Opioid use disorder: Epidemiology, clinical features, health consequences, screening, and assessment

AUTHOR: Eric Strain, MD
SECTION EDITOR: Andrew J Saxon, MD
DEPUTY EDITOR: Michael Friedman, MD

All topics are updated as new evidence becomes available and our peer review process is complete.

Literature review current through: **Oct 2023.**
This topic last updated: **Jul 07, 2022.**

INTRODUCTION

Opioids, used medically for pain relief, have analgesic and central nervous system depressant effects as well as the potential to cause euphoria. Opioid use disorder (OUD) can involve misuse of prescribed opioid medications, use of diverted opioid medications, or use of illicitly obtained heroin. OUD is typically a chronic, relapsing illness, associated with significantly increased rates of morbidity and mortality.

In patients with OUD who have achieved abstinence through medically supervised withdrawal or by other means, maintenance treatment aims to prevent relapse. Options for long-term maintenance treatment include an opioid agonist (ie, methadone or buprenorphine), an opioid antagonist (naltrexone), or nonmedication, abstinence-based treatment.

The psychiatric diagnoses in the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) opioid abuse and opioid dependence were replaced by one diagnosis, OUD, in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) [1].

This topic describes the epidemiology, pharmacology, screening, assessment, and diagnosis of OUD. Treatment of the disorder is discussed separately. Management of intoxication and withdrawal from opioids is discussed separately. Addiction in impaired clinicians and misuse of prescription drugs are also discussed separately.

- (See "Opioid use disorder: Pharmacologic management".)
- (See "Acute opioid intoxication in adults".)
- (See "Opioid withdrawal in the emergency setting".)
- (See "Opioid withdrawal: Medically supervised withdrawal during treatment for opioid use disorder".)
- (See "Substance use disorders in physicians: Assessment and treatment".)
- (See "Substance use disorders in physicians: Epidemiology, clinical manifestations, identification, and engagement".)
- (See "Prescription drug misuse: Epidemiology, prevention, identification, and management".)

TERMINOLOGY

- **Opioid** – The term opioid refers to natural and synthetic substances that act at one of the three main opioid receptor systems (mu, kappa, delta). Opioids can have analgesic and central nervous system depressant effects as well as the potential to cause euphoria.

- **Slang terms for opioid use**

  - Intranasal use – "snorting" or "sniffing"
  - Intravenous use – "shooting up" or "mainlining"
  - Subcutaneous use – "skin-popping"
  - Intramuscular use – "muscling"

- **Heroin** – Heroin is a derivative of morphine and is the opioid most commonly taken by injection. The chemical name for heroin is diacetylmorphine.

  Slang terms for heroin include dope, horse, smack, China white, junk, and tar.

- **Opium** – Opium, extracted from the opium poppy, and containing morphine and codeine, is most commonly self-administered by smoking, but can also be eaten. It is more commonly misused in the Middle East and Asia than in the United States.

- **Endorphin** – The term endorphin refers to a subclass of opioids consisting of endogenous peptides (ie, peptides produced by the human body) that cause pain relief, including enkephalins, dynorphins, and beta-endorphins.

- **Prescribed opioids** – Opioid medications are prescribed principally for pain relief. Because they have the potential for misuse and addiction, their use is regulated by the Controlled Substances Act in the United States and by similar statutes in other countries.

- **Opiates** – Opiate refers to a subclass of opioids consisting of alkaloid compounds that occur naturally in the opium poppy, including morphine and codeine.

- **Synthetic opioids** – Oxycodone and hydrocodone are semi-synthetic opioids. Synthetic opioids include fentanyl, tramadol, and methadone.

Prescribed opioids are subject to misuse and addiction. Clinicians and other health care personnel with access to these medications are at risk of misuse of these and other medications classified as controlled substances. (See "Prescription drug misuse: Epidemiology, prevention, identification, and management" and "Substance use disorders in physicians: Epidemiology, clinical manifestations, identification, and engagement".)

