

# What's the buzz about buprenorphine?

## A pharmacologic overview

Buprenorphine is a pain and opioid addiction treatment medication you may not have encountered. Here are some points to keep in mind.

By Dorothy James Moore, DNP, FNP-C, PMHNP-BC

Buprenorphine is a drug you may not have heard about, but it's very likely you'll encounter a patient who uses it. Buprenorphine is a synthetic opioid medication approved to treat opioid addiction and chronic and acute pain. Although buprenorphine was patented in 1965 and approved for medical use in 1981, it wasn't until 2002 that it was combined with naloxone and approved to treat addiction. Buprenorphine's use has grown steadily with the acceptance of medication-assisted treatment for opioid use disorder (OUD). As many as 1.7 million Americans were prescribed buprenorphine in 2020.<sup>1</sup>

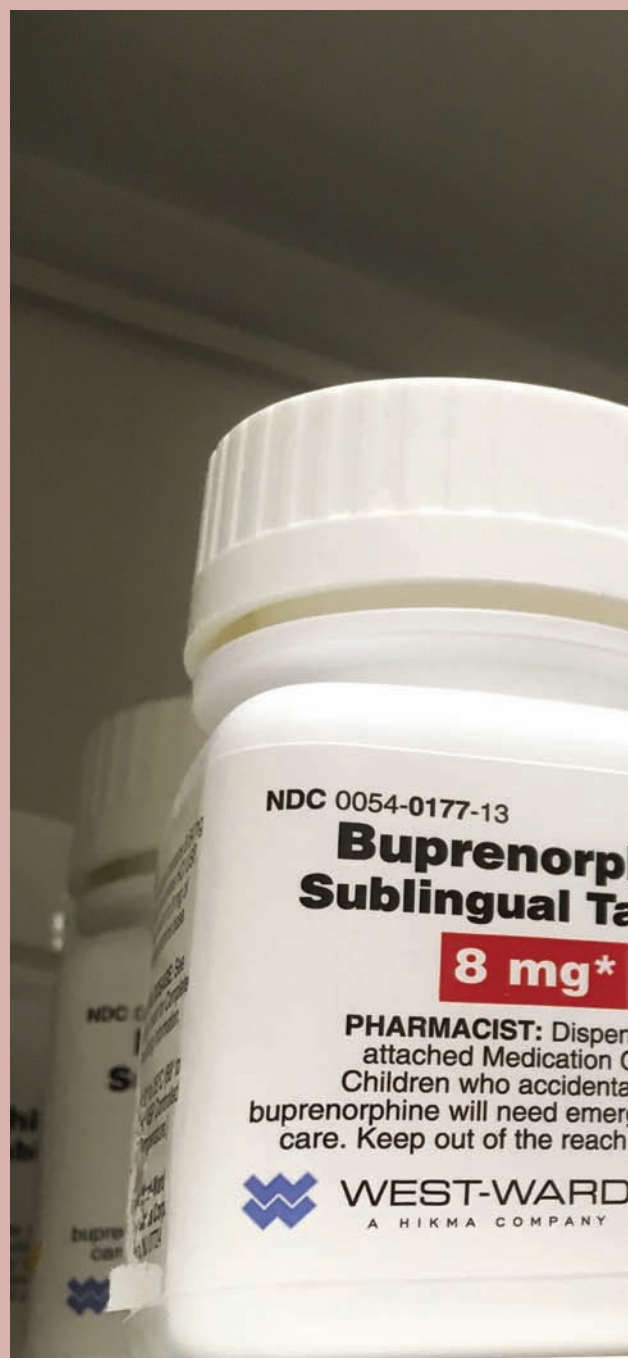
### Buprenorphine and the opioid receptor system

To understand buprenorphine, it's useful to have a working knowledge of the opioid receptor system. There are three main opioid receptors: Mu (MOR), delta (DOR), and kappa (KOR) (see *The opioid receptors and how buprenorphine works on them*).<sup>2</sup>

Opioid receptors are distributed throughout the nervous system and influence reward processing, mood, and painful responses to stress. These receptors are located in the brain, spinal cord, and peripheral nociceptors (pain-sensing neurons), including some places you wouldn't think of, such as the gut.

