6 Co-occurring Substance-Use Disorder in the Emergency Department

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Introduction

All healthcare professionals working in emergency settings will encounter patients with substance-use disorders. Sixty-four percent of emergency department (ED) patients have problematic substance use, and more than 10% have a significant use disorder [1, 2]. Over the last decade, the number of ED visits involving substance use has increased by 37% [3]. Half of the trauma visits are associated with alcohol use, and generally the presence of a substance-use disorder is associated with higher ED utilization [4, 5].

In this chapter, we review an approach to the ED patient with a substance-use disorder:

1. Treat and stabilize the acute presentation
2. Assess for the presence of substance use
3. Manage the substance-use disorder as appropriate
4. Arrange appropriate disposition

Figure 6.1 summarizes this approach and the involved clinical steps. Throughout the chapter, we emphasize issues in the treatment of a patient with an alcohol-use disorder, as this presentation is common, and the involved complications are complex and life-threatening.

The Diagnosis of Substance-Use Disorders

Substance-use disorders comprise a group of problematic symptoms and behaviors resulting from drug or alcohol use that result in functional impairment. The Diagnostic and Statistical Manual, Fifth Edition (DSM-5) describes syndromes for specific substances, although the symptoms are similar regardless of substance used [6]. In general, the more symptoms that are present, the greater the severity of illness:

- Greater use of a substance than intended
- Unsuccessful efforts to control substance use
- Spending time obtaining or using substances, or recovering from their use
- Continued use despite recurrent social problems related to use
- Continued use in hazardous situations
- Reducing important occupational or recreational activities because of use
- Tolerance to the effects of a substance
- Characteristic withdrawal symptoms

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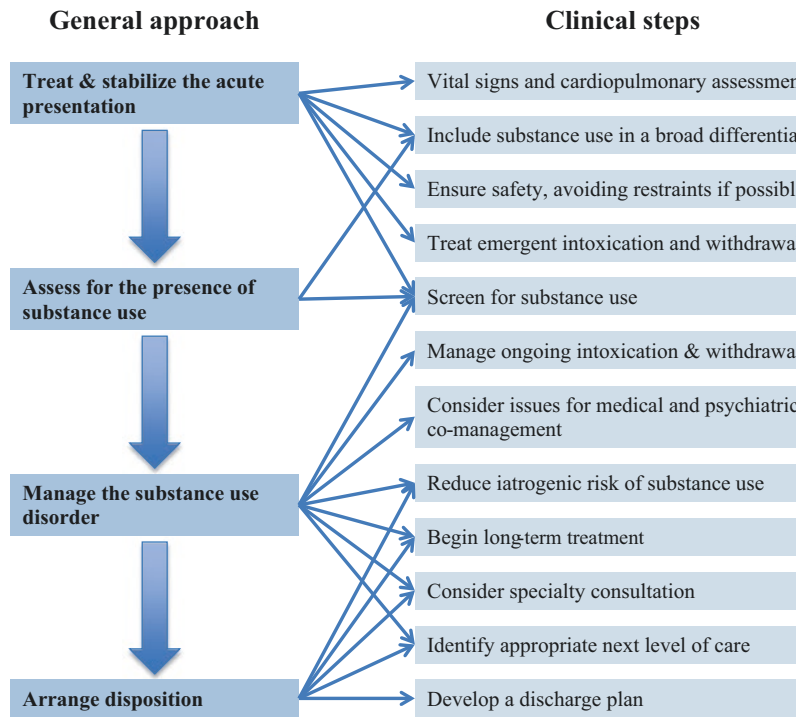

Fig. 6.1 Clinical approach to the ED patient with a substance use disorder

Not all patients who use substances fulfill the criteria for a formal use disorder. Although more than half of Americans are using alcohol in a given month, only about 10% of those have an alcohol-use disorder. About 19% of cannabis users have a cannabis-use disorder, and about 60% of cocaine users have a cocaine-use disorder. Patients may still exhibit risky substance use in the absence of a formal use disorder. For example, almost 40% of young adults have binged on alcohol (had ≥ 5 drinks on the same occasion) in the last month, although most would not fulfill criteria for a DSM-5 use disorder [7].