EPIDEMIOLOGY

Since the 1990s, the increasing incidence of opioid use disorder (OUD) and overdose deaths involving opioids have reached epidemic proportions [2]. Rising use has been seen with both illicit and prescribed opioids:

- In the United States, 5.7 million people (2.1 percent of people aged 12 or older) were estimated in 2019 to have used heroin at some point in their lives; 431,000 (0.2 percent) reported use in the last month [3]. Between 2002 and 2018, the prevalence of heroin use and heroin use disorder nearly doubled [4]. There has been an increase in heroin-related overdose deaths with nearly 15,000 reported in 2018 [5]. The incidence of opioid overdose is reviewed in greater detail separately. (See "Prevention of lethal opioid overdose in the community".)

- Use of illicit synthetic opioids, such as fentanyl, has also increased in the United States. The number of deaths from use of these synthetic opioids (excluding methadone) has been increasing, with an age-adjusted rate of 9.0 percent in 2017 (28,466 deaths) increasing to 9.9 percent (31,335 deaths) in 2018 [6].

- Three million, eight-hundred thousand people in the United States aged 12 and older reported past month misuse of a prescription pain medication in 2015 [7]. Of these, 2.0 million had an American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) disorder of opioid use or dependence during the past year [7]. Prescription opioids are most commonly obtained from a relative or friend rather than directly from a clinician, but prescription-opioid users at highest risk of overdose are as likely to get them from a clinician as a relative or friend [8].

Approximately two-thirds of people who primarily use heroin have been reported to additionally use prescription opioids [9], and there is evidence that the first opioid misused is most frequently a prescription opioid, rather than heroin (as was the case in the 1960s through 1980s) [10,11]. Heroin use is increasing for persons who begin by first having nonmedical use of opioid analgesics [12].

Illicit use of fentanyl, a highly potent synthetic opioid often used to "cut" heroin, has grown in the United States, contributing to a rise in overdoses [2]. Illicit use of tramadol, a lower-potency synthetic opioid that is not on the list of controlled substances regulated by the International Narcotics Control Board, is reported to have become widespread in Africa [13]. Tramadol is a schedule IV controlled substance in the United States.

Pregnant women — The national prevalence of OUD in the United States among pregnant women at hospital delivery is estimated to have increased more than fourfold from 1999 through 2014 [14]. The prevalence increased from 1.5 to 6.5 cases per 1000 delivery hospitalizations. Prevalence rates were calculated from national data and data from 30 states and the District of Columbia. The results are generally consistent with increasing rates of neonatal abstinence syndrome and OUD in the general population. (See "Prenatal care: Patient education, health promotion, and safety of commonly used drugs" and "Prenatal substance exposure and neonatal abstinence syndrome (NAS): Management and outcomes" and "Opioid use disorder: Overview of treatment during pregnancy".)

Risk factors — Data on the nongenetic risk factors for the development of OUD are often based upon case-control studies. These studies show that risk factors for the misuse of prescription opioids include a prior history of substance use disorder, younger age, more severe pain, and co-occurring mental disorders [15]. Risk factors for OUD are likely similar to these. In addition, a risk factor for OUD includes a history of childhood maltreatment (eg, sexual, physical, or emotional abuse or neglect) [16]. Patient risk factors for prescribed opioid misuse and OUD are described in greater detail separately. (See "Prescription drug misuse: Epidemiology, prevention, identification, and management", section on 'Opioid analgesics'.)

PHARMACOLOGY

Mechanism of action — Opioids activate specific transmembrane neurotransmitter receptors (mu, kappa, delta) that couple G proteins. G proteins are molecular intermediaries that initiate the intracellular communication process. Stimulation of G proteins begins the intracellular process of signal transduction. (See "Peptide hormone signal transduction and regulation".)

Activation of endogenous mu opioid receptors results in the prototypic opioid effects of reward, withdrawal, and analgesia. Mu receptor activation can mediate a variety of G proteins that lead to secondary effects on messenger-generating enzymes (adenyl cyclase and phospholipase-C) [17]. Secondary messengers such as cyclic adenosine monophosphate (cAMP) are acutely decreased by opioid receptor activation. Chronic opioid receptor activation results in molecular effects opposite to those of acute opioid administration. Long-term opioid use causes up regulation of cAMP along with changes in gene transcription.