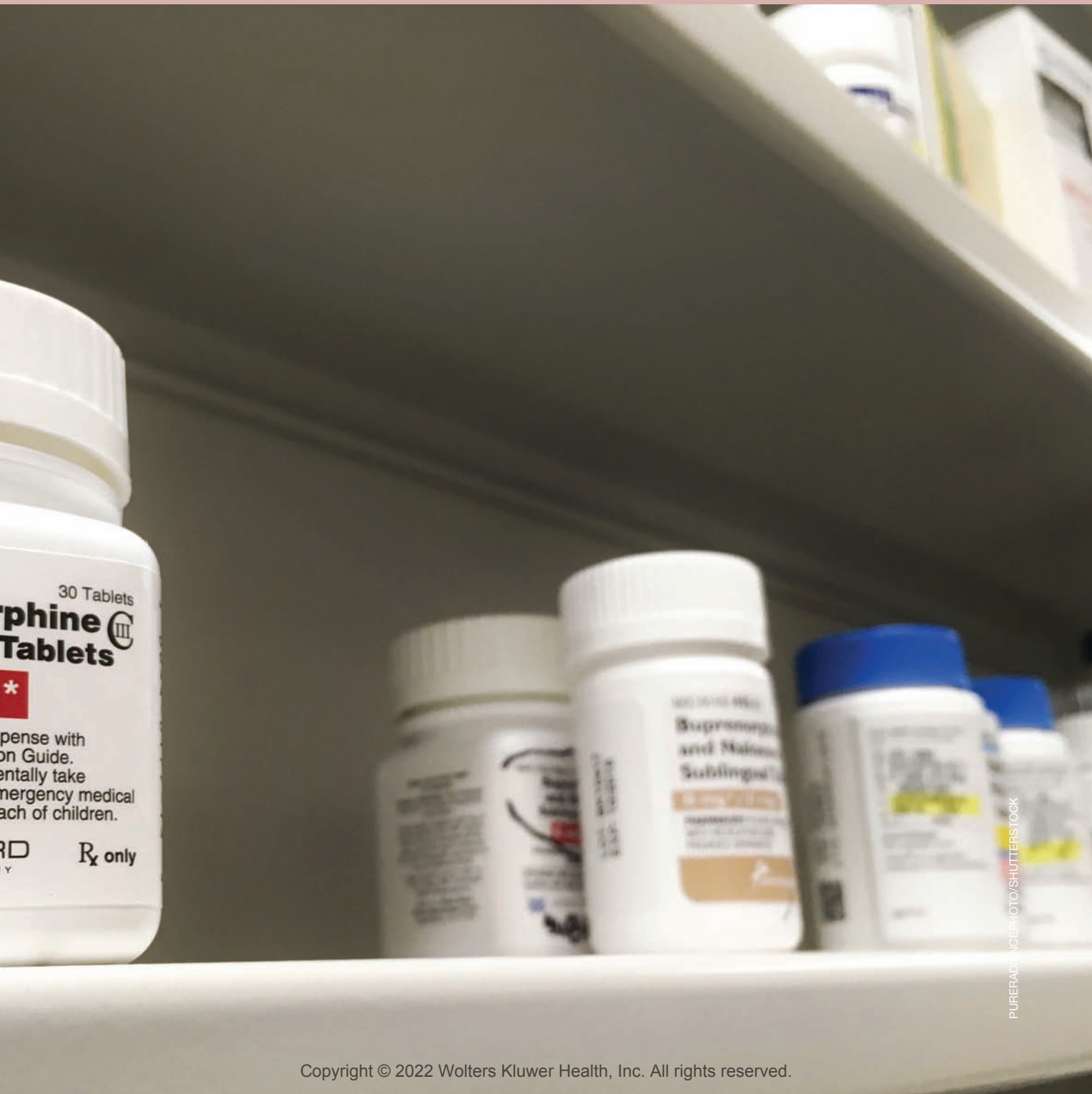
Opioid receptors are G protein-coupled receptors (GPCRs), the largest class of membrane receptors. GPCRs act as both gatekeepers, determining what can enter a cell, and messengers, by transmitting signals out of the cell. There are at least 1,000 different kinds of GPCRs in the human body. They regulate many functions such as the immune system, taste and smell, emotion, and the fight-or-flight response.

