PRN / Breakthrough Dosing

- PRN doses should be 10-20% of the TDD from the previous day (TDD includes scheduled **AND** PRN doses)
- PRN doses are usually given every 4 hours for most opioids; can be given every 2 hours if inadequate pain relief

Equianalgesic Dose Conversion Calculation

$$\frac{\text{Equianalgesic dose \& route from table for } \textbf{current} \text{ opioid}}{\text{Equianalgesic dose \& route from table for } \textbf{new} \text{ opioid}} = \frac{\text{Total 24 hour dose \& route for } \textbf{current} \text{ opioid}}{\text{Total 24 hour dose \& route for } \textbf{new} \text{ opioid}}$$

Example: HYDROmorphone 6 mg po q4hr to HYDROmorphone IV

1. HYDROmorphone 6 mg po q4hr = 36 mg po TDD
2. From Table I: 6 mg po = 1.5 mg IV
3. 6 mg po / 1.5 mg IV = 36 mg po TDD / x mg IV TDD
4. Answer = 9 mg IV TDD HYDROmorphone, or 1.5 mg IV q4hr
5. PRN dose calculation = 10-20% TDD, so the PRN dose is in the range of 0.9 mg to 1.8 mg IV HYDROmorphone per dose

Example: HYDROmorphone 2 mg IV q2hr to po morphine

1. HYDROmorphone 2 mg IV q2hr = 24 mg IV TDD
2. From Table I: 1.5 mg IV HYDROmorphone = 30 mg po morphine
3. 1.5 mg IV / 30 mg IV = 24 mg IV HYDROmorphone / x mg po morphine
4. Answer = 480 mg po TDD morphine
5. PRN dose calculation = 10-20% TDD, so the PRN dose is in the range of 48-96 mg po morphine

Added adjustments should be made for cross tolerance.

Treatment of Common Adverse Drug Effects in Adults

Constipation-Patients do **not** develop tolerance to constipation; therefore, all patients on opioids require **scheduled stimulant laxative +/- stool softener**

Sennosides+Docusate (Senna-S®): 2 tabs daily (MAX=4 tabs BID)
Bisacodyl (Dulcolax®): 5-15 mg PO daily OR 10 mg PR daily (MAX = 30 mg PO when complete evacuation is needed)
Polyethylene Glycol (Miralax®): 17g of powder once daily

Nausea / Vomiting‡-Tolerance usually develops in 3-5 days to n/v
Prochlorperazine 5-10 mg PO/IV/IM q4 or 6hr (MAX= 40 mg/day; rectal is usually 25 mg PR BID)
Promethazine 12.5-25 mg PO/PR/IM q4 or 6hr PRN
Metoclopramide† 5-10 mg PO/IV/IM up to 4 times a day PRN (20 mg doses may be used)
Ondansetron 4-8 mg PO/IV/IM once daily or q12hr PRN
In cases where above agents are ineffective, **droperidol** 0.625-1.25 mg IV q4hr PRN may be considered (caution: may cause prolonged QTc), or contact the pharmacist for further options

* Decreased peristalsis: **Metoclopramide** 5-10 mg PO/IV up to 4 times daily either 30 minutes before or with food

‡ PO / PR / IV / IM are all equally efficacious and route should only depend upon what is best tolerated by the patient

†Metoclopramide effective for gastric stasis-induced n/v, not prophylaxis of n/v

Pruritus-Not an immune mediated allergy (unless rash/bronchospasm/anaphylaxis)
HydrOXYzine 25-50 mg PO/IM q6 or 8hr PRN
DiphenhydrAMINE 25-50 mg PO/IV q2 or 6hr PRN (NTE 400 mg/day
Nalbuphine 2.5 mg IV q3hr PRN

Respiratory Depression-Sedation will precede respiratory depression. Attempt to stimulate patient prior to opioid reversal with naloxone.
Naloxone 0.04-0.4mg IV/IM q3min. Slowly titrate to adequate response to avoid pain or discomfort.

