

## Calculating Oral Morphine Equivalent Daily Doses (MEDD) Using Canadian Opioid Guidelines and CDC Guidelines

This table is for calculating the oral morphine equivalent daily dose (MEDD) only. It is NOT to be used for the purposes of opioid rotation or switching. When rotating, the new dose must be lower to avoid unintentional overdose/poisoning due to incomplete cross-tolerance, individual variability in genetics, pharmacokinetic differences, etc.

<b>Opioid (doses in mg/day, except where noted)</b>	<b>To calculate oral morphine equivalent daily dose (MEDD), multiply by:</b>
Buprenorphine transdermal (in mcg/hour) <sup>a</sup>	3
Codeine	0.15
Fentanyl transdermal (in mcg/hour) <sup>b</sup>	2.4
Hydromorphone	5
Methadone	
1-20 mg/day	4
21-40 mg/day	8
41-60 mg/day	10
≥61-80 mg/day	12
Morphine	1
Oxycodone	1.5
Tapentadol	0.4
Tramadol	0.15

<sup>a</sup> For example, buprenorphine transdermal patch 5 mcg/hour q7days: Multiply by 3, for an oral morphine equivalent daily dose (MEDD) of 15 mg per day.

<sup>b</sup> For example, fentanyl transdermal patch 25 mcg/hour q72h: Multiply by 2.4, for an oral morphine equivalent daily dose (MEDD) of 60 mg per day.

# Conversion Tables from the Canadian Opioid Guidelines and CDC Guidelines

## 2017 Canadian Opioid Guidelines

Table 5: Opioid conversion table

Opioids*	To convert to oral morphine equivalent, multiply by:	To convert from oral morphine, multiply by:	50 MED equivalent dose	90 MED equivalent dose
Oral preparations (mg/d)				
Codeine	0.15 (0.1-0.2)	6.67	334 mg/d	600 mg/d
Hydromorphone	5.0	0.2	10 mg/d	18 mg/d
Morphine	1.0	1	50mg/d	90mg/d
Oxycodone	1.5	0.667	33 mg/d	60 mg/d
Tapentadol	0.3-0.4	2.5-3.33	160	300
Tramadol	0.1 -0.2	6	300	540**

\*Conversion ratios for opioids are subject to variations in kinetics governed by genetics and other drugs.  
 \*\* The maximum recommended daily dose of tramadol is 300 mg - 400 mg depending on the formulation.

## 2010 Canadian Opioid Guidelines

### 2. Equivalence between oral morphine and transdermal fentanyl:

Transdermal fentanyl*	60-134 mg morphine = 25mcg/h
	135-179 mg = 37 mcg/h
	180-224 mg = 50 mcg/h
	225-269 mg = 62 mcg/h
	270-314 mg = 75 mcg/h
	315-359 mg = 87 mcg/h
	360-404 mg = 100 mcg/h

\* Formulations include 12, 25, 50, 75 and 100 mcg/hour patches, but the 12 mcg/hour patch is generally used for dose adjustment rather than initiation of fentanyl treatment.

## CDC Guidelines

TABLE 2. Morphine milligram equivalent (MME) doses for commonly prescribed opioids

Opioid	Conversion factor*
Codeine	0.15
Fentanyl transdermal (in mcg/hr)	2.4
Hydrocodone	1
Hydromorphone	4
Methadone	
1-20 mg/day	4
21-40 mg/day	8
41-60 mg/day	10
≥61-80 mg/day	12
Morphine	1
Oxycodone	1.5
Oxymorphone	3
Tapentadol†	0.4

Source: Adapted from Von Korff M, Saunders K, Ray GT, et al. Clin J Pain 2008;24:521-7 and Washington State Interagency Guideline on Prescribing Opioids for Pain (<http://www.agencymeddirectors.wa.gov/Files/2015AMDGOpioidGuideline.pdf>).

\* Multiply the dose for each opioid by the conversion factor to determine the dose in MMEs. For example, tablets containing hydrocodone 5 mg and acetaminophen 300 mg taken four times a day would contain a total of 20 mg of hydrocodone daily, equivalent to 20 MME daily; extended-release tablets containing oxycodone 10mg and taken twice a day would contain a total of 20mg of oxycodone daily, equivalent to 30 MME daily. The following cautions should be noted: 1) All doses are in mg/day except for fentanyl, which is mcg/hr. 2) Equianalgesic dose conversions are only estimates and cannot account for individual variability in genetics and pharmacokinetics. 3) Do not use the calculated dose in MMEs to determine the doses to use when converting opioid to another; when converting opioids the new opioid is typically dosed at substantially lower than the calculated MME dose to avoid accidental overdose due to incomplete cross-tolerance and individual variability in opioid pharmacokinetics. 4) Use particular caution with methadone dose conversions because the conversion factor increases at higher doses. 5) Use particular caution with fentanyl since it is dosed in mcg/hr instead of mg/day, and its absorption is affected by heat and other factors.

† Tapentadol is a mu receptor agonist and norepinephrine reuptake inhibitor. MMEs are based on degree of mu-receptor agonist activity, but it is unknown if this drug is associated with overdose in the same dose-dependent manner as observed with medications that are solely mu receptor agonists.

### References:

Dowell D, Haegerich TM, Chou R. CDC guideline for prescribing opioids for chronic pain – United States, 2016. MMWR Recomm Rep 2016;65(1):1-49. Busse J (ed). The 2017 Canadian guideline for opioids for chronic non-cancer pain. Available online at:

<http://nationalpaincentre.mcmaster.ca/guidelines.html>

Canadian Guideline for Safe and Effective Use of Opioids for Chronic Non-Cancer Pain. Canada: National Opioid Use Guideline Group (NOUGG); 2010. Available online at: <http://nationalpaincentre.mcmaster.ca/opioid/>