Up to half of all prescription medications bind with GPCRs.<sup>3,4</sup> A GPCR can be fully activated (agonized), partially agonized, or completely turned off (antagonized) by a chemical messenger. This nuanced switching is key to understanding the opioid receptor system and buprenorphine.





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Think of an opioid receptor as a light bulb on a dimmer switch. A full agonist turns on the light bulb to the brightest setting. Most opioids, such as morphine, heroin, oxycodone, and fentanyl, work this way. Buprenorphine is different. It's a partial opioid agonist on the MOR, meaning the MOR is only partially activated, and the light bulb is dimmed.

As a partial agonist, buprenorphine controls pain, but it dials back the euphoria so that people taking it feel "normal." This is an important feature because it's the sense of pleasure associated with opioids that makes them addictive. Although buprenorphine doesn't create euphoria, it's a very powerful pain medication. Depending on how it's formulated, buprenorphine can be 25 to 100 times more powerful than morphine, the gold standard of opioid pain medications.<sup>5</sup>

Buprenorphine has a "ceiling effect." Once a certain dose is reached, its pain-relieving properties don't increase with each subsequent dose. This means that people aren't as driven to take more medication as they may with full-agonist opioids. For most people, 16 to 24 mg is sufficient to achieve therapeutic effect. This feature of buprenorphine makes it unlikely to cause respiratory suppression and cause a person to stop breathing, and it also makes accidental or intentional overdose less likely.

A person taking buprenorphine for chronic pain can have pain relief and an improved quality of life without the addictive properties of full-agonist opioids.<sup>6</sup> In fact, most people taking buprenorphine say that their thinking is clear and they don't feel "high."<sup>7</sup>

Buprenorphine may be better at dulling pain signals in the spinal cord than full-agonist opioids because it primarily works on opioid receptors in the spinal cord rather than on the brain.<sup>2,8</sup> This may explain why it doesn't typically produce euphoria, and why it doesn't cause respiratory depression to the same degree as full-agonist opioids.

### The mu opioid receptor

Buprenorphine has a very high binding affinity to the MOR. It binds many times more tightly than full-agonist opioids and isn't easily displaced. You can think of it as the super glue of opioids. This means that a person taking full-agonist opioid pain medications in conjunction with buprenorphine may not feel any effect from the full-agonist medications, because their opioid receptors are occupied by buprenorphine.

Buprenorphine's high affinity for the MOR also means it can precipitate withdrawal from other opioids.<sup>9</sup> That is, if a person on a full agonist takes buprenorphine, they'll shortly feel sick, as if they have just been given naloxone.

## The opioid receptors and how buprenorphine works on them

Receptor	Buprenorphine's action	Pain response	Emotional response	Physical effects
MOR	Partial agonist	Powerful pain reliever, strongest response	No euphoria; person feels normal Dials down impulsivity, increases self-control	Some potential for respiratory depression, but much less than full-agonist opioids. Some slowing of gastrointestinal motility.
DOR	Antagonist		Helps block anxiety and depression	
KOR	Antagonist		Can block negative emotions like anxiety, depression	

## Common formulations of buprenorphine/naloxone

Formulation	Delivery	Frequency	Indication	Common brand names
Sublingual tablets	Tablet	Up to three times per day	Opioid use disorder	Suboxone Zubsolv (also available as a generic)
Buprenorphine-naloxone films	Buccal or sublingual	Up to three times per day	Opioid use disorder	Suboxone (also available as a generic)

Buprenorphine will displace the full agonist off the opioid receptors and induce withdrawal. This means that when a person is started on buprenorphine it must either be done slowly, through microdosing, or the person must first go into partial withdrawal from the full-agonist opioid.

