MED ED 101 Opioid Comparison Table – Commonly Used Medications

Drug (Links to Podcast Episodes)	Available Dosage Forms	Oral Morphine Milligram Equivalence (MME) Conversion Factor - Higher # = More Potent***	Kinetics (Oral Unless Otherwise Stated)	Relevant PGx	Miscellaneous
Codeine	Oral Liquid, Oral Tablet	0.15	Time to Peak: 60 minutes Half-Life: 3 hours	CYP2D6 Metabolism: Rapid Metabolism = High Toxicity Risk, Poor Metabolism = Decreased Analgesia	Contraindicated in children under 12 years of age. Morphine is a metabolite of codeine, so a morphine allergy equates to a codeine allergy.
Morphine	IM, IV, Oral Capsule/Tablet, Oral Solution, Rectal Suppository	1	Bioavailability: 20-30% Half-Life: 2-4 hours (IR), 15 hours (SR)	No significant gene interactions.	Excretion of metabolites is primarily renal. Morphine-6-glucuronide is the metabolite that can accumulate and cause CNS toxicity in renal failure.
Oxycodone	Oral Tablet/Capsule, Oral Solution	1.5	Bioavailability: 60-87% Half-Life: 3.5-4 hr (IR), 4.5-8 hr (ER)	CYP2D6 Metabolism (Variable Evidence): Rapid Metabolism = High Toxicity Risk, Poor Metabolism = Decreased Analgesia	Available in combinations products with acetaminophen. Oxymorphone is the more active metabolite of oxycodone.
Hydrocodone	Oral Tablet/Capsule	1	Half-Life: 3.8 hours (IR), 7-9 hours (ER)	CYP2D6 Metabolism (Variable Evidence): Rapid Metabolism = High Toxicity Risk, Poor Metabolism = Decreased Analgesia	Available in combination products with acetaminophen. Hydromorphone is the active metabolite of hydrocodone.
Hydromorphone	IV Solution, Oral Solution, Oral Tablet, Rectal Suppository	4	Bioavailability: 24% Half-Life: 2.6 hr (IR), 11 hr (ER)	No significant gene interactions. Avoids CYP metabolism pathways.	Primarily eliminated by the liver, therefore a better option in renal impairment.
Oxymorphone	Oral Tablets	3	Bioavailability: 10% Half-Life: 7.25 - 9.43 hrs	No significant gene interactions. Avoids CYP metabolism pathways.	Oral administration should be separated from food due to increase in AUC.

Methadone	IV Solution, Oral Liquid, Oral Tablet	1-20 mg/day: 4 21-40 mg/day: 8 41-60 mg/day: 10 61-80+ mg/day: 12	Bioavailability: 36-100% Half-Life: 8 to 59 hours	Metabolized by CYP3A4, CYP2B6, CYP2C19, CYP2C9, and CYP2D6. Only CYP2B6 has been shown to be clinically significant with polymorphisms, but there are many drug interactions.	Highest risk for QTc prolongation of all the opioids. Patient response and kinetics are extremely variable to methadone.
Tramadol	Oral Tablet (IR and ER), Oral Liquid	0.1	Bioavailability: ~ 75% Half-Life: 5.6-10 hrs	CYP2D6: Rapid Metabolism = Higher Risk of Toxicity, Poor Metabolism = Decreased Analgesia	Contraindicated in children under 12 years of age. Seizure risk. Serotonin risk with SNRI type activity.
Fentanyl	Transdermal Patch, Buccal Tablet, IV solution, Lozenge/Troche, Sublingual Tablet, Nasal Spray	30mg of morphine/day is approximately equivalent to 12mcg/hr patch	Patches: Tmax = 28-35 hours; Effects may last 3-4 days due to absorption through the skin. Estimated Half-Life 3-12 hours Lozenge: Half-Life = 3-6 hrs	CYP3A4 - Drug interactions exist with inhibitors and inducers, and an accumulation of fentanyl could occur with poor metabolizers though this is not mentioned in the PI or on CPIC.	Absorption affected by external heat application. The lowest patch strength is technically 12.5 mcg/hr but is designated as 12 mcg/hr to avoid possible errors with a 125 mcg/hr dose. A REMS program exists with recommendations for healthcare providers and education programs prepared by manufacturers specifically for transmucosal formulations.
Meperidine	Oral Tablet, IV Solution, Oral Solution/Syrup	0.1	Bioavailability = 50%, Half-Life = 3 to 8 hours	Metabolized by CYP3A4 and CYP2B6 - no data on difference in metabolizers, but drug interactions with CYP3A4 inducers and inhibitors (black box warning)	Contraindicated within 14 days of MAOI use. Risk of neurotoxicity and side effects such as delirium from normeperidine metabolite (generally avoided). Accumulates in poor renal function.

******Conversions are approximate and not an exact science due to variability in genetics, metabolism, age, and kinetics*** - I discuss opioid equivalencies further in this previous blog post: Opioid Equivalencies: Are They Really?