Opioid receptors are located in the central and peripheral nervous system. The effects of activation of neuronal mu receptors will depend on the location of the receptor, the types of G proteins present in the activated neural tissues, and the frequency and duration of activation. Activation of mu receptors in the central nervous system results in responses such as respiratory depression, analgesia, euphoria, and miosis. Stimulation of peripheral mu opioid receptors, in smooth muscle of the bronchi and intestines, results in cough suppression and opioid-induced constipation.

Pharmacokinetics — Heroin has a half-life of 30 minutes but a duration of action of four to five hours due to active metabolites, including morphine [18]. Heroin is metabolized to 6-monoacetylmorphine [19], a metabolite specific to heroin, detectable on urine testing. (See 'Laboratory evaluation' below.)

Like all opioids, heroin binds to receptors that are part of the endogenous opioid systems [20]. Certain opioids can also act on several other central nervous system neurotransmitter systems, including dopamine, gamma-amino-butyric acid, and glutamate. Heroin is more lipid soluble than other opioids, allowing it to rapidly cross the blood-brain barrier (within 15 to 20 seconds) and to reach high brain levels [21].

Genetic polymorphisms and drug interactions — Between 1 and 7 percent of Caucasians of European descent have a genetic defect placing them at risk of respiratory depression from small doses of codeine [22]. This group has multiple functional alleles for cytochrome P-450 enzyme CYP2D6, making them "ultrarapid metabolizers" of codeine into morphine. Their increased metabolism can result in potentially lethal morphine levels.

CLINICAL MANIFESTATIONS

Patients presenting with an opioid use disorder (OUD) may appear acutely intoxicated, in opioid withdrawal, or show no acute effects related to their opioid use. (See "Acute opioid intoxication in adults" and "Opioid withdrawal in the emergency setting".)

Patients who are acutely intoxicated can have slurred speech, appear sedated ("nodding"), and have pinpoint pupils (miosis). If they have injected opioids, then fresh injection sites may be visible on the physical examination. The duration of acute intoxication will depend upon the half-life of the drug taken as well as the patient's tolerance to opioids.

Patients who have developed tolerance to opioids may show no acute effects after use of the drug at a dose typical for that patient. They may not be presenting for treatment of their addiction, but when hospitalized for other reasons may show signs of opioid withdrawal.

Patients with OUD typically have impaired social functioning, which in our clinical experience can vary widely in association with the severity and duration of the disorder. Patients with a mild disorder may maintain jobs and relationships, but detailed interviewing can often reveal problems related to drug use.

Patients with a severe disorder may present impoverished and engaged in illegal behavior (eg, shoplifting, burglary, prostitution) to obtain money with which to purchase heroin or other opioids [23]. Use of heroin (or other illicit opioids) can become the organizing feature in the lives of some patients, and their day is centered on either obtaining money to purchase the drug or using the drug. Other aspects of life, such as work and relationships, may be sacrificed for their drug use. While this lifestyle can lead to legal problems, many users are not antisocial (or sociopathic); once they achieve stability, such as through engagement in methadone treatment, problems with the law no longer occur; other aspects of their life (work, relationships) also return to more normal patterns.

HEALTH CONSEQUENCES

Patients with severe opioid use disorder (OUD) sometimes appear debilitated and in poor general health. Patients with a mild or moderate disorder may not appear to be in overtly poor health. Specific medical conditions that may result from opioid use include:

Infection — Contaminated drugs and inadequately sterile technique with injection drug use leads to localized and systemic infections (eg, cellulitis, localized abscess at the injection site, endocarditis, osteomyelitis). (See "Native valve endocarditis: Epidemiology, risk factors, and microbiology" and "Cellulitis and skin abscess: Epidemiology, microbiology, clinical manifestations, and diagnosis" and "Nonvertebral osteomyelitis in adults: Clinical manifestations and diagnosis".)