The MOR also modulates impulsivity and self-control, because it's responsible for the reward sensations people get from other addictive substances such as alcohol and tobacco.<sup>2</sup> Because buprenorphine is a partial agonist on the MOR, someone who is taking this medication will likely better maintain self-control regarding impulsive substance use and may even find alcohol and tobacco less rewarding.

### The delta and kappa receptors

The MOR and DOR act in opposite ways. The DOR plays a role in regulating pain. It also helps control emotion. The DOR, if fully activated, can cause anxiety and depression, in contrast with the MOR, which produces euphoria. Buprenorphine antagonizes the DOR, turning this receptor off. In fact, buprenorphine is useful in low doses for treating depression.<sup>10</sup>

Buprenorphine also antagonizes the KOR receptor. The KOR is associated with the "dark side" of emotions such as dysphoria and depression and may even induce hallucinations if it's fully activated. The KOR regulates spinal pain sensation, reward, anxiety, motivation, and cognition. It also plays a role in psychiatric disorders such as chronic pain, addiction, anxiety and depression, as well as psychoses such as schizophrenia.

### Buprenorphine as treatment for OUD

Buprenorphine is an ideal drug for the treatment of OUD. In 2002, the FDA approved Suboxone, a formulation of buprenorphine combined with naloxone, the reversal agent for opioids. This combination prevents people from abusing buprenorphine via injection or intranasally. When injected, buprenorphine is 100% bioavailable and for some people does produce mild euphoria. But when taken as prescribed, the naloxone in buprenorphine-naloxone products is inactive. If injected or taken intranasally, naloxone can cause immediate withdrawal.<sup>11</sup>

Besides sublingual tablets, there's a film version of buprenorphine-naloxone that can be used sublingually or buccally (against the cheek). Be sure that your patient knows to let the medication dissolve completely under the tongue or against the cheek because swallowing the medication reduces its effectiveness.<sup>2</sup> Buprenorphine-naloxone also comes as a monthly depot injection, known as Sublocade (see *Common formulations of buprenorphine/naloxone*).

### Buprenorphine for chronic pain

The same qualities that make buprenorphine a good choice for treating OUD make it useful for treating chronic pain. In contrast with some other pain medications, buprenorphine has a low potential for addiction and oversedation; its ceiling effect means that patients can stabilize on a dose and not require escalating amounts of pain medication. Buprenorphine is as effective, if not better, than

full-agonist opioids at controlling pain in noncancer conditions such as osteoarthritis and low back pain.<sup>12</sup> It's also used to treat moderate-to-severe cancer pain.

Transdermal buprenorphine patches can be ideal for treating pain because they deliver sustained pain relief. Transdermal patches come in strengths ranging from 5 to 10 mg/h. Doses greater than 10 mg/h of buprenorphine are roughly equivalent to 80 mg/day of morphine. Patches are usually changed every 7 days. You should always check patients for these patches and make sure that multiple patches aren't applied unless explicitly directed by the prescriber. Buprenorphine has a long half-life of up to 44 hours.<sup>13</sup> Know that because of this, it can remain in a patient's system for up to 3 days, even if the patch is removed. Patients may bathe and shower with patches in place. Buccal and sublingual buprenorphine is also used to control pain. They can be dosed three to four times a day (see *Common formulations of buprenorphine*).

### Pharmacokinetics of buprenorphine

Buprenorphine, if taken orally, isn't effective. It has a heavy first-pass effect (the pathway from the GI tract to the liver), meaning that only a small amount of the medication reaches systemic circulation. Tablets, when swallowed, are about one-fifth as potent than if they'd been taken sublingually.

Buprenorphine's transdermal, buccal, and sublingual formulations were designed to bypass first-pass metabolism. Its metabolites are primarily excreted by the biliary system through enterohepatic

circulation—recycled from the liver to bile to small intestine, then transported back to the liver—and indirectly through feces and urine. Buprenorphine isn't metabolized through the kidneys, making it safe for most patients with kidney disease.

### Safety and adverse reactions

Although overdose from buprenorphine is rare, where it does happen, it's almost always when buprenorphine has been taken in combination with central nervous system depressants such as benzodiazepines or alcohol.<sup>14,15</sup> Common adverse reactions are like those of full-agonist opioids, but typically much less pronounced. These include constipation, headache, nausea, urinary retention, sedation, small pupils (miosis), and dizziness. You can help patients manage constipation by encouraging adequate fluid intake and a diet rich in fiber that includes fruits and vegetables.

