



Eastern Metropolitan Region
Palliative Care Consortium

Opioid Conversion Ratios - Guide to Practice 2010

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INSTRUCTIONS FOR USE

Printing: It is highly recommended these guidelines are printed in colour, to aid ease of use.

The access point for the current electronic version of these guidelines is at Eastern Metropolitan Region Palliative Care Consortium www.emrpcc.org.au or Centre for Palliative Care www.centreforpallcare.org

DISCLAIMER

The information in this document is to be used as a guideline only. It is the responsibility of the user to ensure information contained in this document is used correctly. These guidelines reflect current Australian/Victorian palliative care practice and available literature at the time of the guideline release. Printed versions can only be considered up-to date for a period of one month from the printing date, after which the latest version should be downloaded from the Eastern Metropolitan Region Palliative Care Consortium website.

All medication doses derived from these guidelines should be checked and prescribed by a medical doctor with appropriate experience before administering. Medication doses should be modified in response to the patient/client's clinical situation and status, including previous exposure to opioids and concurrent medications. Adhere to all legislation and professional requirements including organisational policies and procedures regarding opioid medications and their administration.

All patients should be monitored closely until stable when commencing, adjusting dosage and/or switching opioid medications.

GENERAL NOTES

1. Where there are differences in the literature regarding opioid conversion ratios, Australian/Victorian references have been used.
2. Pethidine has not been included in this document, as its use in palliative care is not recommended.¹
3. **Allowing for Incomplete Cross-Tolerance** - When switching from one opioid to another, the new opioid may have increased potency, even if from a similar class of analgesic. Dosage of the new opioid therefore should be based upon several factors, including available equi-analgesic dose data, clinical condition of the patient, concurrent medications and patient safety. It is recommended that the new opioid dose should be reduced by 30% - 50% to allow for incomplete cross-tolerance. The patient should be monitored and assessed closely when a change is made from one opioid medication to another.^{6,7}
4. When changing from one opioid to another (when not morphine), always convert to oral morphine first. For example if converting from transdermal fentanyl to transdermal buprenorphine, first convert transdermal fentanyl to oral morphine then convert from oral morphine to transdermal buprenorphine.
5. Sufentanil has been removed from this edition. The medication is only used by specialised palliative care services as it is only available through the special access scheme.³



ORAL MORPHINE TO OTHER ORAL ANALGESICS

Oral to Oral	Conversion Ratio	Comments	Ref.
Morphine to Tramadol	1:5	Oral Morphine 10 mg = Oral Tramadol 50 mg Tramadol has a limited role in managing moderate-severe pain in palliative care. ¹	1
Morphine to Codeine	1:8	Oral Morphine 7.5 mg = Codeine 60 mg	1
Morphine to Methadone	-	CONSULTANT REQUIRED. See methadone conversion on p8 for more information.	
Morphine to Oxycodone	1.5:1	Oral Morphine 15 mg = Oral Oxycodone 10 mg	1,2,11
Morphine to Hydromorphone	5:1	Oral Morphine 5 mg = Oral Hydromorphone 1 mg If changing drugs start at ½ the conversion dose and titrate according to response. ³	1,2,3,11

ORAL OPIOIDS TO PARENTERAL OPIOIDS (SC, IV, IM) – same drug to same drug

Oral	Parenteral	Ratio	Calculation	Comments	Ref.
Morphine	Morphine	2-3:1	Oral Morphine 30 mg = Subcutaneous Morphine 10 -15 mg		1
Oxycodone	Oxycodone	2:1	Oral Oxycodone 10 mg = Subcutaneous Oxycodone 5 mg	The variability of bioavailability requires the conversion to be conservative. Titrate according to response ³	1,3,5
Hydromorphone	Hydromorphone	3:1	Oral Hydromorphone 15 mg = Subcutaneous Hydromorphone 5mg		1
Methadone	Methadone	2:1	Oral Methadone 20mg = Subcutaneous Methadone 10 mg	Consultation with a palliative care specialist or pain clinic is advised.	1,2,11
Tramadol	Tramadol	1.5:1	Oral Tramadol 150 mg = Parenteral Tramadol 100 mg	Tramadol has a limited role in managing moderate-severe pain in palliative care.	1



