

## Opioid Dose Equivalence

### Calculation of oral Morphine Equivalent Daily Dose (oMEDD)

*oMEDD (mg) = Current Opioid Dose x Conversion factor*

CURRENT OPIOID		CONVERSION FACTOR	PROPRIETARY NAMES
<b>ORAL (SWALLOWED) PREPARATIONS</b>			
<i>Note: Modified release formulations are marked MR</i>			
Morphine	mg/day	1	Anamorph, Kapanol (MR), MS Contin (MR), MS Mono (MR), Ordine, Sevredol
Oxycodone	mg/day	1.5	Endone, OxyContin (MR), OxyNorm, Targin (MR)
Hydromorphone	mg/day	5	Dilaudid, Journista (MR)
Codeine	mg/day	0.13	Aspalgin, Codalgin, Panadeine, Panadeine Forte, Mersyndol, Nurofen Plus, others
Dextropropoxyphene	mg/day	0.1	Di-Gesic, Doloxene
Tramadol	mg/day	0.2	Durotram-XR (MR) , Tramal, Tramadol SR (MR), Zydol, Zydol SR (MR), others
Tapentadol	mg/day	0.3	Palexia-SR (MR), Palexia-IR
<b>SUBLINGUAL PREPARATIONS</b>			
Buprenorphine	mg/day	40	Suboxone, Subutex, Temgesic
<b>RECTAL PREPARATION</b>			
<i>Note: Absorption from rectal administration is highly variable</i>			
Oxycodone	mg/day	1.5	Proladone
<b>TRANSDERMAL PREPARATIONS</b>			
Buprenorphine	mcg/hr	2	Norspan
Fentanyl	mcg/hr	3	Denpax, Durogesic, Dutran, Fenpatch, Fentanyl Sandoz
<b>PARENTERAL PREPARATIONS</b>			
Morphine	mg/day	3	DBL morphine sulphate injection, DBL morphine tartrate injection
Oxycodone	mg/day	3	OxyNorm FI
Hydromorphone	mg/day	15	Dilaudid FI, Dilaudid-HP FI
Codeine	mg/day	0.25	Codeine phosphate injection USP
Pethidine	mg/day	0.4	Pethidine injection BP
Fentanyl	mcg/day	0.2	DBL fentanyl injection, Sublimaze
Sufentanil	mcg/day	2	

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### Practical considerations

1. This opioid dose equivalence table is intended for comparison of different opioid and opioid formulations in individual patients or in patient cohorts.

2. Caution is required if opioid dose equivalence tables are used to guide opioid switching, as the administration of a calculated 'equivalent' dose of the replacement opioid may lead to overdosage.
3. It should be noted that there is considerable variability in pharmacokinetics and pharmacodynamics of the different opioids, within and between individual patients. In addition interactions with non-opioid drugs can strongly influence opioid pharmacokinetics.
4. Modified-release formulations can be sub-classified as delayed- or extended- release. Extended release of a drug can be achieved using sustained- or controlled-release delivery systems. When the opioid regimen includes modified- and immediate-release preparations, both should be included in calculation of the oMEDD.
5. Methadone, fentanyl lozenges and neuraxial opioids are not included in this table due to their complex and variable pharmacokinetics.
6. The conversion factors listed are derived from pooled data in the peer-reviewed literature and pharmaceutical company product information.

### **Selected references**

1. Anderson R et al. Accuracy in equianalgesic dosing: conversion dilemmas. *J Pain Sym Manage*. 2001; 21:397-406
2. Bruera E, Pereira J, Watanabe S et al. Opioid rotation in patients with cancer pain. A retrospective comparison of dose ratios between methadone, hydromorphone, and morphine. *Cancer* 1996;78(4):852-57
3. Dale O, Moksnes K, Kaasa S. European Palliative Care Research Collaborative pain guidelines: Opioid switching to improve analgesia or reduce side effects. A systematic review. *Palliative Medicine* 2011;25:494-503
4. Faculty of Pain Medicine. Principles regarding the use of opioid analgesics in patients with chronic non-cancer pain. 2015
5. Fine PG, Portenoy RK. Establishing "Best Practices" for Opioid Rotation: Conclusions of an Expert Panel. *J Pain Sym Manage* 2009;38:418-425
6. Galvez R, Schafer M, Hans G, Falke D, Steigerwald I. Tapentadol prolonged release versus strong opioids for severe, chronic low back pain: results of an open-label, phase 3b study. *Advances in Therapy* 2013; 30(3): 229-259.
7. Glare PA, Walsh TD. Dose-ranging study of oxycodone for chronic pain in advanced cancer. *J Clin Oncol*. 1993;11(5):973-8
8. Hagen NA, Babul N. Comparative clinical efficacy and safety of a novel controlled-release oxycodone formulation and controlled-release hydromorphone in the treatment of cancer pain. *Cancer*. 1997;79(7):1428-37
9. Houde R, Wallenstein S, Beaver W. Evaluation of analgesics in patients with cancer pain. *Clin Pharm*. 1966;1:59-97
10. Kalso E, Vainio A. Morphine and oxycodone hydrochloride in the management of cancer pain. *Clin Pharmacol Ther*. 1990;47(5):639-46

11. Kalso E, Vainio A et al. Morphine and oxycodone in the management of cancer pain: plasma levels determined by chemical and radioreceptor assays. *Pharmacol Toxicol.* 1990;67(4):322-28
12. Knotkova H, Fine PG, Portenoy RK. Opioid Rotation: The science and the limitations of the equianalgesic dose table. *J Pain Sym Manage* 2009;38:426-439
13. Lawal, O., et al. Assessment of a systematic framework to determine the equianalgesic conversion ratio between opioids: Determining the conversion ratio between tapentadol and morphine. *Pain Medicine (United States)* 2018; 19 (4): 869.
14. Mahler DL, Forrest WH. Relative analgesic potencies of morphine and hydromorphone in postoperative pain. *Anesthesiology* 1975;42(5):602-607
15. Mercadante S, Caraceni A. Conversion ratios for opioid switching in the treatment of cancer pain: a systematic review. *Palliative Medicine* 2011;25(5):504-515
16. Mercadante S, Porzio G, Aielli F, Adile C, Verna L, Ficarella C, Giarratano A, Casuccio A. Opioid switching from and to tapentadol extended release in cancer patients: conversion ratio with other opioids. *Current Medical Research and Opinion* 2013; 29:6, 661-666,
17. Pereira J, Lawlor P, Vigano A et al. Equianalgesic dose ratios of opioids: a critical review and proposals for long-term dosing. *J Pain Sym Manage* 2001;22:672-687
18. Sittl R, Likar R, Nautrup BP. Equipotent doses of transdermal fentanyl and transdermal buprenorphine in patients with cancer and noncancer pain: results of a retrospective cohort study. *Clin Ther.* 2005;27(2):225-37
19. Skaer TL. Dosing considerations with transdermal formulations of fentanyl and buprenorphine for the treatment of cancer pain. *J Pain Research* 2014;7:495-503
20. The Royal Australasian College of Physicians. Prescription Opioid Policy: Improving management of chronic non-malignant pain and prevention of problems associated with prescription opioid use. Sydney 2008