

# What classes of prescription drugs are commonly misused?

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## Opioids

### What are opioids?

Opioids are medications that act on opioid receptors in both the spinal cord and brain to reduce the intensity of pain-signal perception. They also affect brain areas that control emotion, which can further diminish the effects of painful stimuli. They have been used for centuries to treat pain, cough, and diarrhea.<sup>28</sup> The most common modern use of opioids is to treat acute pain. However, since the 1990s, they have been increasingly used to treat chronic pain, despite sparse evidence for their effectiveness when used long term.<sup>29</sup> Indeed, some patients experience a worsening of their pain or increased sensitivity to pain as a result of treatment with opioids, a phenomenon known as hyperalgesia.<sup>30</sup>

Importantly, in addition to relieving pain, opioids also activate reward regions in the brain causing the euphoria—or high—that underlies the potential for misuse and substance use disorder. Chemically, these medications are very similar to heroin, which was originally synthesized from morphine as a pharmaceutical in the late 19th century.<sup>31</sup> These properties confer an increased risk of substance use disorder even in patients who take their medication as prescribed.<sup>29</sup>

Overdose is another significant danger with opioids, because these compounds also interact with parts of the brain stem that control breathing. Taking too much of an opioid can suppress breathing enough that the user suffocates. An overdose can be reversed (and fatality prevented) if the compound *naloxone* is administered quickly (see "[Reversing an Opioid Overdose with Naloxone](#)").

Prescription opioid medications include hydrocodone (e.g., Vicodin<sup>®</sup>), oxycodone (e.g., OxyContin<sup>®</sup>, Percocet<sup>®</sup>), oxymorphone (e.g., Opana<sup>®</sup>), morphine (e.g., Kadian<sup>®</sup>, Avinza<sup>®</sup>), codeine, fentanyl, and others. Hydrocodone products are the most commonly prescribed in the United States for a variety of indications, including dental- and injury-related pain.<sup>32</sup> Oxycodone and oxymorphone are also prescribed for moderate to severe pain relief.<sup>33,34</sup> Morphine is often used before and after surgical procedures to alleviate severe pain, and codeine is typically prescribed for milder pain.<sup>28</sup> In addition to their pain-relieving properties, some of these drugs—codeine and diphenoxylate (Lomotil<sup>®</sup>), for example—are used to relieve coughs and severe diarrhea.<sup>28</sup>

### How do opioids affect the brain and body?

Opioids act by attaching to and activating opioid receptor proteins, which are found on nerve cells in the brain, spinal cord, gastrointestinal tract, and other organs in the body.<sup>28</sup> When these drugs attach to their receptors, they inhibit the transmission of pain signals. Opioids can also produce drowsiness, mental confusion, nausea, constipation, and respiratory depression, and since these drugs also act on brain regions involved in reward, they can induce euphoria, particularly when they are taken at a higher-than-prescribed dose or administered in other ways than intended. For example, OxyContin<sup>®</sup> is an oral medication used to treat moderate to severe pain through a slow, steady release of the opioid. Some people who misuse OxyContin<sup>®</sup> intensify their experience by snorting or injecting it. This is a very dangerous practice, greatly increasing the person's risk for serious medical complications, including overdose

#### Understanding Dependence, Addiction, and Tolerance

Dependence occurs as a result of physiological adaptations to chronic exposure to a drug. It is often a part of addiction, but they are not equivalent. Addiction involves other changes to brain circuitry and is distinguished by compulsive drug seeking and use despite negative consequences.<sup>36</sup>

Those who are dependent on a medication will experience unpleasant physical withdrawal symptoms when they abruptly reduce or stop use of the drug. These symptoms can be mild to severe (depending on the drug) and can usually be managed medically or avoided by slowly tapering down the drug dosage.<sup>37</sup>

Tolerance, or the need to take higher doses of a medication to get the same effect, often accompanies dependence. When tolerance occurs, it can be difficult for a physician to evaluate whether a patient is developing a drug problem or has a medical need for higher doses to control his or her symptoms. For this reason, physicians should be vigilant and attentive to their patients' symptoms and level of functioning and should screen for substance misuse when tolerance or dependence is present.<sup>29</sup>

### What are the possible consequences of prescription opioid misuse?



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When taken as prescribed, patients can often use opioids to manage pain safely and effectively. However, it is possible to develop a substance use disorder when taking opioid medications as prescribed. This risk and the risk for overdose increase when these medications are misused. Even a single large dose of an opioid can cause severe respiratory depression (slowing or stopping of breathing), which can be fatal; taking opioids with alcohol or sedatives increases this risk.<sup>4,26</sup>

When properly managed, short-term medical use of opioid pain relievers—taken for a few days following oral surgery, for instance—rarely leads to an opioid use disorder or addiction. But regular (e.g., several times a day, for several weeks or more) or longer-term use of opioids can lead to dependence (physical discomfort when not taking the drug), tolerance (diminished effect from the original dose, leading to increasing the amount taken), and, in some cases, addiction (compulsive drug seeking and use) (see "[Understanding Dependence, Addiction, and Tolerance](#)"). With both dependence and addiction, withdrawal symptoms may occur if drug use is suddenly reduced or stopped. These symptoms may include restlessness, muscle and bone pain, insomnia, diarrhea, vomiting, cold flashes with goose bumps, and involuntary leg movements.<sup>31</sup>

Misuse of prescription opioids is also a risk factor for transitioning to heroin use. Read more about the relationship between prescription opioids and heroin in NIDA's [Prescription Opioids and Heroin Research Report](#).

### How is prescription opioid misuse related to chronic pain?

Health care providers have long wrestled with how best to treat the more than 100 million Americans who suffer from chronic pain.<sup>38</sup> Opioids have been the most common treatment for chronic pain since the late 1990s, but recent research has cast doubt both on their safety and their efficacy in the treatment of chronic pain when it is not related to cancer or palliative care.<sup>29</sup> The potential risks involved with long-term opioid treatment, such as the development of drug tolerance, hyperalgesia, and addiction, present doctors with a dilemma, as there is limited research on alternative treatments for chronic pain. Patients themselves may even be reluctant to take an opioid medication prescribed to them for fear of becoming addicted.

Estimates of the rate of opioid misuse among chronic pain patients vary widely as a result of differences in treatment duration, insufficient research on long-term outcomes, disparate study populations, and different outcome measures (e.g., dependence versus OUD or addiction). One study assessing current criteria for OUD in a large number of chronic pain patients receiving opioids found that 28.1 percent had mild OUD, 9.7 percent had moderate OUD, and 3.5 percent had severe OUD (addiction).<sup>39</sup>

To mitigate addiction risk, physicians should adhere to the [CDC Guideline for Prescribing Opioids for Chronic Pain](#). Before prescribing, physicians should assess pain and functioning, consider if non-opioid treatment options are appropriate, discuss a treatment plan with the patient, evaluate the patient's risk of harm or misuse, and co-prescribe naloxone to mitigate the risk for overdose (see NIDA's webpage on [naloxone](#)). When first prescribing opioids, physicians should give the lowest effective dose for the shortest therapeutic duration. As treatment continues, the patient should be monitored at regular intervals, and opioid treatment should be continued only if meaningful clinical improvements in pain and functioning are seen without harm.<sup>29</sup>