### Sexual adverse reactions

All opioids including buprenorphine can cause sexual adverse reactions that include loss of libido and erectile dysfunction.<sup>16</sup> Opioids block testosterone production, which affects sexual function for all genders. Sexual adverse reactions may be more severe when on full-agonist opioids than on buprenorphine. One study showed sexual dysfunction was four times higher on methadone than on buprenorphine.<sup>17</sup>

This is an important topic to discuss with your patients who are on buprenorphine, as it can be a reason for

### Common formulations of buprenorphine

Brand name	Delivery form	Frequency	Indication
Sublocade	Depot injection	Monthly	Opioid use disorder
Belbuca	Buccal film	Every 12 hours	Severe pain
Butrans	Transdermal patch	Weekly	Severe pain
Buprenex	Injection	Every 6 hours	Severe pain

## Test your knowledge

1. When explaining buprenorphine's action on the opioid receptors, the nurse correctly states that:
  - a. Buprenorphine is an antagonist on the MOR and an agonist on the DOR and KOR.
  - b. Buprenorphine is a partial agonist on the MOR, an agonist on the DOR, and an antagonist on the KOR.
  - c. Buprenorphine is a full agonist on the MOR, DOR, and KOR.
  - d. Buprenorphine is a partial agonist on the MOR and an antagonist on the DOR and KOR.
2. Which of the following is NOT an FDA-approved indication for buprenorphine?
  - a. Use as an antidepressant
  - b. Use for chronic pain
  - c. Use for acute pain
  - d. Treatment of OUD
3. True or false: Buprenorphine is a less powerful pain medication than morphine.
  - a. True
  - b. False
4. A nurse is providing pre-op teaching to a patient scheduled for elective surgery. Which explanation best describes why the patient has been directed to reduce their buprenorphine dose to 8 mg/day 2 days before surgery?
  - a. This will make it easier for the anesthesia to work.
  - b. Buprenorphine is contraindicated for surgical patients.
  - c. Reducing the dose of buprenorphine will free some pain receptors up so that the team can use additional full-agonist pain medication.
  - d. Reducing the dose of buprenorphine will free some pain receptors up so that I.V. ketorolac can be prescribed.
5. True or false: Patients taking buprenorphine don't experience sexual adverse reactions.
  - a. True
  - b. False
6. A nurse is educating a patient at a prenatal visit. The patient is 15 weeks pregnant and wants to stop taking her 16 mg buprenorphine-naloxone daily as prescribed for OUD. What is the most appropriate response from the nurse?
  - a. "I think that's a good idea. You wouldn't want to do anything that could hurt your baby."
  - b. "Why don't we talk to your doctor about cutting down your dose?"
  - c. "Studies show that individuals who continue buprenorphine during pregnancy have better pregnancy outcomes."
7. A patient who is newly prescribed buprenorphine-naloxone for OUD tells his nurse, "I don't think this medication is really doing anything. I just feel normal." Which response by the nurse is the most correct?
  - a. "Maybe you need to talk to your doctor about increasing your dose."
  - b. "Buprenorphine controls your withdrawal cravings and your desire to use, but it blocks the feelings of euphoria that you get with regular opioids."
  - c. "You probably aren't taking the medication correctly. Let's review how you take buprenorphine-naloxone."
8. True or false: For patients who were taking buprenorphine during pregnancy, it's safe to take while breastfeeding.
  - a. True
  - b. False

