



[Print](#) :: [Close](#)

FAST FACTS AND CONCEPTS #36

Author(s): Robert Arnold MD and David E Weissman MD

Introduction A variety of published conversion tables exist to provide clinicians a rough guide for making calculations when switching between different opioid routes or preparations. Listed below are methods for common conversions using standard published conversion ratios. The examples assume a change in drug or route at a time of stable pain control using equianalgesic doses. See *Fast Fact #2* about conversions involving transdermal fentanyl; #75 and #86 about methadone; and #181 about oxymorphone.

Caution: Published values in equianalgesic tables should be considered a rough clinical guide when making dose conversions; substantial inter-individual variation exists. The final prescribed dose needs to take into account a patients' age, renal, pulmonary and hepatic function; their current pain level and opioid side effects such as sedation; as well as prior and current opioid use.

Opioid Equianalgesic Conversion Ratios for use with the following examples:

Morphine 10 mg parenteral = Morphine 30 mg oral = Hydromorphone 1.5 mg parenteral = Hydromorphone 7.5 mg oral (see Reference 1).

A. Change route, keeping drug the same (e.g. oral to IV morphine)

- Example: Change 90 mg q12 Extended Release Morphine to Morphine by IV continuous infusion
 1. Calculate the 24 hour current dose: 90mg q 12 = 180 mg Morphine/24 hours
 2. Use the oral to parenteral equianalgesic ratio: 30 mg PO Morphine = 10 mg IV Morphine
 3. Calculate new dose using ratios: $180/30 \times 10 = 60$ mg IV Morphine/24 hours or 2.5 mg/hour infusion
 4. Some experts recommend starting the new opioid at 75% of the calculated dose to account for inter-individual variation in first pass clearance.

B. Change drug, keep the same route (e.g. po morphine to po hydromorphone)

- There is incomplete cross-tolerance between different opioids, but the exact amount will differ. Thus, equianalgesic tables are only approximations. Depending on age and prior side effects, most experts recommend starting a new opioid at 50% of the calculated equianalgesic dose, in the setting of well-controlled pain.
 1. Example: Change 90 mg q 12 Extended Release Morphine to oral Hydromorphone.
 2. Calculate the 24 hour current dose: $90 \text{ Q12} \times 2 = 180$ mg PO Morphine/24 hrs
 3. Use the equianalgesic ratio: 30 mg PO Morphine = 7.5 mg PO Hydromorphone
 4. Calculate new dose using ratios: $180/30 \times 7.5 = 45$ mg oral Hydromorphone/24 hours.
 5. Reduce dose 50% for cross-tolerance: $45 \times 0.5 = 22$ mg/24 hours = 4 mg q4h

C. Changing drug and route (e.g. oral morphine to IV hydromorphone)

- Example: Change from 90 mg q12 Extended Release Morphine to IV Hydromorphone as a continuous infusion.
 1. Calculate the 24 hour current dose: $90 \text{ Q12} \times 2 = 180$ mg PO Morphine/24 hrs
 2. Use the equianalgesic ratio of PO to IV morphine: 30 mg po Morphine = 10 mg IV Morphine
 3. Calculate new dose using ratios: $180/30 \times 10 = 60$ mg Morphine/24 hours
 4. Use the equianalgesic ratio of IV Morphine to IV Hydromorphone: 10 mg Morphine = 1.5 mg Hydromorphone
 5. Calculate new dose using ratios: $60/10 \times 1.5 = 9$ mg IV Hydromorphone/24 hours

6. Reduce dose 50% for cross-tolerance: $9 \times 0.5 = 4.5$ mg/24 hours = 0.2 mg IV continuous infusion

References

1. Gammaitoni AR, Fine P, Alvarez N, McPherson ML. Clinical application of opioid equianalgesic data. Clin J Pain. 2003; 19:286-297.
2. Pereira J et al. Equianalgesic dose ratios for opioids: a critical review and proposals for long-term dosing. J Pain Sym Manage. 2001; 22:672-687.
3. Anderson R et al. Accuracy in equianalgesic dosing: conversion dilemmas. J Pain Sym Manage. 2001; 21:397-406.

Fast Facts and Concepts are edited by Drew A. Rosielle MD, Palliative Care Center, Medical College of Wisconsin. For more information write to: drosiell@mcw.edu. More information, as well as the complete set of Fast Facts, are available at EPERC: www.eperc.mcw.edu.

Version History: This Fast Fact was originally edited by David E Weissman MD. 2nd Edition published July 2005. Current version re-copy-edited March 2009; references updated.

Copyright/Referencing Information: Users are free to download and distribute Fast Facts for educational purposes only. Arnold R, Weissman DE. Calculating Opioid Dose Conversions, 2nd Edition. Fast Facts and Concepts. July 2005; 36. Available at: http://www.eperc.mcw.edu/fastfact/ff_036.htm.

Disclaimer: Fast Facts and Concepts provide educational information. This information is not medical advice. Health care providers should exercise their own independent clinical judgment. Some Fast Facts cite the use of a product in a dosage, for an indication, or in a manner other than that recommended in the product labeling. Accordingly, the official prescribing information should be consulted before any such product is used.

ACGME Competencies: Medical Knowledge

Keyword(s): Pain – Opioids

© 2008 Medical College of Wisconsin

Medical College of Wisconsin

8701 Watertown Plank Road, Milwaukee, WI 53226

www.mcw.edu | 414.456.8296

[Print](#) :: [Close](#)