PARENTERAL (SC, IV, IM) MORPHINE TO OTHER PARENTERAL (SC, IV, IM) ANALGESICS

From SC, IV, IM	To SC, IV, IM	Ratio	Calculation	Comments	Ref.
Morphine	Fentanyl	100:1	Morphine 10,000 micrograms = Fentanyl 100 micrograms	Morphine 10 mg = Fentanyl 100 micrograms Morphine 100 mg = Fentanyl 1 mg (1000 micrograms)	1,2,3
Morphine	Hydromorphone	5:1	Morphine 10 mg = Hydromorphone 2 mg	Differing conversion ratios are provided in the literature depending on the duration of opioid exposure, the route of administration and the direction of the switch (Morphine : Hydromorphone or Hydromorphone : Morphine) ^{2,5,6} Close monitoring and titration for each individual is required. See General Note 3	1,2,4,5
Morphine	Tramadol	1:10	Morphine 10 mg = Tramadol 100 mg	Tramadol has a limited role in managing moderate-severe pain in palliative care.	1,2
Morphine	Oxycodone	1:1	Morphine 10 mg = Oxycodone 10 mg		1,2,5,11

PARENTERAL FENTANYL & TRANSDERMAL FENTANYL - same drug to same drug

		Ratio	Calculation	Ref.
Parenteral Fentanyl	Transdermal Fentanyl	1:1	Fentanyl 600 micrograms / 24 hours = Fentanyl patch 25 micrograms/hour	14,15,

TRANSMUCOSAL FENTANYL LOZENGES

Fentanyl lozenges offer a faster onset of relief than oral or subcutaneous morphine in breakthrough pain. Transmucosal fentanyl should only be used in patients who are already receiving opioids, and are opioid tolerant. A patient should be receiving at least 60mg of oral morphine equivalents per day, or 50 micrograms transdermal fentanyl per hour, if transmucosal fentanyl is to be considered for breakthrough pain ⁵. At present, there is no direct conversion ratio between morphine and transmucosal fentanyl.

The Manufacturer notes, National Prescribing Service website, and MIMS suggest using a titration method to arrive at the optimum dose, commencing with 200micrograms. ^{5,7,8}



TRANSDERMAL FENTANYL TO MORPHINE

Patch Strength	Dose	Parenteral Morphine equivalent (mg/24 hours)	Oral Morphine equivalent (mg/24 hours)	Break through pain management	Ref
Fentanyl Patch 12 microgram/hour	288 mcg/24 hours	10 to 15	20 to 45	5mg immediate release oral morphine 1 hourly / p.r.n.	
Fentanyl Patch 25 microgram/hour	600 mcg/24 hours	30 to 40	60 to 100*	10mg immediate release oral morphine 1 hourly / p.r.n.	1
Fentanyl Patch 50 microgram/hour	1200 mcg/24 hours	60 to 80	120 to 200*	20mg immediate release oral morphine 1 hourly / p.r.n.	1
Fentanyl Patch 75 microgram/hour	1800 mcg/24 hours	90 to 120	180 to 300	30mg immediate release oral morphine 1 hourly / p.r.n.	1
Fentanyl Patch 100 microgram/hour	2400 mcg/24 hours	120 to 160	240 to 400	40mg immediate release oral morphine 1 hourly / p.r.n.	1

*The Mims Narcotic Prescribing Guide 2009/2010, p46 gives a higher oral morphine: transdermal patch range⁵.

