

# Prescribing Opioids to Older Adults: A Guide to Choosing and Switching Among Them

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*The use of opioid medications and converting among them in the older adult population can often be challenging. Physiological changes in older adults may affect metabolism and cognitive abilities. Due to renally cleared metabolites, some opioids, such as morphine, should be used with caution among older adults. Others, such as meperidine, should never be used at all. When prescribing or changing opioids, the choice of the correct formulation, appropriate counselling, and close follow-up are essential for optimal pain management and in order to prevent adverse outcomes.*

*Key words: opioids, pain management, older adults, analgesia, opioid conversion*

## Introduction

The treatment of pain in the older adult population can present significant challenges. Older adults may have a number of chronic conditions. Some of these may affect which drugs they can use, and others may require medications that may put these patients at a higher risk for drug-drug interactions. Age-related changes in physiology, such as renal function, may limit which drugs can be prescribed. Cognitive, language, and hearing obstacles are important considerations as well.

Inappropriate prescription and ineffective pain management are common.<sup>1</sup> Because pain control is poorly taught in training, many physicians are reluctant to

prescribe opioids in sufficiently high doses, for fear of causing harm.<sup>2</sup> Inappropriate medication use in older adults has also been linked to a growing number of adverse drug reactions and to excess health care utilization.<sup>3</sup>

The purpose of this article is to familiarize the reader with commonly used opioids and how they can be applied in the older population. Special attention is given to selecting the appropriate drug in this particular group of patients, and how to convert from one opioid to another.

## Choosing Opioids for Use in Older Adults

When choosing an opioid, the World Health Organization recommends using

a systematic and graduated approach, the “analgesic ladder,” starting with non-narcotics, then changing to weak opioids and nonsteroidal anti-inflammatory drugs (NSAIDs), and subsequently progressing to stronger medications as needed, depending on side-effects or inefficacy (Figure 1).<sup>4</sup> However, many older adults have contraindications to NSAIDs and may have comorbidities precluding them from adhering to this approach.

There are two factors that must be taken into account when prescribing and switching opioids in older adults. First, it is important to ensure that the patient is able to comprehend the instructions given. Cognitive deficits may lead to confusion, and hearing difficulties may interfere with comprehension.<sup>5</sup> In the case of conversion from one drug to another, it is vital that the patient understands that the old drug is not to be used anymore and must be disposed of appropriately.

Second, as people age, their creatinine clearance may become reduced, even if their creatinine is within the normal range.<sup>6</sup> The choice of opioids should take this into account. In general, most of the metabolism of opioids occurs in the liver.<sup>7</sup> The kidney is an important site for excretion. Some medications, such as morphine, should be used with caution among older adults, particularly in those with poor renal function, because of a tendency for renally accumulated metabolites to cause adverse effects. Others, such as meperidine, should not be used at all.

## Commonly Used Opioids

Table 1 lists the various properties of commonly used opioids, along with their indications and contraindications.

### Codeine

Codeine is indicated for mild pain and may be used to step down from a stronger opioid in instances when a patient’s pain is decreasing over time. A weak opioid, it has no analgesic effect on its own, but is a prodrug, converted to morphine by the liver.<sup>8</sup> Due to genetic differences, some people lack the ability

to make this conversion due to low CYP2D6 enzyme levels<sup>8</sup>; for them, an equianalgesic dose of another opioid should be considered if codeine appears to have no effect.

**Morphine**

In the oral form, morphine is six times more potent than oral codeine.<sup>9</sup> Its metabolites are excreted renally.<sup>10</sup> Many older adults have comorbid illnesses such as diabetes, hypertension, and congestive heart failure that predispose them to kidney disease. In addition, creatinine clearance decreases with age, even among healthy individuals.<sup>6</sup> Therefore, a normal creatinine value may not guarantee that morphine metabolites will not accumulate, particularly at higher dosages. For this reason, morphine should be used with caution in the older adult population.

**Hydromorphone**

Five times stronger than morphine,<sup>9</sup> hydromorphone also has renally cleared metabolites; however, owing to its higher potency, a much smaller dose can be used for an equianalgesic effect. This

makes it a more suitable choice for patients with renal impairment. One advantage of hydromorphone is that it is available both orally and parenterally, allowing for use via either route without the need for converting between drugs.

