO morphine: PO oxymorphone	3:1
Hydrocodone	N/A	30 mg	N/A	PO morphine: PO hydrocodone	1:1
Methadone*	1 mg	1 mg	1:1	PO morphine: PO methadone 1-20 mg/day 21-40 mg/day 41-60 mg/day ≥61-80 mg/day	 4:1 8:1 10:1 12:1

Table 1. Equianalgesic Dosing of Opioids: Intravenous to Oral.[3] **Methadone: conversion factor increases at higher doses*

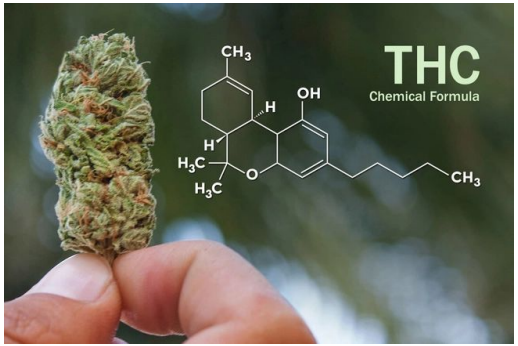
Opioid-Specific Assessments

- Respiratory system
- 4 As
  - Analgesia
  - ADLs (functionality)
  - Adverse effects
  - Aberrant drug taking
    - Use despite harm or at inappropriate times
    - Early refills
- Monitoring compliance
  - Random drug screens, documenting improved activity levels, opiate contracts

Warning Signs

- Escalating tolerance in absence of objective signs of uncontrolled pain
- Early refills
- Lost/damaged prescriptions
- Lost/stolen pills
- Doctor shopping
- Stealing drugs or prescription pads
- Forged prescriptions
- Buying uncontrolled drugs online
- Advancement to illicit substances or alcohol

Nonpharmacological Therapy and Clinical Considerations



Medical Marijuana

- Derived from cannabis sativa plant
- Contains cannabinoids
  - Delta-9 tetrahydrocannabinol (THC) and cannabidiol (CBD)
- Pharmacokinetics
- Forms
  - cannabidiol (Epidiolex), dronabinol (Marinol), dronabinol (Syndros), nabilone (Cesamet)
- Considerations
  - Sex - patients with higher estrogen levels more sensitive to THC
  - Long term exposure leads to decreased hormone production
  - CV conditions: increase in HR, decreased HRV
  - Limited studies

Nonpharmacologic Pain Management

- Hypnosis
- PT/OT
- Acupuncture
- Massage
- Hot/cold therapy
- TENS therapy/neurostimulation
- Counseling
- Music therapy
- Guided imagery
- Pet therapy
- Environmental changes




Clinical Considerations

- Give ordered meds ASAP. Know how they work and their appropriate dosing
- Range dosing
- Know what you and cannot combine

- What do you do if a patient is “drug-seeking?”
- What do you do if patient’s pain is not relieved with ordered medications?
- “Nurse dosing”
- What do you do if a provider doesn’t believe patient is in pain?
- When to withhold pain medication