CONVERSION CALCULATION – TRANSDERMAL FENTANYL TO ORAL MORPHINE

Ref 1, 2, 5, 11

Transdermal fentanyl to oral morphine conversion rate = 1:100 -150

Using 25 micrograms/hour Fentanyl as example:

$$25 \text{ mcg / hour} \times 24 = 600 \text{ mcg / 24 hours}$$

$$600\text{mcg} \times 100 \text{ (conversion)} = 60\,000 \text{ micrograms morphine} = 60 \text{ mg oral morphine}$$

or

$$600\text{mcg} \times 150 \text{ (conversion)} = 90\,000 \text{ micrograms morphine} = 90 \text{ mg oral morphine}$$

- Comments
- When commencing transdermal fentanyl, peak serum concentration generally occurs between 24 and 72 hours⁵.
 - When ceasing transdermal fentanyl, there will be a therapeutic benefit for a period of time (half-life from 22 to 25 hours)⁵.
 - To ensure pain relief is maintained, carefully consider the timing of the next dose of analgesic.

INTRANASAL FENTANYL

Intranasal Fentanyl solutions are being administered in some clinical settings to provide rapid management of breakthrough pain. Use is not confined to palliative care. Fentanyl is well absorbed into the nasal mucosa with approximately 70% bioavailability. Administration is with an atomisation device. Further information is available in Therapeutic Guidelines (eTG complete) *fentanyl analogues* section. 2, 9, 10, 12



TRANSDERMAL BUPRENORPHINE to ORAL MORPHINE

Patch Strength	Delivery Rate	Conversion Ratio	Oral Morphine Dose	Parenteral morphine dose
Buprenorphine 5 mg/7 days 120 micrograms/24 hours	5 micrograms/hour	1:100	12 mg/24 hours	4 – 6 mg/24 hours
Buprenorphine 10 mg/7 days 240 micrograms/24 hours	10 micrograms/hour	1:100	24 mg/24 hours	8 – 12 mg/24 hours
Buprenorphine 20 mg/7 days 480 micrograms/24 hours	20 micrograms/hour	1:100	48 mg/24 hours	16 – 24 mg/24 hours

❖ Maximum dose of 40mcg/hour (2 x 20mcg/hour patches)^{1,3}

CONVERSION CALCULATION – TRANSDERMAL BUPRENORPHINE TO ORAL MORPHINE

Ref. 2, 11

5 mg patch = 5 micrograms buprenorphine per hour
 5 mcg x 24 = 120 micrograms over 24 hours
 120mcg buprenorphine x 100 (conversion) = 12,000mcg
 Convert 12000mcg to mg by ÷ 1000 = 12 mg oral morphine over 24 hours

CONVERSION CALCULATION – ORAL MORPHINE TO TRANSDERMAL BUPRENORPHINE

Ref.1

30 mg morphine over 24 hours:
 30 ÷ 100 (conversion) = 0.3 mg buprenorphine
 Convert 0.3mg to mcg by x 1000
 = 300 micrograms buprenorphine over 24 hours = 12.5 micrograms/hour
 Round to 10 mg buprenorphine patch

- Comment - Breakthrough pain is treated with immediate release morphine or oxycodone.
- Buprenorphine is a partial opioid receptor antagonist so withdrawal symptoms may be experienced in patients who have developed physical dependence on opioids⁷.
 - In overdose, buprenorphine is only partially reversed by naloxone.⁷
 - After removal of the buprenorphine patch, a short acting opioid should be prescribed for the initial 24 hours and a long acting opioid commenced after 24hours¹.



METHADONE

Conversion to methadone from other opioids is complex, and *should not be attempted without consultation* with a specialist experienced in the use of methadone. Consultation is of particular importance for the higher doses shaded in red below. It is *strongly* recommended that Methadone therapy be initiated in the inpatient setting where patients can be closely monitored for signs of cumulative toxicity (commonly sedation or confusion).

Methadone is lipophilic - care must be taken to avoid toxicity as it may take several days to reach steady-state plasma concentrations. Elimination half-life is lengthy and **highly variable** between individuals.

Conversion methods used by palliative care physicians **vary considerably** and there is no clear-cut evidence to support one method over another.

Conversions should be based on current daily oral morphine equivalent dosage.