Injection drug use with shared needles or syringes is associated with an increased risk of infection with a bloodborne pathogen, such as HIV, hepatitis B, and hepatitis C. Individuals with

substance use disorder are also at increased risk for systemic bacterial infections, such as pneumonia and tuberculosis. (See "Substance use disorders: Clinical assessment".)

Hepatitis C virus infection may also occur in those who use heroin but do not inject it. Transmission has been associated with tattooing [24] and sharing of straws for intranasal insufflation [25,26]. (See "Epidemiology and transmission of hepatitis C virus infection".)

Rising incidence rates or hospitalization rates for many of these infections have accompanied the epidemic of OUD seen since 2000 [27-29].

Systemic effects

- **Opioid-induced bowel syndrome** – Opioid agonists affect gastrointestinal motility with effects that usually manifest as constipation, but can result in bloating, early satiety, and pain. Patients occasionally develop ileus or a syndrome characterized by a relatively high level of abdominal pain. When pain is significant, the term "narcotic bowel syndrome" has sometimes been applied. (See "Prevention and management of side effects in patients receiving opioids for chronic pain", section on 'Opioid bowel dysfunction'.)

- **Opioid-induced hyperalgesia** – Chronic use of opioid agonists may result in hyperalgesia, characterized by an increased sensitivity to pain. The pain can be severe, chronic or recurring, and significantly reduced following medically supervised withdrawal from the opioids. Not all patients treated with chronic opioids develop opioid-induced hyperalgesia. (See "Prevention and management of side effects in patients receiving opioids for chronic pain", section on 'Opioid-induced hyperalgesia' and "Opioid use disorder: Pharmacologic management", section on 'Adverse effects'.)

- **Opioid-associated liver fibrosis** – People who use opioids are at greater risk for liver-related morbidity and mortality [30,31]. In a cross-sectional analysis of 679 participants from a cohort of people living with and without HIV, the association between heroin use and liver fibrosis was examined using magnetic resonance elastography [30]. Heroin use was found to be associated with liver fibrosis (odds ratio 2.77, 95% CI 1.18-6.50) independently of other substance use, HIV, or hepatitis C virus infection. The exact mechanism of fibrosis is unknown. (See "Drug-induced liver injury".)

- **Opioid-related leukoencephalopathy** – This encephalopathy was initially described with heroin vapor inhalation [32]. It has a variable clinical spectrum and is associated with a spongiform leukoencephalopathy. Subsequent reports suggested that the leukoencephalopathy can also develop with heroin injection or snorting [33,34]. Despite

the rising prevalence of heroin inhalation, this complication remains rare. (See "Leukoencephalopathy due to heroin use".)

- **Opioid amnestic syndrome** – Approximately 19 cases of an opioid amnestic syndrome have been identified in the United States and Canada, characterized by acute onset amnesia, evidence of prior opioid use on history or toxicology, and magnetic resonance imaging (MRI) of the brain showing acute, bilateral hippocampal ischemia (image 1) [35]. It is possible, though controversial, that all of the cases involved fentanyl, a synthetic opioid, either in a transdermal formulation used as prescribed, obtained illicitly and consumed in overdose, or possibly used as an adulterant of heroin [36,37]. Diagnosis of this syndrome may require specific testing for synthetic opioids in patients with evidence of opioid use and use of MRI within one week in cases of amnesia after overdose.

Overdose and mortality — Opioid addiction is associated with increased mortality compared with the general population, principally due to higher rates of overdose and trauma. Opioid overdose and prevention are discussed separately (see "Prevention of lethal opioid overdose in the community"):

- In a Australian state-wide study of 42,676 people who received opioid pharmacotherapy between 1985 and 2006, mortality was elevated compared with age and sex-adjusted peers [38]. The two leading causes of death in the cohort were overdose and trauma. Treatment with methadone or buprenorphine was associated with a 29 percent reduction in mortality compared with periods out of treatment.

- A longitudinal study of 115 untreated individuals with heroin addiction found them to have mortality rate 63 times that expected for a non-using group of the same age and sex distribution, and higher than a group of former heroin users in methadone maintenance programs [39].