### ANSWERS:

1. D. Why: Buprenorphine dials down the MOR (partial antagonist) and turns off the DOR and KOR (antagonizes).
2. A. Why: Although research shows buprenorphine may have antidepressant properties, this isn't an FDA-approved indication.
3. False. Why: Research shows buprenorphine is up to 100 times more powerful than morphine.
4. C. Why: Decreasing a patient's dose 24 hours preoperatively frees MORs, enabling pain management with full-agonist opioids. At discharge, the patient returns to his or her usual dose of buprenorphine.
5. False. Why: As with all opioids, patients can experience sexual adverse reactions such as loss of libido and erectile dysfunction. These effects are generally less of an issue with buprenorphine versus full-agonist opioids.
6. C. Why: For pregnant individuals with OUD, treatment with buprenorphine is much safer both for the parent and the fetus than counseling alone.
7. B. Why: As a partial agonist on the MOR, buprenorphine provides pain relief and blocks feelings of withdrawal, but it doesn't create euphoria or clouded thinking. C is incorrect because the patient states he feels normal and therefore isn't experiencing withdrawal or pain.
8. True. Why: For patients who were using buprenorphine during pregnancy, it's safe—and even recommended—to breastfeed their baby. There's good evidence that this can help treat or prevent NAS. The amount of buprenorphine found in breastmilk is relatively small, but it wouldn't be a good idea to introduce breastmilk from a person taking buprenorphine to an opiate-naïve baby.

## Consider this

Robert, 54, is admitted to a hospital for pyelonephritis and a right kidney stone. He presents with a fever of 102.4° F, painful urination with hematuria, nausea, vomiting, and right flank pain. He has a history of failed back surgery with escalating Oxycontin use that led to OUD. Six months ago, an addiction specialist transitioned Robert to buprenorphine/naloxone 8 mg twice a day and he has responded well. Today he rates his pain at a 9 out of 10, and he worries that additional pain medications won't help.

Because Robert has an anticipated short hospitalization, the nurse advises that Robert should continue his usual dose of buprenorphine and that they can provide additional opioids as needed. Nurses continue his buprenorphine/naloxone at 4 mg sublingual film four times a day and add hydromorphone 1 mg I.V. every 2 hours while Robert can't tolerate oral medications. Once this regimen is established, Robert reports that his pain is well controlled for the duration of his stay.

nonadherence or psychological distress. Male patients sometimes wonder if they can take sildenafil with buprenorphine. There are no known contraindications, but patients should check with their provider.

### Buprenorphine during pregnancy

All opioids, including buprenorphine, can cause harm to the fetus. The greatest risks are from opioid misuse; withdrawal places stress on the fetus, which could result in impaired placental function, preterm labor, stunted growth, fetal convulsions, fetal death, and maternal death. Buprenorphine, when taken throughout pregnancy as an ongoing treatment for OUD, stabilizes maternal and fetal opioid levels. For these patients, it's much safer to be on buprenorphine than to receive counseling alone because of the high risk of relapse.<sup>18</sup>

Until recently, gestational parents received buprenorphine-only products for OUD because it was thought that the naloxone in buprenorphine-naloxone might

harm the fetus. Recent studies show very little naloxone crosses the placenta and that buprenorphine-naloxone may be safer for patients than a buprenorphine mono-product because of the lower potential for diversion or misuse.<sup>19,20</sup>

Babies born to parents who have taken buprenorphine during pregnancy may have neonatal abstinence syndrome (NAS), but symptoms are less severe than those born to parents using full-agonist opioids such as methadone during pregnancy. Symptoms of NAS occur within 72 hours after birth and include tremors, irritability, fever, and diarrhea, among other symptoms.<sup>21</sup> Breastfeeding is considered safe for individuals who have been on buprenorphine throughout pregnancy and can be helpful in treating mild symptoms of NAS.<sup>22</sup>

### Special considerations for surgery

Patients undergoing surgery require special consideration if they're taking buprenorphine. Generally, for a minimally painful and brief procedure such as a colonoscopy, the patient can maintain his or her normal dose of buprenorphine. Nonopioid pain medication may be offered preprocedure; however, additional full agonists will likely have little effect because the patient's opioid receptors are fully occupied by buprenorphine. Pain specialists will typically ask a patient to reduce their dose of buprenorphine

## Memory jogger

### Buprenorphine

- **Half-life:** The half-life ranges from 24 to 42 hours.
- **Peak onset:** Onset of effects is about 30 to 60 minutes. Peak clinical effect ranges from 1 to 4 hours.<sup>5</sup>

