**methadone (meth-a-done)**

**Classification**
- Opioid analgesic

**Pharmacologic: opioid agonists**

**Schedule II**

**Pregnancy Category C**

**Indications**


**Action**

Binds to opiate receptors in the CNS. Alters the perception of and response to painful stimuli, while producing generalized CNS depression.

**Therapeutic Effects:** Decrease in severity of pain. Suppression of withdrawal symptoms during detoxification and maintenance from heroin and other opioids.

**Pharmacokinetics**

Absorption: Well absorbed from all sites (50% absorbed following oral administration).

Distribution: Widely distributed. Crosses the placenta; enters breast milk.

Protein Binding: High.

Metabolism and Excretion: Mostly metabolized by the liver; some metabolites are active and may accumulate with chronic administration.

Half-life: 15–25 hr; q with chronic use.

**TIME/ACTION PROFILE (analgesic effect)**

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO</td>
<td>30–60 min</td>
<td>90–120 min</td>
<td>4–12 hr</td>
</tr>
<tr>
<td>IM, subcut</td>
<td>10–20 min</td>
<td>60–120 min</td>
<td>4–6 hr</td>
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**Contraindications/Precautions**

- **Contraindicated in:** Hypersensitivity; Significant respiratory depression; Acute or severe bronchial asthma; Paralytic ileus; Known alcohol intolerance (some oral solutions); Concurrent MAO inhibitor therapy.

- **Use Cautiously in:** Structural heart disease, concomitant diuretic use, hypokalemia, hypomagnesemia, history of arrhythmias/myopathy, or other risk factors for arrhythmias; Concurrent use of drugs that prolong the QT interval or are CYP3A4 inhibitors; Head trauma, Seizure disorders, Intracranial pressure; Severe renal, hepatic, or pulmonary disease; Hypothyroidism, Adrenal insufficiency, Alcoholism; Undiagnosed abdominal pain; Peptic ulcer disease or neuralgia; OB: Use with addiction control: weight risk against potential for illicit drug use. Counsel mother about potential harm to fetus; Lactation: Appears in breast milk. Weigh risks against potential for illicit drug use. Counsel mother about potential harm to infant and to wean breast feeding slowly to prevent abstinence syndrome; Geri: Dose suggested.

**Adverse Reactions/Side Effects**

**CNS:** Confusion, Sedation, Dizziness, Dysphoria, Euphoria, Floating feeling, Hallucinations, Headache, Unusual dreams.

**EENT:** Blurred vision, Diplopia, Miosis.

**Resp:** Respiratory depression.

**CV:** Torse des pointes, Hypotension, Bradycardia, QT interval prolongation.

**GI:** Constipation, Nausea, Vomiting.

**GU:** Urinary retention.

**Derm:** flushing, sweating.

**Misc:** physical dependence, Psychological dependence, Tolerance.

**Interactions**

- **Drug-Drug:** Use with extreme caution in patients receiving MAO inhibitors (may result in severe, unpredictable reactions — initial dose of methadone to 25% of usual dose). Use with extreme caution with any drug known to potentially prolong QT interval, including class I and III antiarrhythmics, some neuroleptics and tricyclic antidepressants, and calcium channel blockers. Use with extreme caution with CYP3A4 inhibitors, including ketoconazole, itraconazole, erythromycin, clarithromycin, calcium channel blockers, or voriconazole. Concurrent use with laxatives, diuretics, or mineralocorticoids may risk of hypomagnesemia or hypokalemia and risk of arrhythmias. CNS depression with alcohol, antihistamines, and sedative/hypnotics. Administration of agonist/antagonist opioids may precipitate opioid withdrawal in physically dependent patients. Nalbutadine or pentazocine may antagonize Interferons (alpha) may inhibit metabolism.

**DOSAGE & ADMINISTRATION**

**Adults**

**Dosing:**Dosage may be advanced to 15 mg q6h.

**Initial Dose:**Dosage may be advanced to 30 mg q6h.

**Maintenance Dose:**Dosage may be advanced to 30 mg q6h.

**Management of Moderate to Severe Chronic Pain**

**Dosing:**Dosage may be advanced to 15 mg q6h.

**Initial Dose:**Dosage may be advanced to 30 mg q6h.

**Maintenance Dose:**Dosage may be advanced to 30 mg q6h.

**Detoxification and Maintenance Therapy for Opioid Use Disorder**

**Dosing:**Dosage may be advanced to 15 mg q6h.

**Initial Dose:**Dosage may be advanced to 30 mg q6h.

**Maintenance Dose:**Dosage may be advanced to 30 mg q6h.

**Neonatal Abstinence Syndrome**

**Dosing:**Dosage may be advanced to 0.8 mg q4h.

**Initial Dose:**Dosage may be advanced to 0.8 mg q4h.

**Maintenance Dose:**Dosage may be advanced to 0.8 mg q4h.
and effects of rifabutin, phenytoin, carbamazepine, and valproate. May indicate hepatic failure.

Drug-Natural Products: St. John's wort and valerian, may increase methadone metabolism and effects of rifabutin, phenytoin, carbamazepine, and valproate. May indicate hepatic failure.

Drug-Over the Counter: Vitamin and mineral supplements, may increase methadone metabolism and effects of rifabutin, phenytoin, carbamazepine, and valproate. May indicate hepatic failure.

Drug-Other: Fluoxetine, Kava-kava, chamomile, valerian, and St. John's wort, may increase methadone metabolism and effects of rifabutin, phenytoin, carbamazepine, and valproate. May indicate hepatic failure.