Method: ^{7, 13}

1. Stop original opioid when commencing methadone.
2. Days 1 and 2 - give calculated daily dose (see table below) plus 25-50% extra (as loading, to saturate tissues), give in 4 divided doses (6 hourly). Omit loading dose in frail, elderly or in those on long-acting sedatives.
3. Days 3 and 4 – give calculated daily dose (without the loading) in 3 divided doses (8 hourly).
4. Day 5 onwards – give calculated daily dose in 2 divided doses (12 hourly).
5. Use short-acting opioids for breakthrough pain (e.g. oxycodone, morphine).

Royal Perth Methadone Conversion Protocol¹³

METHADONE CONVERSION RATIO			Ref.3,7,13
Daily oral morphine equivalent dose	Conversion Ratio	Daily oral Methadone dose	
Less than 100 mg	3:1	I.e. 3 mg morphine: 1 mg methadone 0 to 30 mg methadone	
101 mg to 300 mg	5:1	20 mg to 60 mg methadone	
301 mg to 600 mg	10:1	30 mg to 60 mg methadone	
601 mg to 800 mg	12:1	50 mg to 65 mg methadone	
801 mg to 1000 mg	15:1	50 mg to 65 mg methadone	
More than 1000 mg	20:1	50 mg methadone	

The EMR PCC Clinical Working Party gratefully acknowledges the following palliative care physicians for their contribution to the methadone section in the 2008 guidelines⁷: Shirley Bush; Kate Jackson; Brian Le; Peter Martin; Greg Mewett and Peter Poon.



ABBREVIATIONS USED IN THESE GUIDELINES

b.d = twice (2) times daily	Parental = administration via SC,IM or IV routes
IM = Intramuscular	p.r.n. = as required/when necessary
IV = Intravenous	q.i.d. = four (4) times daily
mcg = micrograms	SC = subcutaneous
mg = milligrams	t.d.s = three (3) times daily

1 mg = 1000 micrograms

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The EMRPCC Clinical Working Party welcomes feedback regarding the planned formal review process in 2013. Please send comments to:
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Eastern Metropolitan Region
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Opioid Conversion Ratios - Guide to Practice 2010 Summary Chart

The entire document must be viewed at www.emrpcc.org.au

ORAL MORPHINE TO OTHER ORAL ANALGESICS		
Oral to Oral	Conversion Ratio	Example
Morphine to Tramadol	1:5	Oral Morphine 10 mg = Oral Tramadol 50 mg
Morphine to Codeine	1:8	Oral Morphine 7.5 mg = Codeine 60 mg
Morphine to Methadone	-	CONSULTANT REQUIRED.
Morphine to Oxycodone	1.5:1	Oral Morphine 15 mg = Oral Oxycodone 10 mg
Morphine to Hydromorphone	5:1	Oral Morphine 5 mg = Oral Hydromorphone 1 mg

ORAL TO PARENTAL – same drug to same drug			
Oral	Parenteral	Ratio	Working example
Hydromorphone	Hydromorphone	3:1	Oral Hydromorphone 60 mg = Subcutaneous Hydromorphone 20 mg
Morphine	Morphine	2-3:1	Oral Morphine 30 mg = Subcutaneous Morphine 10-15 mg
Methadone	Methadone	2:1	Oral Methadone 20 mg = Subcutaneous Methadone 10 mg
Oxycodone	Oxycodone	2:1	Oral Oxycodone 20 mg = Subcutaneous Oxycodone 10 mg

PARENTAL (SC,IV,IM) MORPHINE TO OTHER PARENTAL (SC,IV,IM) ANALGESICS			
From SC, IV, IM	To SC, IV, IM	Ratio	Calculation
Morphine	Fentanyl	100:1	Morphine 10mg = Fentanyl 100mcg
Morphine	Hydromorphone	5:1	Morphine 10 mg = Hydromorphone 2 mg See full guidelines for information
Morphine	Tramadol	1:10	Morphine 10 mg = Tramadol 100 mg
Morphine	Oxycodone	1:1	Morphine 10 mg = Oxycodone 10 mg