**Oxycodone**

Oxycodone is twice as potent as morphine.<sup>9</sup> Less than 15% of an oxycodone dose is excreted in the kidneys,<sup>10</sup> making it an excellent drug for older adults. It also has a moderate side effect profile. It is available only orally; thus, patients who may require alternate routes throughout their course of treatment may benefit from another choice of drug.

**Fentanyl**

Transdermal fentanyl may be used for patients who do not tolerate the orally available opioids or who cannot swallow sustained-release formulations. Patches are available in multiples of 12.5 µg/h, but the recommended starting dose is usually 25 µg, the equivalent of a minimum equivalent daily dose of 50 mg of oral morphine.<sup>9</sup> Because it can take up to 48 hours to attain full effects from the

patch and another 48 to completely clear the drug upon discontinuation, fentanyl patches should only be prescribed to patients with stable opioid requirements. A conservative starting dose should be used, and there should be close monitoring for the first few days. Patients will still require a conventional as-needed breakthrough drug. Hydromorphone and oxycodone are the best choices.

**Meperidine**

There have been numerous warnings about the use of meperidine, especially for older adults, such that both the American Pain Society and the Institute for Safe Medication Practice do not recommend meperidine’s use as an analgesic for chronic pain in this population.<sup>11</sup> Its toxic metabolite, normeperidine, has an extremely long half-life and accumulates rapidly in patients with impaired renal function.<sup>12</sup> In older adults with reduced creatinine clearance, this poses an even greater danger. Normeperidine has neuroexcitatory properties and can lower the threshold for seizures.<sup>13</sup> Early evidence had provided an indication for meperidine in pancreatitis and biliary colic

**Table 1:** Commonly Used Opioids

Opioid	Important Points	Indications	Contraindications/Cautions
Codeine	Metabolized to morphine	Mild pain	
Morphine	Renally cleared metabolites	Moderate to severe pain	Avoid in patients with decreased creatinine clearance
Hydromorphone	Renally cleared metabolites Much more potent than morphine	Older adults who require parenteral opioids	Avoid in patients with decreased creatinine clearance
Oxycodone	No renally cleared metabolites Very potent	Patients with reduced creatinine clearance who can take oral medications	
Fentanyl	Takes up to 48 hours to achieve steady state Can be a good choice in many older adults	Patients with stable opioid requirements	Patients with fluctuating pain levels
Meperidine	Renally cleared metabolite Long metabolite half-life Metabolite causes neuroexcitation		Contraindicated for treatment of pain High risk of seizures

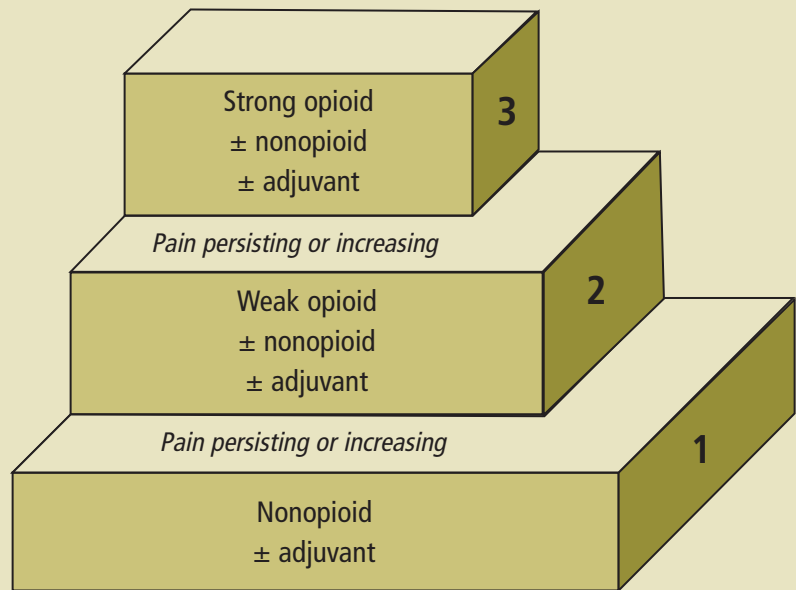
because of animal models which showed decreased sphincter of Oddi pressures compared with other opioids. However, human trials have since shown that meperidine is not superior to other opioids in avoiding smooth muscle spasm in biliary colic.<sup>14</sup>