Treat and Stabilize the Acute Presentation

Substance-use disorders often present in two ways. First, patients present primarily because of the complications related to substance use. For example, a patient intoxicated on alcohol is violent and brought to the ED by the police. Alternatively, patients present for other reasons, and their treatment is complicated by substance use. For example, a patient with pneumonia is at increased risk for mortality because of concurrent alcohol use [8].

Maintain Safety, Stability, and a Broad Differential Diagnosis

As with any medical or behavioral emergency, initial treatment must start with ensuring hemodynamic stability and physical safety. Intravenous (IV) fluids and cardiac monitoring should be initiated as indicated, and the possibility of acute medical illness excluded [9]. Abnormal vital signs may represent the sequelae of substance use, but they may also indicate alternative or concurrent illnesses such as infection. Substance use may be associated with a number of life-threatening presentations:

- Behavioral illness, including agitation, violence, and suicidality.
- Cardiovascular illness, including myocardial infarction or arrhythmias, may occur in the setting of stimulant intoxication and, rarely,

cannabis intoxication. Alcohol withdrawal frequently causes arrhythmias.

- Neurological complications such as intracerebral hemorrhage can occur due to stimulant intoxication. Seizures may occur in the setting of alcohol or benzodiazepine withdrawal. Individuals who smoke are at risk for embolic events. Overdoses may result in a coma.
- Rhabdomyolysis may occur with patients who have been unconscious for prolonged periods or as a result of excited delirium due to stimulant use.
- Dangerous metabolic complications include hyponatremia, hepatic encephalopathy, or thiamine deficiency.

One particularly concerning metabolic complication in patients with severe alcohol-use disorder and malnutrition is beer potomania, in which a hypo-osmolar hyponatremia develops when the kidneys lack sufficient solute to excrete water. In the ED, a patient given just 1 l of IV normal saline may receive sufficient solute (in the form of sodium and chloride) to urinate several liters of fluid and reverse a severe hyponatremia over the course of only a few hours. This rapid reversal puts the patient at risk for central pontine myelinolysis. Thus, IV fluids should be given judiciously and only after evaluating for hyponatremia. A serum osmolality, urine osmolality, and urine sodium should be obtained. If beer potomania is suspected, renal consultation should be considered before administering IV fluids.

Providers must also ensure the safety of the patient and staff. Patients with alcohol and/or stimulant intoxication often arrive at the ED with intense agitation. Emergency medication treatment or physical restraints may be necessary, as described in the related Chap. 24. Also, consider that patients may have received treatment from paramedics prior to ED arrival (see the related Chap. 27).

Treat Emergent Intoxication

The medical implications of intoxication depend on the primary substance involved. Stimulant intoxication induces tachycardia, hyperthermia, and hypertension via its sympathomimetic effects; patients are at risk of myocardial infarction, arrhythmias including QT prolongation, intracerebral hemorrhage, and rhabdomyolysis [10, 11]. Cannabis toxidromes may be of greater intensity and length after the consumption of edible cannabis products [12]. These hyper-adrenergic states contrast with the profile of opioid intoxication, in which patients exhibit bradypnea and hypoactivity. Table 6.1 summarizes several intoxication syndromes and their treatment. See related Chap. 5 on drug intoxication for more guidance on management strategies.

