

## Sample Opioid Equianalgesic Doses

Morphine Receptor Agonist	PO/PR (mg)	SQ/IV (mg)
Hydrocodone	10	n/a
Hydromorphone	5	1
Morphine	15	5
Oxycodone	10	n/a

McPherson, ML. *Demystifying Opioid Conversion Calculations: A Guide to Effective Dosing*. American Society of Hospital Pharmacists. 2009.

### Example A: Switching from morphine 30mg PO q6h to hydromorphone PO

- 1) Calculate total daily dose of morphine:  
 $30\text{mg (q6h)} * 4 = 120\text{ mg}$
- 2) Using above chart, calculate equivalent total daily dose of hydromorphone :  
 $15/5 = 120/x; x = 40\text{ mg}$
- 3) For safety, reduce calculated equivalent daily dose of hydromorphone by 50% to accommodate individual variability and/or imprecision of calculation  
 $40\text{ mg} * 0.50 = 20\text{mg}$
- 4) Use supplemental short-acting breakthrough pain medication (e.g., morphine immediate-release 5-10 mg q3h as needed)

**ANSWER:** When switching from morphine 30mg PO q6h to hydromorphone PO, start with hydromorphone 20 mg total PO daily, divided as hydromorphone 4-6 mg PO q6h.

### Example B: Switching from morphine 30mg PO q6h to transdermal fentanyl patch q3d

- 1) Calculate 3 day amount of morphine prescribed  
 $30\text{mg (q6h)} * 4 * 3 = 360\text{ mg}$
- 2) Estimating transdermal fentanyl as approximately 100-fold more potent than oral morphine, calculate 3 day fentanyl dose requirement  
 $360\text{ mg} / 100 = 3.6\text{ mg} = 3600\text{ micrograms}$
- 3) Divide total fentanyl dose delivered over 3 days by 72 hours to yield hourly fentanyl dose  
 $3600\text{ micrograms} / 72\text{ hours} = 50\text{ micrograms / hour}$
- 3) For safety, reduce calculated equivalent hourly dose of transdermal fentanyl by 50% to accommodate individual variability and/or imprecision of calculation  
 $50\text{ micrograms / hour} * 0.50 = 25\text{ micrograms / hour}$
- 4) Use supplemental short-acting breakthrough pain medication (e.g., morphine immediate-release 5-10 mg q3h as needed)

**ANSWER:** When switching from morphine 30mg PO q6h to transdermal fentanyl q3d, start with transdermal fentanyl 25 micrograms / hour, applied q3D.

**CAUTION:** As experience with opioid rotation and morphine equivalence has grown, so has appreciation that the above equivalence calculations may not work equally well in each patient (References 1,2 below).

**Therefore, some advocate an even more cautious approach to opioid transition (Reference 3 below):**

- 1) Reduce the current dose by 10–30% while beginning the new opioid at a dose that would normally be used in an opioid-naïve patient or at the lowest available dose for the formulation.
- 2) Reduce the original total daily opioid dose by 10–25% per week while increasing the dose of the new daily opioid dose by 10–20% based on clinical need and safety.
- 3) Allow 3-4 weeks for this transition. Provide sufficient immediate-release opioid during this transition to prevent withdrawal and/or increased pain.

### References on opioid equivalence calculations including "MEDD" (Morphine Equivalent Daily Dose)

- 1) Webster LR, Fine PG. Review and critique of opioid rotation practices and associated risks of toxicity. *Pain Medicine* 2012; 13: 562-570
- 2) Fudin F, Cleary JP, Schatman ME. The MEDD myth: the impact of pseudoscience on pain research and prescribing-guideline development. *J Pain Research* 2016; 9: 153-156
- 3) Webster LR, Fine PG. Overdose deaths demand a new paradigm for opioid rotation. *Pain Medicine* 2012; 13:571-574