### Combination Drugs

Codeine and oxycodone are both available in combination with acetaminophen, ibuprofen, or acetylsalicylic acid (ASA). Care should be taken when prescribing these. In the case of acetaminophen, it is important to ensure that the patient does not ingest more than 4 g/d of acetaminophen from all sources.<sup>15</sup> In the case of ASA-containing formulations, care must be taken to make sure that there are no adverse renal or gastrointestinal (GI) effects. In patients taking cyclo-oxygenase 2 inhibitors, co-ingestion of ASA, even at lower dosages, can greatly increase the risk of upper-GI bleeding.<sup>16</sup>

The nonopioid components of these combination drugs are not standardized and may vary with each formulation. It is, therefore, often preferable in older adults to prescribe the drugs separately rather than in combined form, so that the amount of each drug ingested can be

**Figure 1:** The World Health Organization’s “Analgesic Ladder”



Source: Stjernsward J, 1988.<sup>4</sup>

monitored more accurately.

One common misconception is that the potency of the most popular codeine-containing formulation (codeine 30 mg) is equal to that of the most common oxycodone-containing medication (5 mg). Often these drugs are used interchangeably, especially by patients; however, closer scrutiny reveals that the oxycodone-containing drug is twice as potent as its counterpart. Therefore, when switching between these medications, it is important to ensure that old pills are disposed of safely.

### Side Effects

When starting a patient on a new opioid, or switching the patient from one opioid to another, the clinician should carefully

monitor for side effects of both the drug and its metabolites. The direct side effects and side effects from metabolites of most opioids are similar (Table 2).<sup>17</sup> Direct side effects usually appear early on in therapy and often improve over time. In contrast, adverse effects from metabolites often have a more insidious onset, related to their slow accumulation.

Some health care professionals are reluctant to prescribe opioids for patients with advanced end-stage disease, particularly when there is a potential for respiratory compromise. Therapeutic doses can reduce respiratory rate and depth, but the resulting hypercarbia from mild hypoventilation stimulates central chemoreceptors, leading to a compensatory increase in respiratory rate to

**Table 2:** Opioid Side Effects

Sedation
Nausea and vomiting
Impaired cognition
Ileus and constipation
Myoclonus
Pupillary constriction
Respiratory depression
Urinary retention
Hyperalgesia
Loss of appetite
Impaired orthostatic tolerance
Seizures

**Table 3:** Dosing Intervals

Dosing	Formulation/Route	Frequency
Standard	Immediate release	Every 4 hours
As-needed	Oral	Every 60–90 minutes
	Subcutaneous	20–30 minutes
	Intravenous	10–15 minutes

maintain arterial oxygen levels.<sup>17</sup> When properly titrated, these drugs are safe for this population.

Morphine, hydromorphone, oxycodone, and codeine belong to one class of opioids called phenanthrenes.<sup>9</sup> Fentanyl and meperidine belong to another class known as phenylpiperidines.<sup>9</sup> Although genuine allergies to opioids are rare, in the case where there is a documented allergy, an opioid with another chemical structure should be chosen.

## Dosing and Intervals

A number of factors should be taken into consideration when choosing a starting dose. Polypharmacy is prevalent in many patients with multiple medical conditions, and this increases the risk of drug interactions and unexpected side effects.<sup>18</sup> In the opioid-naïve patient, consideration should be made to commencing with a low dose. By monitoring progress frequently at the onset and titrating the dose as tolerated, side effects can be monitored and the minimum required dose can be used. A reasonable starting dose in a patient with moderate pain (requiring an opioid) might be the equivalent of 1 mg of hydromorphone at a time (the equivalent of one 30 mg codeine-containing combination tablet).

When a patient begins taking an opioid, it should be given on an as-needed (PRN) basis, until the need for a standing dose is established. The frequency of PRN dosing is based on the time to maximal effect of the drug (onset of action) and depends on the route (Table 3). Traditionally, PRN dosing has been ordered every 4–6 hours; however, there is a risk that the patient may require more medication and remain in pain until the next dose can be given.