Table 6.1 Clinical features and ED treatment of drug intoxication and withdrawal syndromes

Drug class	Features of intoxication	Treatment of intoxication[a]	Features of withdrawal	Treatment of withdrawal[a]
Alcohol	Belligerence, dysarthria, unsteady gait, smells of alcohol, variable vital signs	Typical antipsychotics, avoid benzodiazepines, may require restraint	Tachycardia, hypertension, diaphoresis, nausea, anxiety, tremor, seizures, psychosis	Benzodiazepines, barbiturates, anticonvulsants
Barbiturates	Bradycardia, hypotension, variable pupillary constriction, comatose	Respiratory support as indicated	Tachycardia, hypertension, diaphoresis, nausea, anxiety, tremor, seizures, psychosis	Benzodiazepines, barbiturates
Benzodiazepines	Vitals often normal, somnolent, comatose	Respiratory support as indicated, generally avoid flumazenil	Tachycardia, hypertension, diaphoresis, nausea, anxiety, tremor, seizures, psychosis	Benzodiazepines, barbiturates

(continued)

Table 6.1 (continued)

Drug class	Features of intoxication	Treatment of intoxication[a]	Features of withdrawal	Treatment of withdrawal[a]
Cannabis	Tachycardia, slowed speech lethargy, injected sclera, psychosis, smells of cannabis	Low-dose benzodiazepine or atypical antipsychotic	Irritability, anxiety, insomnia, decreased sleep, restlessness	Symptomatic treatment
Cocaine	Tachycardia, hypertension, dilated pupils, impulsive, agitation, perspiration, psychosis	Benzodiazepine	Fatigue, unpleasant dreams, irritability, somnolence, increased appetite	Symptomatic treatment
Dissociatives (ketamine, dextromethorphan)	Tachycardia and hypertension, psychomotor retardation	Benzodiazepine	Insomnia	Symptomatic treatment
Hallucinogens	Tachycardia, hypertension, dilated pupils, diaphoresis, impoverished thought process, psychosis, hyponatremia	Benzodiazepine, low stimulation environment	Clinically insignificant, may include fatigue, irritability, anhedonia	Symptomatic treatment
Inhalants	Nystagmus, incoordination, dysarthria, depressed reflexes, tremor, coma	Respiratory support as indicated	Tachycardia, diaphoresis	Symptomatic treatment
Opioids	Bradypnea, poor oxygen saturation, constricted pupils, dysarthria, lethargic	Respiratory support and oxygen as indicated; naloxone	Fever, dilated pupils, piloerection, dysphoria, nausea, muscle aches, diarrhea, fever, yawning	Opioid substitution (methadone or buprenorphine), clonidine, symptomatic treatment
MDMA	Tachycardia and hypertension, dilated pupils, awake, hypersexual	Benzodiazepine, low stimulation environment	Clinically insignificant, may include muscle pain	Symptomatic treatment
Methamphetamine	Tachycardia, hypertension, dilated pupils, agitation, psychosis, affective instability, leukocytosis	Benzodiazepine, atypical antipsychotic, may require restraint	Fatigue, unpleasant dreams, irritability, somnolence, increased appetite, diarrhea	Symptomatic treatment
PCP	Tachycardia, hypertension, dilated pupils, vertical nystagmus, hyperacusis, agitation, psychosis, belligerence	Benzodiazepine, antipsychotics, may require restraint	Somnolence, anxiety, diaphoresis	Symptomatic treatment

[a]All patients should receive supportive treatment including intravenous fluids, oxygen, and possible cardiac monitoring

Treat Emergent Withdrawal

Withdrawal syndromes may also require immediate treatment. As with toxidromes, the particular withdrawal syndrome reflects the substance of choice and may be indistinguishable from other psychiatric or medical illnesses. Table 6.1 summarizes some withdrawal syndromes and their treatment.

It is most important to recognize alcohol, benzodiazepine, or barbiturate withdrawal, as these syndromes may rapidly progress to life-

threatening agitation, seizures, and delirium tremens. Moreover, early recognition and treatment of alcohol withdrawal in the ED improve mortality [13]. Risk factors for alcohol withdrawal include a history of withdrawal symptoms, concurrent misuse of benzodiazepines, increased autonomic activity, or a blood alcohol level (BAL) of 200 or greater on presentation [14]. Acute medical or traumatic comorbidities increase the risk of severe withdrawal [15].