Table V: Common Non-Opioid Analgesic Adjuvants for Adults

Drug	Indication	Starting Dose / (Dose Range)	Clinical Considerations
Amitriptyline	Neuropathic Pain	10-25 mg po qHS (50-150 mg po qHS)	Anticholinergic side effects (drying, dizzy, constipation, urinary retention, confusion). **Avoid** in elderly.
Baclofen	Muscle spasticity	5-10 mg po TID or 4 times daily (80-120 mg po per 24hr)	Caution in renal insufficiency.
Buprenorphine Transdermal	Moderate-to-severe chronic pain	Opioid-naïve: 5mcg/hr transdermal, then titrate at a minimum interval of every 72 hr Opioid-experienced: <30mg Morphine equiv: Initial 5mcg/hr 30 – 80 mg Morphine equiv: Initial 10mcg/hr	Max 20mcg/hr transdermally. Replace patch q7 days. Opioid-experienced patient must be titrated to less than 30mg per day of oral morphine or equiv before starting transdermal therapy.
Carbamazepine	Neuropathic Pain	100 mg po BID (300 – 400 mg po BID – TID)	Monitor serum levels. Multiple drug-drug interactions.
Duloxetine	Neuropathic Pain	30 mg po once daily (60mg TDD)	Caution in hepatic impairment, elderly. **Do not use with MAOIs**. Consider lower initial dose when tolerability is a concern.
Gabapentin	Neuropathic Pain	100 mg po TID, increase by 100 mg po TID every 3 days (1800 - 3600 mg/day in 3 divided doses)	Adjust for renal dysfunction. 1800mg = minimally effective TDD
Lidocaine Patch	Herpetic Neuralgia	1 – 3 patches over painful area(s) (3 patches = max)	Apply on for 12hr, off for 12hr. Patch may be cut. Place only on intact skin.
Milnaciprin	Fibromyalgia	12.5mg po daily, titrated up over 7+ days (50-100mg po BID)	Adjust for renal dysfunction. 50mg = minimally effective TDD
Pregabalin	Neuropathic Pain	50mg TID or 75mg BID, may be increased within 1 week up to a maximum dose of 300mg/day	Adjust for renal dysfunction. 150mg = minimally effective TDD
Steroids (prednisone, dexamethasone)	Spinal cord compression, bony mets	Pred: 5-10mg po daily or BID Dex: 4-8mg po q8 or q12h; 10-20mg IV q6h	Minimize duration of high dose therapy. Dex alleviates n/v in palliative care. Dex rapid infusion can cause n/v.

Department of Pharmacy Pocket Reference for Opioid Management of Pain

UCONN HEALTH

Principles of Pain Management

- ALL OPIOIDS HAVE THE POTENTIAL TO CAUSE RESPIRATORY DEPRESSION. HAVE NALOXONE READILY AVAILABLE.
- There is **no** maximum dose of opioids. Doses should be increased to lowest effective dose until pain relief achieved or adverse drug effects are unmanageable before changing drug.
- Administer orally when possible, IV if not; IM injections have erratic absorption. Consider IV for patients reporting higher pain scores (8-10).
- Administer analgesics around the clock with additional PRN doses for breakthrough pain.
- Do not use sustained/controlled release preparations for initial therapy.
- For patients on chronic opioids, post operative pain management plan should include appropriate standing order for chronic pain control.
- Morphine is the least potent opioid with the highest histamine potential. HYDROmorphone, by any route, is more potent than morphine. Fentanyl is the most potent opioid. Dose with caution.
- Patients on chronic methadone maintenance who develop pain should continue maintenance dose with a different analgesic used for pain control; if methadone is for chronic pain syndrome, titrate standing dose according to pain and use a short-acting agent for breakthrough management.
- Patients on Suboxone® or Subutex® , both containing buprenorphine may require a pharmacy consult (even for elective surgery). Buprenorphine has a high affinity for opioid receptors so it may also block the analgesic effect of other opioids.
- Meperidine is not approved at UCHC-JDH for the treatment of pain.
- Daily physical exam should include sedation, sensory, and motor function assessment.
- Anticipate constipation will occur and prevent it.