Drug-Endocrine: Nevirapine, ritonavir/lopinavir, didanosine, zidovudine, and metformin, may increase methadone metabolism and effects of rifabutin, phenytoin, carbamazepine, and valproate. May indicate hepatic failure.

Analysis: Methadone maintenance therapy is considered the gold standard treatment for opioid addiction. It is highly effective and reduces the risk of opioid-related mortality. It is associated with improved quality of life, reduced criminal activity, and increased engagement in health care.

Prognosis: Methadone maintenance therapy is effective in the long term, but patients may require periodic dose adjustments. Treatment should be individualized, and the dose should be titrated to achieve the lowest effective dose. The most common side effects are somnolence, nausea, vomiting, and constipation. These effects are usually dose-related and can be managed with dose titration and appropriate use of concomitant medications.

Opioid detoxification—15–40 mg once daily or amount needed to prevent withdrawal. Dose may be decreased q 1–2 days; maintenance dose is determined on an individual basis.

Doses of methadone for patients on methadone maintenance only prevent withdrawal symptoms; no anaphylaxis is provided. Additional opioid doses are required for treatment of pain.

Assess patient for signs of opioid withdrawal (irritability, restlessness, insomnia, runny nose and eyes, abdominal cramps, body aches, sweating, loss of appetite, yawning). Methadone maintenance is undertaken only by federally approved treatment centers. This should not prevent patient from receiving adequate analgesia. Most patients who receive methadone for pain do not develop psychological dependence. Prematurely higher doses may be required to relieve pain with long-term therapy.

Assess for history of structural heart disease, arrhythmia, and syncope. Obtain a pretreatment ECG to measure QTc interval and follow-up ECG within 30 days and annually. Additional ECGs recommended if dose exceeds 2–3 days, unless contraindicated.

If an opioid antagonist is required to reverse respiratory depression or coma, naloxone is the antidote. Dilute the 0.4-mg ampule of naloxone with 10 ml of sterile saline to achieve a final concentration of 0.04 mg/ml. slowly and cautiously administer naloxone. If the patient does not respond, additional naloxone may be administered at 0.5- to 1-mg increments every 3 to 5 minutes until the desired response is achieved. The naloxone dose should be titrated to the patient's individual response.

Assess type, location, and intensity of pain prior to and 1–2 hr (peak) following administration. When titrating opioid doses, increases of 25–50% should be administered until there is either a 50% reduction in the patient's pain rating or a numeric or visual analogue scale on the patient reports satisfactory pain relief. A repeat dose can be safely administered at the time of the peak if previous dose is ineffective and side effects are minimal. Cumulative effects of opioid medication may require period dose adjustments.

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European drug name.

Genetic Implication. CAPI TALS indicate life-threatening, underlines indicate most frequent. Strikethrough Discontinued.

CONTINUED methadone

Intravenous use: In an IV catheter, administer 0.9% NaCl and administer 0.5 mL (0.02 mg) by direct IV push every 2 min. For children and patients weighing < 40 kg, dilute 0.1 mg of naloxone in 10 mL of 0.9% NaCl for a concentration of 10 mcg/mL and administer 0.5 mcg/kg every 2 min. Titrate dose to avoid withdrawal, seizures, and severe pain.

Potential Nursing Diagnoses Acute pain (Ineffective)

● Strikethrough/Italicized indicates most frequent. Bold for injury (Side Effects)

Implementation

● High Alert: Accidental overdose of opioid analgesics has resulted in fatalities. Before administering, clarify all ambiguous orders; have second practitioner independently check original order and dose calculations.

● Do not confuse methadone with demoxepam, ketorolac, methylphenidate, or methylphenidate.

● Explain therapeutic value of medication prior to administration to enhance the analgesic effect.

● Regularly administered doses may be more effective than prn administration. Intravenous use more effective if administered before pain becomes severe. For patients in chronic severe pain, the oral solution containing 5 or 10 mg/5 mL is recommended as a fixed dose schedule.

● Coadministration with nonopioid analgesics may have additive analgesic effects and may permit lower doses.

● Medications should be discontinued gradually after long-term use to prevent withdrawal symptoms.

● PO: Doses may be administered with food or milk to minimize GI irritation.

● Dilute each dose of 10 mg/mL oral concentrate with at least 30 mL of water or other liquid prior to administration.

● Discontinuation of the drug may be discontinued gradually after long-term use to prevent withdrawal symptoms.

● IM is the preferred parenteral route for repeated doses. Subcut administration may cause tissue irritation.

Patient/Family Teaching

● Instruct patient when to take methadone exactly as directed. If dose is less effective after a few weeks, do not increase dose without consulting health care professional.

● May cause drowsiness or dizziness. Advise patient to call for assistance when ambulating or smoking and to avoid driving or other activities requiring alertness until response to medication is known.

● Informed patient of the potential for arrhythmias and to emphasize the importance of regular ECGs.

● Caution patient about health care professional if signs of overdose (difficulty or shallow breathing, extreme tiredness or sleepiness, blurred vision, difficulty in thinking, talking, or swallowing, and feelings of faintness, dizziness, or confusion) occur. Methadone has a prolonged action causing increased risk of overdose.

● Advise patients to change positions slowly to minimize orthostatic hypotension.

● Advise patients to report hospital emergency department, or desirable products without consulting health care professional. Caution patient to avoid concurrent use of alcohol or other CNS depressants with this medication.

● Encourage patient to turn, cough, and breathe deeply every 2 hr to prevent atelectasis.

Evaluation/Desired Outcomes

● Decrease in severity of pain without a significant alteration in level of consciousness or respiratory status.

● Prevention of withdrawal symptoms in detoxification from heroin and other opioid analgesics.

Why was this drug prescribed for your patient?