ED patients with an alcohol-use disorder often require treatment for withdrawal before their BAL decreases to zero, especially if the patient maintains a BAL above 300. Serious withdrawal can occur before the BAL is zero. Seizures may be the first sign of withdrawal and typically occur within the first few hours—and almost always within 48 hours—of the patient's last drink [16]. For example, a patient who typically maintains a BAL near 400 may seize with an elevated BAL. One-third of patients who experience a seizure will develop delirium tremens [16, 17].

There are three main pharmacologic approaches to treating alcohol withdrawal: front-loading, symptom-triggered, and a standing fixed taper method. Benzodiazepines are the mainstay of alcohol withdrawal treatment [18].

Front-loading involves administering high medication doses early in the course of withdrawal—for example, diazepam 20 mg IV every 5 minutes until the patient is sedated. Benzodiazepines with a quick onset of action and long half-life are ideal for front-loading, as they rapidly control symptoms and can self-taper over time [19]. Patients can be dosed in the presence of symptoms or the level of sedation (e.g., until their Richmond Agitation-Sedation Scale score is −1 or −2) [20]. Front-loading phenobarbitol decreases the risk of an intensive care unit admission and, later, more aggressive medication treatment [21]. Lorazepam drips—which are sometimes confused with front-loading, but rather are given over longer periods of time—should be avoided due to the risk of excessive sedation and prolonged lengths of stay.

Symptom-triggered benzodiazepine regimens provide safe, comfortable withdrawal, although they have limitations. Symptom scales must be administered by an experienced nurse or clinician, and patients must be able to appropriately answer questions. Some patients might score points for reasons other than alcohol withdrawal (e.g., due to anxiety from a primary psychiatric disorder) and thereby receive excessive medication. Patients who cannot be reliably assessed with a symptom-triggered scale should be treated with the fixed tapering regimen or front-loading approach.

Assess for the Presence of Substance Use

The assessment of substance use often begins with the provider's initial approach to the patient, when acute intoxication or withdrawal is part of a broad differential diagnosis. Less commonly considered are the implications of comorbid substance when treating other illnesses. Yet, the most common reason for patients with substance use to present to the ED is common illness [22]. Nonintoxicated ED trauma patients screen positive for substance-use disorders up to 46% of the time [23]. Providers should have little to no threshold to screen patients for substance-use disorders. Patients with frequent ED utilization, accidents or traumas, and substance-related presentations may particularly benefit from screening, as these conditions correlate with problematic substance use.

All patients with psychiatric symptoms should be screened for substance-use disorders. Many toxidromes induce psychiatric symptoms, including hallucinations, delusions, disorientation, and impaired consciousness. Acute psychiatric symptoms alone are insufficient to differentiate among etiologies, due to primary mental illness, delirium, or substance-induced conditions [24]. Additional history, laboratory testing, collateral information, or prolonged observation may be necessary for an accurate diagnosis.

Screening for substance use can begin with only a single question. The National Institute on Drug Abuse (NIDA) Quick Screen begins with an initial inquiry as to whether the patient has used illegal drugs, prescription drugs for nonmedical reasons, tobacco, or alcohol excessively (≥5 drinks/day for men or 4 for women) in the past year [25]. A response of "yes" merits further

evaluation, perhaps using the Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST) or Alcohol Use Disorders Identification Test (AUDIT) [26]. Another screening approach is the Drug Abuse Screening Test Modified for ED (DAST-ED), which incorporates brief questions for all substances [9]. In general, screening for greater frequency of use is more likely to identify patients with significant substance-use disorders (greater specificity) at the cost of missing some patients who may benefit from treatment (less sensitivity) [27].

Toxicology testing offers minimal diagnostic value when evaluating substance-use disorders and is unlikely to alter disposition decisions from the ED [28, 29]. Instead, the use of screeners and a clinical history are more valuable for diagnosis. Acute clinical signs, including vitals and physical examination findings, help identify acute intoxication or withdrawal. Toxicology testing in the ED is most helpful when the patient's mental status precludes a reliable history or the diagnosis is unclear.

Manage the Substance-Use Disorder

Once the patient has sobered and the presence of a substance-use disorder ascertained, providers will need to manage the use disorder in the setting of ongoing medical illness and provide appropriate treatment for the use disorder.