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References Available Upon Request from Pharmacy

Table I: ADULT Opioid Equianalgesic** Chart

Drug‡	Injection (mg)	Oral (mg)	Duration of Analgesia (hr)	Onset of Action (min)	Clinical Considerations
Morphine	10	30	Oral: (IR) 3 - 4, (CR) 8 - 24	IV: 5 - 10 Oral: 15 - 30	**Avoid** in renal insufficiency, elderly (active metabolite accumulation). High-risk of histaminergic reactions. 10mg rectal suppository = 10mg PO. Do **not** crush CR form.
FentaNYL inj.	0.1 (= 100mcg)	NA	IV: 0.5 - 1	IV: 0.25 - 2	**Caution**: only use under guidance of anesthesiology or palliative care. Safe in renal insufficiency.
HYDROcodone	NA	30	Oral: 3 - 4	Oral: 10 - 20	**Caution** in renal insufficiency.
HYDROmorphone	1.5	6 - 7.5	IV and Oral: 3 - 4	IV: 5 Oral: 15 - 30	**Caution** in renal insufficiency. 3mg PR suppository = 3mg tab. 6mg conversion for chronic use.
OxyCODONE	NA	20	IR: 3 - 4 CR: 8 - 12	IR: 10 - 15 CR: 10 - 30	CR oxycodone conversion to oral morphine is 1:2 or 2:3 (20mg Oxycodone = 30mg Morphine) Use clinical judgement when converting. **Caution** in renal insufficiency. Do **not** crush CR formulations.
Methadone[Y]	2.5	5	Oral: 4 - 12	IV: 10 - 20 Oral: 30 - 60	Safe in renal insufficiency. Available in oral solution. Pharmacy pain consult recommended for conversion to Methadone from other Opioids.
NON-FORMULARY (included for completeness and conversion education):					
OxyMORPHONE	1	10	IV: 3 - 6 Oral: (IR): 4 - 6, (CR): 12	IV: 5 - 10 Oral: 30	CrCl<50 mL/min: Reduce initial dosage of oral formulations (bioavailability increased 57% to 65%). Begin therapy at lowest dose and titrate carefully.
Tapentadol	NA	100	Oral: 4 - 6	Oral: 40 - 60	**Caution** in renal insufficiency. **Avoid** in patients taking a MAOI. NTE 600mg per day.

**This chart should only be used as a guide. Individual patients will require individual dose titrations based on response. The "Equianalgesic Dose Ratio" is the ratio of the dose of two analgesic agents required to produce the same analgesic effect.

‡ *Equianalgesic dose to 10 mg IM morphine* **Y** *Methadone has a curvilinear relationship to morphine; the Equianalgesic dose ratio increases as the dose of morphine increases. For example: at oral morphine doses between 30 – 300 mg, the equianalgesic methadone dose is between 4:1 – 6:1 (morphine::methadone); at oral morphine doses >300 mg, the equianalgesic oral methadone dose is between 10:1 – 12:1 (morphine::methadone).*

Table III: PEDIATRIC† Opioid Equivalency Dosing Guidelines

Drug	Parenteral Equivalent Starting Dose	Equipotent Oral Starting Dose	Clinical Considerations / Maximal Daily Doses‡
Morphine	< 50 kg: 0.1 mg/kg q2 or 4hr ≥ 50 kg: 5-8 mg q2 or 4hr	< 50 kg: 0.3 mg/kg q3 or 4hr **[IR]** ≥ 50 kg: 15-20 mg q3 or 4hr **[IR]**	Typically not more than 5-10 mg IV or 15-30 mg oral dose used for peds > 50 kg
FentaNYL	< 50 kg: 0.5-2 mcg/kg q1 or 2hr ≥ 50 kg: 25-50 mcg q1 or 2hr	NA	**Caution:** only use under guidance of anesthesiology (risk of respiratory depression).
HYDROmorphone	< 50 kg: 0.02 mg/kg q3 or 4hr ≥ 50 kg: 1 mg q3 or 4hr	< 50 kg: 0.04-0.08 mg/kg q3 or 4hr ≥ 50 kg: 2-4 mg q3 or 4hr	NA
OxyCODONE	NA	< 50 kg: 0.1-0.2 mg/kg q3 or 4hr ≥ 50 kg: 5-10 mg q3 or 4hr	NA