Other consequences

- Motor vehicle-related – Individuals who use heroin have higher rates of motor vehicle collisions than the general population [40]; those arrested for intoxicated driving have significantly increased rates of all-cause mortality [41]. Patients maintained on methadone or buprenorphine do not have significant deficits in tasks related to driving performance when not using illicit drugs [42].

- Risk of fracture – In a prospective study including over 539,000 individuals prescribed opioids, the risk of fracture was nearly four times greater during periods of exposure to opioids than during nonexposure periods (incidence rate ratio 3.93, 95% CI 3.82-4.04) [43].

The risk was greatest during the first week after starting opioid use (incidence rate ratio 7.81) and declined with increasing duration of use. The relevance of this study to individuals with OUD is uncertain, as it is likely most of these patients did not have OUD and were being treated for pain.

COURSE

A United States nationally representative survey found that, of people who had any lifetime use of heroin, 53 percent went on to develop an American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) disorder of heroin abuse or dependence. Persons who try heroin may be a select population that is inherently at higher risk for developing an opioid use disorder (OUD).

A 2015 study of a nationally representative (Australia), community-based sample estimated that 10 to 20 percent of patients prescribed opioids for non-cancer pain control developed a pharmaceutical OUD [44]. Most patients take analgesic opioid medications as prescribed without such consequences.

For persons who develop an OUD, relapse following withdrawal appears to be common, particularly if effective maintenance treatment is not established [45]. As an example, a study of persons undergoing a three-day inpatient medically supervised withdrawal from opioids found only 17 percent of patients reported being abstinent from opioids at a 30-day follow-up after discharge, although drug use decreased and treatment engagement increased following the withdrawal treatment [46]. Among persons who stabilize on an opioid agonist medication, such as methadone or buprenorphine, rates of relapse are significantly reduced [47]. (See "Opioid use disorder: Pharmacologic management" and "Continuing care for addiction: Implementation".)

SCREENING

We suggest screening in patients for whom there is evidence of risk for opioid misuse, for example, patients with hepatitis C virus or HIV infection, or who have not had a good response in terms of functional improvement to long-term opioid therapy for chronic pain. This suggestion is consistent with a multispecialty expert panel's 2018 recommendation that all patients receiving medical evaluation for endocarditis, bacteremia, skin abscess, vertebral osteomyelitis, HIV infection, or hepatitis C virus infection be screened for opioid use disorder (OUD) [48]. Although there are options for treating OUD, no data suggest that screening

improves engagement in or outcome of treatment. (See 'Epidemiology' above and 'Infection' above.)

Screening tools for opioid use that are not time consuming, have readily available scores, and have good sensitivity and specificity include [49,50]:

- Rapid opioid dependence screen (RODS) – An eight-item screening tool for opioid dependence. RODS can be administered as a stand-alone instrument or as part of a comprehensive interview.
- OWLS – A four-item self-administered screening tool to detect prescription opioid use disorder (OUD) in persons prescribed long-term opioid therapy.

Patients who screen positive for opioid misuse should be further evaluated for OUD using the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) criteria [1] (see 'Diagnosis' below). We recommend treating patients diagnosed with OUD with US Food and Drug Administration-approved medications for OUD and adjunctive psychosocial treatment as clinically indicated. (See "Opioid use disorder: Treatment overview" and "Opioid use disorder: Pharmacologic management".)

Screening tools for the detection of unhealthy use and misuse of alcohol and other substances are discussed elsewhere. (See "Screening for unhealthy use of alcohol and other drugs in primary care".)

ASSESSMENT

Substance use history — Taking a history of drug use with a patient who has been identified as using opioids should address what substances are used, frequency of consumption, and amount consumed as well as problematic consequences of use, treatment history, and age at first use, as described further below.

Consumption — It is difficult to know exactly how much active drug a patient has been using because street drugs are diluted (or "cut") by dealers with other substances prior to sale. Heroin purchased on the street may contain 10 to 40 percent active drug; the rest is an adulterant such as sugar, powdered milk, over-the-counter medications such as aspirin or pseudoephedrine (to counteract some of the drowsiness associated with the high), or even a prescription medication. Heroin becomes progressively more diluted and adulterated as it moves down the distribution chain [51]. Dealers and consumers generally do not know the proportion of heroin in the product they sell or use [52].