48 hours prior to surgery. This will leave some opioid receptors “uncovered.” The patient will take full-agonist opioids in addition to the buprenorphine, then transition back to their regular regimen after hospitalization.<sup>23,24</sup>

If medication reversal is required, staff should be prepared to administer multiple large doses of naloxone and monitor carefully due to buprenorphine’s long half-life and its affinity for the MOR. It may take as long as 3 hours for a dose of 10 mg of naloxone to completely reverse buprenorphine.<sup>25</sup> A continuous infusion of naloxone is effective in reversing overdose related to buprenorphine.<sup>26</sup>

Remember that patients who are on buprenorphine will likely have a higher perioperative need for opioid pain medications. That’s because with chronic exposure to buprenorphine (or any opioid), the body develops a tolerance to opioids by down-regulating (decreasing) the number of opioid receptors. The fewer the receptors, the greater the amount of opioid medication required to achieve effect.

The risk of respiratory depression is low with buprenorphine, but it’s greatly increased if a patient is placed on supplemental full-agonist opioids. It’s very important that you closely monitor these patients for signs of respiratory depression such as somnolence, reduced respiratory rate, and minimal to no response to verbal or physical stimulation.

## Wrapping it up

So, what’s the buzz about buprenorphine? You now know it doesn’t create a “buzz.” Patients taking it don’t feel “high” or euphoric; they feel normal. But that doesn’t mean it’s not a strong pain medication. Here are some other key takeaways:

- Buprenorphine is widely used to treat OUD.
- It’s best absorbed through the skin, sublingually, or buccally. Buprenorphine isn’t effective if swallowed.

## On the web

### How opioid addiction occurs

[www.mayoclinic.org/diseases-conditions/prescription-drug-abuse/in-depth/how-opioid-addiction-occurs/art-20360372](http://www.mayoclinic.org/diseases-conditions/prescription-drug-abuse/in-depth/how-opioid-addiction-occurs/art-20360372)

### How do medications to treat opioid use disorder work?

<https://nida.nih.gov/publications/research-reports/medications-to-treat-opioid-addiction/how-do-medications-to-treat-opioid-addiction-work>

### CDC:

### Treatment for opioid use disorder before, during, and after pregnancy

[www.cdc.gov/pregnancy/opioids/treatment.html](http://www.cdc.gov/pregnancy/opioids/treatment.html)



- Buprenorphine binds tightly on the MOR and stays there for up to 3 days.
- It’s difficult for patients to overdose on buprenorphine, but it’s possible. You need to closely monitor patients who are taking it with other central nervous system depressants.

Buprenorphine is a powerful and complex medication. Keep these points in mind when you meet your first patient who takes it, and you’ll manage the medication like an expert. ■

## REFERENCES

1. Han B, Jones CM, Einstein EB, Compton WM. Trends in and characteristics of buprenorphine misuse among adults in the US. *JAMA Netw Open*. 2021;4(10):e2129409.
2. Gudin J, Fudin J. A narrative pharmacological review of buprenorphine: a unique opioid for the treatment of chronic pain. *Pain Ther*. 2020;9(1):41-54.
3. Shukla AK, Singh G, Ghosh E. Emerging structural insights into biased GPCR signaling. *Trends Biochem Sci*. 2014;39(12):594-602.
4. Hilger D, Masureel M, Kobilka BK. Structure and dynamics of GPCR signaling complexes. *Nat Struct Mol Biol*. 2018;25(1):4-12.
5. Khanna IK, Pillarisetti S. Buprenorphine—an attractive opioid with underutilized potential in treatment of chronic pain. *J Pain Res*. 2015;8:859-870.
6. Valentino RJ, Volkow ND. Untangling the complexity of opioid receptor function. *Neuropsychopharmacology*. 2018;43(13):2514-2520.
7. Moore DJ, Goyal D, Rodriguez L. Experiences of opioid use disorder patients receiving buprenorphine through a telehealth program. *J Addict Nurs*. 2021;32(3):205-210.
8. Stanciu CN, Glass OM, Penders TM. Use of buprenorphine in treatment of refractory depression—a review of current literature. *Asian J Psychiatr*. 2017;26:94-98.
9. Spadaro A, Long B, Koyfman A, Perrone J. Buprenorphine precipitated opioid withdrawal: prevention and management in the ED setting. *Am J Emerg Med*. 2022;58:22-26.