Manage Ongoing Withdrawal

Most withdrawal syndromes are not life-threatening, but they do complicate treatment and disposition from the ED. For example, patients with methamphetamine withdrawal experience intense dysphoria and psychomotor retardation such that they may be unable to provide a history, participate in treatment decisions, or discharge safely.

Opioid withdrawal is uncomfortable—so much so that these patients are more likely to leave the hospital prior to the completion of treatment [30]. Patients may benefit from the administration of methadone or buprenorphine to prevent detoxification while hospitalized. Patients who withdraw will be at increased risk for overdosing after hospital discharge, due to their decreased tolerance; maintaining tolerance with opioid substitution reduces this risk.

Consider Issues for Medical Management

Emergency providers must consider the impact of substance-use disorders on treatment plans for other medical conditions. For example, patients with opioid-use disorders and significant tolerance will require higher opioid doses for pain control; patients with sedative–hypnotic use are at risk for respiratory depression when administered opioids. The presence of an alcohol-use disorder may increase the risk of in-hospital mortality for conditions commonly seen in the ED, including pneumonia and orthopedic injuries [8, 31]. Substance use is a risk factor for early hospital discharge [30, 32, 33], and early discharge correlates with a greater 30-day mortality risk [34].

Pathology related to substance use must be considered when delivering treatment. For example, patients with an alcohol-use disorder are often deficient in thiamine and may develop an iatrogenic Wernicke's encephalopathy if given IV glucose prior to thiamine replenishment. Beer potomania should be considered in patients with hyponatremia who have an alcohol-use disorder. And alcohol use incurs significant liver toxicity that alters drug metabolism.

Consider Issues for Psychiatric Management

Substance-use disorders and other psychiatric illnesses are syndemic—co-occurring and exacerbating one another. The presence of a psychiatric disorder is a risk factor for the development of a substance-use disorder, and around half of illicit drug users have a psychiatric diagnosis besides their use disorder [2]. Among patients with severe mental illness, more than 20% have a substance-use disorder, which is associated with higher rates

of hospitalization, suicide, and violence [35]. Some substance-use disorders are primarily restricted to the mentally ill, as with anticholinergic drugs among patients with schizophrenia [36].

In the ED, the presence of the comorbid substance and other psychiatric illness makes diagnosis challenging. In general, the quality of presenting symptoms is insufficient to discern whether psychiatric symptoms are substance-induced. Comorbid diagnosis also makes disposition difficult, as many substance treatment facilities cannot manage other psychiatric illnesses. Patients with behavioral dyscontrol or other psychiatric illness may require a higher level of care for detoxification. (See section "Arrange Appropriate Disposition.")

Reduce Iatrogenic Risk of Substance Use

The rise of opioid-related deaths has brought scrutiny to prescription practices in the ED. More than 40% of opioid prescriptions from the ED are likely to be misused [37]. Patients receiving larger opioid prescriptions from ED providers are more likely to transition to long-term opioid use than similar patients receiving lower doses [38]. Particular patterns of drug-seeking behavior—for example, requests for early refills or demanding behaviors—have not proven to be reliable in identifying the risk of misuse [39]. Risk factors for aberrant opioid use include a history of use disorders, a history of sexual abuse, and certain psychiatric illnesses including schizophrenia, attention-deficit/hyperactivity disorder, depression, and obsessive-compulsive disorder [40].

Benzodiazepine prescriptions should be avoided on ED discharge. Benzodiazepine misuse is frequently associated with emergency department visits [41]. Although providers often feel the urge to prescribe these medications for anxious patients, benzodiazepines are contraindicated for many types of anxiety, including post-traumatic stress—a condition for which these medications are not only unhelpful but also increase the risk of substance use [42]. Benzodiazepine prescriptions are also associated with self-harm after ED discharge [43]. ED providers should only consider bridging prescriptions after discussion with the patient's primary provider. Patients with risk of mild or moderate alcohol withdrawal syndromes on discharge may benefit from a prescription for carbamazepine, gabapentin, or another nonbenzodiazepine regimen [44].