The amount of drug being consumed influences the likelihood and severity of withdrawal symptoms when the drug is stopped, so it is useful to obtain an estimate of the amount used (frequency and number of times per day). In the eastern United States, heroin users typically describe their quantity of use as number of “bags” of powder heroin. In the western United States, the quantity of tar heroin is typically characterized as fractions of a gram. People with an opioid use disorder (OUD) typically use heroin two to six times a day.

Another way to estimate quantity is to ask the patient how much he or she has been spending on heroin on the average day or week. Drug prices and/or the amount of pure heroin in a bag of a fixed amount vary widely based upon geography (even between neighborhoods), by demand, by amount of adulterant added, and over time [53]. A typical "quarter bag" ($25 worth) has enough adulterated heroin powder to snort several lines or inject several times, depending on the tolerance of the buyer. Amounts used can range from $20 to $200 per day.

It is important to determine if the patient uses other drugs and/or alcohol in addition to opioids. Obtaining an accurate history can be complicated, as patients may accelerate use of one substance (eg, alcohol) during times when heroin is less available. The clinician must accurately identify patients who need concomitant treatment for physiological dependence on alcohol or a benzodiazepine because withdrawal from these drugs can be life-threatening.

Inquire specifically about nonmedical use of prescription opioids, which many heroin users also consume. Ask about the drug, dose, and average number of tablets consumed daily. Over 10 percent of nonmedical use of prescription opioids involves "snorting" the tablet contents [54].

Route of administration — For both heroin and prescription opioids, ask about the route of administration.

- The intravenous route is rapid and produces high bioavailability but is also most dangerous to the user. Injection is the most efficient means of producing euphoria when relatively low-purity heroin is being used. Most overdoses occur when heroin is taken intravenously.

- Intranasal inhalation requires minimal equipment and the onset of action is rapid enough to produce euphoria. Increased purity and potency of heroin in the United States and concerns about overdose have resulted in a rising prevalence of heroin snorting in many areas [55].

- Opioids can be smoked; this is more common in Asian countries, where it is known as "chasing the dragon," but has become more popular worldwide, including some cities in the United States. Smoking opioids is the fastest route for delivering the drug to the brain.

Tolerance — The clinician should determine whether the patient has been using larger and larger amounts of heroin to get the same effect. This demonstrates tolerance to opioids and indicates that the patient is likely to experience withdrawal symptoms if he or she abruptly stops using. Many persons with OUD start out using heroin to get high then reach a point where they must use simply to avoid withdrawal symptoms.

Persons who have recently consumed an opioid and are tolerant to its effects may not show obvious signs of intoxication or withdrawal; injection sites may not be apparent on examination. A careful history, if possible including secondary informants, may help the clinician to identify the disorder.

Last use — The clinician should determine the date of last use and the dose, frequency and pattern of use at that time. This information, along with other history and examination, can be used to determine acute consequences for the OUD patient who has ceased to use opioids (eg, upon hospital admission). Symptoms of withdrawal, for example, indicate that the patient has developed physical dependence on opioids and may require medically supervised withdrawal treatment. (See "Opioid withdrawal: Medically supervised withdrawal during treatment for opioid use disorder".)

Treatment history — Ask whether and when the patient has received substance use disorder treatment and what type (medically supervised withdrawal, opioid maintenance with medications such as buprenorphine or methadone, inpatient, residential, outpatient counseling, or self-help groups such as Narcotics Anonymous). Asking the length of the longest period of abstinence helps predict the patient's ability to maintain abstinence in the future. In our clinical experience, abstaining from heroin for at least one year suggests a favorable prognosis for remaining abstinent again for a significant period of time.

Asking about problems that have resulted from drug use helps the patient to begin thinking about reasons to stop using drugs. Patients should be asked about past and present physical and psychiatric conditions as well as legal and social problems, especially if the patient has lost jobs, relationships, or freedom as a consequence of heroin use.