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TRANSDERMAL FENTANYL TO MORPHINE				
Patch Strength	Dose	Parenteral Morphine equivalent (mg/24 hours)	Oral Morphine equivalent (mg/24 hours)	Breakthrough pain management
Fentanyl Patch 12 microgram/hour	288 mcg/24 hours	10 to 15	20 to 45	5 mg immediate release oral morphine 1 hourly p.r.n.
Fentanyl Patch 25 microgram/hour	600 mcg/24 hours	30 to 40	60 to 100	10 mg immediate release oral morphine 1 hourly p.r.n.
Fentanyl Patch 50 microgram/hour	1200 mcg/24 hours	60 to 80	120 to 200	20 mg immediate release oral morphine 1 hourly p.r.n.
Fentanyl Patch 75 microgram/hour	1800 mcg/24 hours	90 to 120	180 to 300	30 mg immediate release oral morphine 1 hourly p.r.n.
Fentanyl Patch 100 microgram/hour	2400 mcg/24 hours	120 to 160	240 to 400	40 mg immediate release oral morphine 1 hourly p.r.n.

CONVERSION CALCULATION – TRANSDERMAL FENTANYL TO ORAL MORPHINE

Transdermal fentanyl to oral morphine conversion ratio = 1: 100 - 150

Using 25micrograms/hour Fentanyl as example:

$$25\text{mcg/hour} \times 24 = 600\text{mcg/24 hours}$$

$$600\text{mcg} \times \mathbf{100} \text{ (conversion)} = 60\,000 \text{ micrograms morphine} = 60 \text{ mg oral morphine}$$

or

$$600\text{mcg} \times \mathbf{150} \text{ (conversion)} = 90\,000 \text{ micrograms morphine} = 90 \text{ mg oral morphine}$$

TRANSDERMAL BUPRENORPHINE to ORAL MORPHINE				
Patch Strength	Delivery Rate	Conversion Ratio	Oral Morphine Dose	Parenteral morphine dose
Buprenorphine 5 mg / 7 days 120 micrograms/24 hours	5 micrograms/hour	1:100	12 mg/24 hours	4 – 6 mg/24 hours
Buprenorphine 10 mg / 7 days 240 micrograms/24 hours	10 micrograms/hour	1:100	24 mg/24 hours	8 – 12 mg/24 hours
Buprenorphine 20 mg / 7 days 480 micrograms/24 hours	20 micrograms/hour	1:100	48 mg/24 hours	16 – 24 mg/24 hours

CONVERSION CALCULATION – TRANSDERMAL BUPRENORPHINE TO ORAL MORPHINE

5 mg patch = 5 micrograms buprenorphine per hour

$$5 \text{ mcg} \times 24 = 120 \text{ micrograms over 24 hours}$$

$$120\text{mcg buprenorphine} \times 100 \text{ (conversion)} = 12,000\text{mcg}$$

$$\text{Convert } 12000\text{mcg to mg by } \div 1000 = 12 \text{ mg oral morphine over 24 hours}$$

CONVERSION CALCULATION – ORAL MORPHINE TO TRANSDERMAL BUPRENORPHINE

30 mg morphine over 24 hours:

$$30 \div 100\text{(conversion)} = 0.3 \text{ mg buprenorphine}$$

Convert 0.3mg to mcg by x 1000

$$= 300 \text{ micrograms buprenorphine over 24 hours} = 12.5 \text{ micrograms/hour}$$

Round to 10 mg buprenorphine patch

DISCLAIMER: The information contained in this summary is to be read in conjunction with the entire document. The guidelines reflect current Australian/Victorian palliative care practice and available literature at the time of the release. All medication doses should be checked and prescribed by a medical doctor with appropriate experience before administering. Adhere to all legislative and professional requirements including organisational policies and procedures regarding opioid medications and their administration. All patients should be monitored closely until stable when commencing, adjusting dosage and/or switching opioid medications.