10. Urits I, Pham C, Swanson D, et al. The utilization of buprenorphine in chronic pain. *Best Pract Res Clin Anaesthesiol.* 2020;34(3):355-368.
11. Middleton LS, Nuzzo PA, Lofwall MR, Moody DE, Walsh SL. The pharmacodynamic and pharmacokinetic profile of intranasal crushed buprenorphine and buprenorphine/naloxone tablets in opioid abusers. *Addiction.* 2011;106(8):1460-1473.
12. Aiyyer R, Gulati A, Gungor S, Bhatia A, Mehta N. Treatment of chronic pain with various buprenorphine formulations: a systematic review of clinical studies. *Anesth Analg.* 2018;127(2):529-538.
13. Elkader A, Sproule B. Buprenorphine: clinical pharmacokinetics in the treatment of opioid dependence. *Clin Pharmacokinet.* 2005;44(7):661-680.
14. Wightman RS, Perrone J, Scagos R, Krieger M, Nelson LS, Marshall BD. Opioid overdose deaths with buprenorphine detected in postmortem toxicology: a retrospective analysis. *J Med Toxicol.* 2021;17(1):10-15.
15. Darke S, Duflou J, Larance B, Farrell M, Lappin J. Characteristics and circumstances of death related to buprenorphine toxicity in Australia. *Drug Alcohol Depend.* 2021;218:108360.
16. Baykara S, Alban K. The effects of buprenorphine/naloxone maintenance treatment on sexual dysfunction, sleep and weight in opioid use disorder patients. *Psychiatry Res.* 2019;272:450-453.
17. Yee A, Loh HS, Hashim HM, Ng CG. The prevalence of sexual dysfunction among male patients on methadone and buprenorphine treatments: a meta-analysis study. *J Sex Med.* 2014;11(1):22-32.
18. Ko JY, D'Angelo DV, Haight SC, et al. Vital signs: prescription opioid pain reliever use during pregnancy—34 U.S. jurisdictions, 2019. *Morb Mortal Wkly Rep.* 2020;69(28):897-903.
19. Link HM, Jones H, Miller L, Kaltenbach K, Seligman N. Buprenorphine-naloxone use in pregnancy: a systematic review and metaanalysis. *Am J Obstet Gynecol MFM.* 2020;2(3):100179.
20. Mullins N, Galvin SL, Ramage M, et al. Buprenorphine and naloxone versus buprenorphine for opioid use disorder in pregnancy: a cohort study. *J Addict Med.* 2020;14(3):185-192.
21. Hirai AH, Ko JY, Owens PL, Stocks C, Patrick SW. Neonatal abstinence syndrome and maternal opioid-related diagnoses in the US, 2010-2017. *JAMA.* 2021;325(2):146-155.
22. Gieseke L, Adams S, Speirs J, Orobona M, Stuart K. What are the risks and benefits to breastfeeding infants when mothers are on medication-assisted therapy with methadone and buprenorphine? *Evid Based Pract.* 2022;25(3):43-44.
23. Lembke A, Ottestad E, Schmiesing C. *Patients Maintained on Buprenorphine for Opioid Use Disorder Should Continue Buprenorphine through the Perioperative Period.* Vol 20. Oxford University Press; 2019:425-428.
24. Warner NS, Warner MA, Cunningham JL, et al. A practical approach for the management of the mixed opioid agonist-antagonist buprenorphine during acute pain and surgery. In: *Mayo Clinic Proceedings.* Vol 95. Elsevier; 2020:1253-1267.
25. Gal TJ. Naloxone reversal of buprenorphine induced respiratory depression. *Clin Pharmacol Ther.* 1989;45(1):66-71.
26. Pedapati EV, Bateman ST. Toddlers requiring pediatric intensive care unit admission following at-home exposure to buprenorphine/naloxone. *Pediatr Crit Care Med.* 2011;12(2):e102-e107.

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