Physical examination — A physical examination should be conducted to elucidate common complications of opioid use and/or assist in diagnosing OUD. Chronic intravenous use can be confirmed by the presence of "track marks," which are callouses and scars that follow the course of a subcutaneous vein. These are caused by repeated injections into adjacent sites over an accessible vein. Tracks are often found in easily accessible body areas, such as the backs of the hands, antecubital fossae, on the legs, or in the neck. Signs of recent injection may be found in unusual places in patients attempting to hide their sites of injection. A thorough examination

for tracks or recent injection sites should include looking between the fingers and toes, under the fingernails and toenails, in the axillae, breast veins, and the dorsal vein of the penis.

The nasal septum should be examined for perforation from repeated intranasal insufflation (especially when cocaine is mixed with heroin and snorted). A heart murmur may indicate subacute bacterial endocarditis. Posterior cervical lymphadenopathy may suggest early viral infection, especially with HIV. Hepatic enlargement may indicate acute hepatitis; a small, hard liver is consistent with chronic viral hepatitis due to hepatitis B or C virus, which is common among injection drug users.

Signs of opioid intoxication may include pinpoint pupils, drowsiness, slurred speech, and impaired cognition. Signs of acute opioid withdrawal syndrome include watering eyes, runny nose, yawning, muscle twitching, hyperactive bowel sounds, and piloerection. (See "Acute opioid intoxication in adults" and "Opioid withdrawal: Medically supervised withdrawal during treatment for opioid use disorder".)

Laboratory evaluation

Opioid detection — Metabolites of morphine and heroin can be detected on a standard urine drug screen for one to three days after the last use and occasionally longer in chronic users (table 1). Many opioid analgesics, such as oxycodone, will often not be detected by this test, though it is possible to order a test that will specifically assess for drugs such as oxycodone. Methadone and buprenorphine are not typically detected on a routine “opioid” drug detection urine test and require a specific test for detection.

False-positive opiate drug screens have been reported in patients taking rifampin and quinolones [56,57] and in those eating poppy seeds (table 1) [58]. Confirmatory testing (eg, with gas chromatography, mass spectrometry, or high-performance liquid chromatography) is warranted in patients who have a positive screen after ingesting substances which might cause a false-positive result, although these techniques may not resolve the issue in the setting of poppy seed consumption.

The presence of 6-monoacetylmorphine (6-MAM) [19], a metabolite specific to heroin, on a urine test distinguishes the use of heroin from other opioids. 6-MAM is a short-lived metabolite. Failure to detect it in urine positive for opioids does not rule out the use of heroin or distinguish between heroin and pharmaceutical opioids.

Health risks — A complete blood count and liver function studies should be conducted as preliminary screening for infection, liver dysfunction, and other conditions; abnormal results may suggest need for further investigation.

Patients who use intravenous heroin are at risk for infections that include HIV, hepatitis (A, B, C), syphilis, and tuberculosis. They should receive:

- Counseling and encouragement to be tested for HIV (see "Screening and diagnostic testing for HIV infection")
- Testing for hepatitis A, B, and C. Hepatitis A and hepatitis B vaccination should be given to patients whose hepatitis serology is negative (see "Screening and diagnosis of chronic hepatitis C virus infection" and "Hepatitis A virus infection in adults: Epidemiology, clinical manifestations, and diagnosis" and "Hepatitis B virus: Screening and diagnosis in adults")
- A serologic test for syphilis (see "Syphilis: Screening and diagnostic testing")
- Testing for tuberculosis, with a purified protein derivative skin test in patients without a history of a prior positive skin test or by a QuantiFERON blood test in patients with a history of a positive test (see "Use of interferon-gamma release assays for diagnosis of tuberculosis infection (tuberculosis screening) in adults" and "Tuberculosis infection (latent tuberculosis) in adults: Approach to diagnosis (screening)")

Prescription monitoring programs — Prescription monitoring programs in the United States and other countries allow clinicians to identify patients prescribed opioid medications by multiple providers. Regulations in some states in the United States require clinicians to review this online resource prior to starting an opioid. (See "Prescription drug misuse: Epidemiology, prevention, identification, and management", section on 'Prescription monitoring programs'.)