Table IIIA: ADULT AND PEDIATRIC† Non-Opioid Equivalency Dosing Guidelines

Acetaminophen	<50 kg and/or 2-12yrs: 15mg/kg q6hr or 12.5mg/kg q4hr ≥ 50kg: 1000mg q6hr or 650mg q4hr	< 60 kg: 10-15 mg/kg q4 or 6hr ≥ 60 kg: 650-1000 mg q4 or 6hr	Oral: < 60 kg: 75 mg/kg NTE 3000 mg ≥ 60 kg: 3000 mg IV (only if NPO): < 50kg: 75mg/kg or 3750mg, ≥50kg: 4000mg
Ibuprofen	≥ 17yrs: 400mg to 800mg q6hr	< 60 kg: 5-10 mg/kg q6 or 8hr ≥ 60 kg: 400-600 mg q6 or 8hr	Oral: < 60 kg: 40 mg/kg NTE 2400 mg ≥ 60 kg: 3200 mg
Ketorolac	≥ 16yrs and < 50kg: 15mg q6hr ≥ 16yrs and ≥ 50kg: 30mg q6hr MAX geriatric dose = 15mg	≥ 17yrs and < 50kg : 10mg, followed by 10mg q4 or 6hr ≥ 17yrs and ≥ 50kg : 20mg, followed by 10mg q4 or 6hr	Limited studies in pediatric patients IV: NTE 120 mg/day or 5 days Geriatric IV: NTE 60mg/day or 5 days PO: NTE 40mg/day or 5 days
Naproxen	NA	< 60 kg: 5-10 mg/kg q12hr ≥ 60 kg: 220-500 mg q12hr	< 60 kg: 24 mg/kg NTE 1000 mg ≥ 60 kg: 1250 mg

†Pediatric defined as age greater than 1 year or children/adolescents (excludes neonates and infants)

Table II: Conversion of Oral & IV Morphine to Transdermal FentaNYL (TDD=Total Daily Dose)

Oral Morphine TDD (mg/day)	IV Morphine TDD (mg/day)	Transdermal FentaNYL (mcg/hr)
25	8.5	12
50	17	25
100	33	50
150	50	75
200	67	100
250	83	125
300	100	150
350	117	175
400	133	200
450	150	225
500	167	250
550	183	275
600	200	300

Transdermal fentanyl (TDF) is not recommended for acute pain, post-op pain, or opioid naïve patients. On-/offset of action is ~12-24 hours; peak effect seen in ~24-48 hours. DO NOT CUT PATCHES. Best when switching to/from TDF to adjust for cross tolerance: reduce new opioid daily dose by 25-50%. Consult pharmacy when converting from TDF to another opioid.

Table IVa: Commonly Used Adult Standard PCA Concentrations†

	Morphine	HYDROmorphone	FentaNYL*
Standard Concentrations	1 mg/ml	0.2 mg/ml	10 mcg/ml
PCA Bolus Dose	1 mg	0.2 mg	10 mcg
Lockout Time	10 - 15 min	10 - 15 min	10 - 15 min
Usual 1-hour Max Dose	25 mg	4 mg	150 mcg

Table IVb: HIGH DOSE Adult PCA Concentrations†

	Morphine High Dose	HYDROmorphone High Dose	FentaNYL High Dose*
High Dose Concentrations	5 mg/ml	1 mg/ml	50 mcg/ml
PCA Bolus Dose	5 mg	1 mg	50 mcg
Lockout Time	10 - 15 min	10 - 15 min	10 - 15 min
Usual 1-hour Max Dose	80 mg	20 mg	1300 mcg

†Consult UConn Health-JDH nursing guidelines for the current policy on a PCA administered with a basal rate.
*Sickle cell patients only per UConn Health-JDH nursing policy.
Patients treated with chronic opioids may require continuous infusion dosing. In these cases, contact the pharmacy for further guidance.