When monitoring of PRN dosing reveals a regular need for opioids, a standing dose should be calculated based on the cumulative dose of the preceding 24 hours. The interval for standing opioids is every 4 hours, based on the kinetics of their metabolism. The PRN dose should be roughly 10% of the total daily dose.<sup>9</sup> In cases where the regular dose is quite low (such as 0.5 or 1 mg of hydro-

morphine), the PRN dose can be the same as the standing dose. Periodically, the prescriber should calculate the cumulative daily dose to determine whether the standing dose needs to be increased.

When a stable standing dose is established, a long-acting (slow-release) formulation can be substituted. For instance, a 15 mg capsule of slow-release morphine every 12 hours can replace 5 mg of immediate-release morphine taken every 4 hours. The calculation of breakthrough (PRN) dosing remains the same. One advantage of long-acting opioids is that they can improve compliance by increasing convenience. Another is that the continuous release avoids the peaks and troughs of the immediate-release dosing, to which older adults may be sensitive.

Initial prescription of long-acting opioids for opioid-naïve patients may seem to be a time-saving measure, but substantial risks may be incurred if a stable dose is not established first. For instance, if too many pills are accidentally ingested, the danger to the patient and need for monitoring extend for 12 hours instead of 4. For this reason, long-acting formulations are contraindicated for patients who have widely fluctuating pain levels or for whom a stable 24-hour dose has not yet been established.

## Converting Between Opioids

When switching between opioids, the goal is to achieve an equianalgesic effect. Equianalgesic conversion tables are based on opioid-naïve patients with acute pain.<sup>19</sup> Table 4 provides an example of equivalent dosing for the commonly chosen drugs.<sup>20</sup> A number of factors must be taken into account when making the switch. In general, to switch between opioids, a rough estimation of the 24-hour dose should be calculated, converted to the new opioid, and then divided by the desired dosing schedule.<sup>20</sup>

## Incomplete Cross-Tolerance

A patient who has been taking an opioid for an extended period of time may develop a degree of tolerance to it; however, when converting to another opioid, only a part of this tolerance may carry

**Table 4:** Equianalgesic Opioid Dosages

Drug	IV	PO
Morphine	10	20
Codeine	60	120
Oxycodone	—	10
Hydromorphone	2	4
Fentanyl (transdermal)*	—	100 µg/h

\*Dose of transdermal fentanyl in µg/h is approximately half the 24-hour dose of oral morphine (mg).

over to the new drug.<sup>9</sup> Therefore, after calculating the required dose of the new drug to achieve an equianalgesic effect, the dose may need to be lowered by up to 50%. Because this phenomenon is difficult to predict on an individual basis, any opioid conversion requires close monitoring.

Similarly, patients who are being converted from a long-acting opioid formulation should first be stabilized on the immediate-release form of the new drug. Once a stable standing dose is re-established, a slow-release dose can be introduced.

## Conclusion

Choosing the right opioid for an older adult can be challenging for a number of reasons, including comorbidities, polypharmacy, physiological changes, and cognitive and communication challenges. For this reason, the safe and effective management of pain for older adults

## Clinical Pearls

Because creatinine clearance can be significantly decreased in older adults, opioids with few or no renally cleared metabolites, such as hydromorphone or oxycodone, are preferred choices. When converting from one opioid to another, a stable dosage should be established using an immediate-release formulation before switching to a sustained-release formulation.

**Key Points**

Older adults can take opioids but may need to be started at lower dosages and titrated up more slowly.

Creatinine clearance is a key consideration in the choice of which opioid to use.

Meperidine should never be used for pain in older adults.

When converting between opioids, attention must be paid to the potential for incomplete cross-tolerance.

Close monitoring is essential after any change in opioid prescription.

requires a careful, graduated, and systematic approach.

Thorough cognitive assessment of patients' ability to comply with drug regimens is absolutely necessary. Upon switching opioids, it is important to ensure that patients are stabilized on immediate-release drugs prior to converting to their longer-acting formulations. Physicians must ensure that there will be no concomitant use of the previous drug. Continued monitoring is then essential to guard against side effects of the new medication and its metabolites.



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