DIAGNOSIS

The American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) diagnostic criteria for opioid use disorder (OUD) are described in a table (table 2) [1].

Most clinical trials of OUD treatment were conducted in samples of patients diagnosed using criteria for opioid dependence from Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) and earlier editions. Applying trial results to patients diagnosed with DSM-5 OUD is imprecise, but the most closely comparable group of patients is those with OUD, moderate to severe subtype. Opioid abuse is similar to the mild subtype of OUD.

SOCIETY GUIDELINE LINKS

Links to society and government-sponsored guidelines from selected countries and regions around the world are provided separately. (See "Society guideline links: HIV prevention" and "Society guideline links: Opioid use disorder and withdrawal".)

INFORMATION FOR PATIENTS

UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5th to 6th grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10th to 12th grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or e-mail these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on "patient info" and the keyword(s) of interest.)

- Basics topics (see "Patient education: Prescription drug misuse (The Basics)" and "Patient education: Opioid use disorder (The Basics)")

SUMMARY AND RECOMMENDATIONS

- **Epidemiology** – Synthetic opioids (eg, fentanyl) are the most commonly misused opioids in the United States and the leading cause of opioid-related overdoses in the United States. (See 'Terminology' above and 'Overdose and mortality' above and "Prescription drug misuse: Epidemiology, prevention, identification, and management".)

- **Clinical manifestations** – Signs of acute opioid intoxication include slurred speech, sedation, and pinpoint pupils. Patients who have developed tolerance to opioids may show no acute effects after use of the drug at a dose typical for that patient. (See 'Clinical manifestations' above.)

  In hospitalized patients with unacknowledged, undetected opioid use disorder, presenting signs and symptoms may be of opioid withdrawal (eg, dysphoria, restlessness, rhinorrhea, lacrimation, sweating, myalgias, nausea, vomiting, abdominal cramping, pupillary dilation,

and diarrhea). (See 'Clinical manifestations' above and "Opioid withdrawal in the emergency setting", section on 'Clinical features of opioid withdrawal'.)

- **Health consequences** – Health consequences of opioid use disorder include increased mortality, overdose, infections, endocarditis, narcotic bowel syndrome. Persons with opioid use have an increased rate of accident-related injuries compared with the general population. (See 'Health consequences' above.)

  Illicitly purchased heroin can vary in purity, leading to the user's lack of knowledge of the dose administered and increasing the risk of morbidity and mortality. (See 'Route of administration' above.)

- **Assessment** – We include the amount, frequency, and duration of opioid use, last use, and signs of tolerance, and use of other drugs and alcohol as part of our assessment of history. Additionally, we ask about problems resulting from drug use (eg, interpersonal, occupational) and prior substance use disorder treatment. Physical examination can detect signs of opioid use (eg, track marks, deviated nasal septum), as well as physical consequences of use (eg, infections and liver dysfunction). (See 'Assessment' above and 'Physical examination' above.)

  As part of the laboratory evaluation, we include screening for HIV and hepatitis A, B, and C. Vaccination for hepatitis A and hepatitis B should be given to those with negative serologies. (See 'Laboratory evaluation' above.)

  Urine drug tests can detect metabolites of heroin and morphine within three days of last use and possibly longer in chronic users. False-negative tests may occur because not all opioids are detected; false-positive tests can be seen in patients taking rifampin, quinolones, or eating poppy seeds. (See 'Opioid detection' above.)

- **Prescription monitoring programs** – In the United States and other countries prescription monitoring programs allow clinicians to identify patients prescribed opioid medications by multiple providers. Regulations in some states in the United States require clinicians to review this online resource prior to starting an opioid. (See 'Prescription monitoring programs' above and "Prescription drug misuse: Epidemiology, prevention, identification, and management", section on 'Prescription monitoring programs'.)

- **Diagnosis** – The diagnoses of opioid abuse and opioid dependence in the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) were replaced by opioid use disorder (mild, moderate,

and severe) in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5). (See 'Diagnosis' above.)

Topic 7804 Version 41.0