All clinicians should review a patient's history in a prescription-monitoring database before prescribing opioids or benzodiazepines. Clinicians should be aware of local rules governing opioid prescribing. Many states and health systems have implemented policies governing ED prescriptions [45, 46].

Begin Long-Term Treatment

Effective interventions for substance-use disorder in the ED help patients achieve sobriety and reduce ED recidivism. Although many ED providers will deliver these interventions on their own, a dedicated consultant or substance-use specialist may provide additional support for the identification and treatment of use disorders. One model for providing this care is screening, brief intervention, and referral for treatment (SBIRT), described in the inset.

Motivational interviewing (MI) is a brief counseling method designed to explore a patient's ambivalence about behavior change and emphasize the patient's motivation for positive change [47]. MI interventions no longer than 10–15 minutes can reduce substance use, and MI appears even more effective when reiterated [48, 49]. MI may be combined with other treatment modalities, including problem-solving therapy and directed feedback to enhance treatment efficacy [50, 51].

Growing evidence speaks to the efficacy of initiating pharmacotherapy for relapse prevention in the ED. For example, a randomized trial demonstrated that initiating buprenorphine in the ED for opioid-dependent patients improved rates of treatment adherence after 30 days to 78%, compared to 37–45% for patients in non-medication control groups [52]. In another trial, a multimodal pharmacotherapy and MI interven-

tion for smoking cessation delivered in the ED achieved abstinence rates of 12%, compared to 5% of controls [53]. Gabapentin and opioid antagonists reduce heavy alcohol consumption [54, 55].

Screening, Brief Intervention, and Referral for Treatment (SBIRT)

SBIRT is a public health approach designed to identify and treat patients with substance-use disorders in clinical settings [56]. SBIRT has been widely adopted in EDs and recommended by the American College of Surgeons for Level I Trauma Centers. The SBIRT model typically starts with a standardized screening program comprised of a patient's self-report or a clinician's referral. A trained SBIRT counselor then conducts a brief intervention most often comprised of motivational interviewing. Finally, appropriate treatment referrals are provided.

SBIRT programs have demonstrated the prominence of substance-use disorders in the ED and how the ED visit is a teachable moment to engage patients in treatment. The expertise provided by embedded SBIRT teams increases the capacity of trauma centers to address substance-use disorders, and SBIRT provides a platform to initiate novel treatments for relapse prevention [57]. Published data suggest that for every $1 spent on SBIRT in the ED, $3.81 is saved—a savings of several hundred dollars per patient per month—although other analyses are less conclusive [23, 58, 59].

There are several challenges to implementing SBIRT. Reimbursement rates have traditionally been poor [56]. Although SBIRT appears helpful for patients with mild or even moderate use disorders, there is less evidence of efficacy in severe use disorders [59, 60]. It remains unclear what populations are most likely to benefit [27].

Arrange Appropriate Disposition

After a substance-use disorder has been diagnosed and treatment initiated, the ED clinician must arrange a suitable disposition. Successfully connecting patients to outpatient care after their ED visit reduces future substance use, hospitalizations, and ED recidivism [61].

Patients with substance-use disorders often have multiple medical, psychiatric, and social needs complicating disposition. The American Society of Addiction Medicine (ASAM) placement criteria help guide disposition for patients with substance-use disorders [62]. Considerations for disposition include the risk of withdrawal, the existence of medical or psychiatric conditions, the patient's readiness to change, the potential for relapse, and psychosocial needs. For example, a patient at low risk of withdrawal, with stable chronic medical illness and a supportive social network, is often appropriate for outpatient referral and a 12-step program (e.g., Alcoholics Anonymous). On the other hand, hospitalization is typically indicated for alcohol and benzodiazepine withdrawal syndromes occurring in the presence of comorbid medical illness [63]. Between those levels of care exist intensive outpatient programs, "social detoxification" programs, sober living environments, and other recovery programs, depending on locale. An ED clinician should be familiar with local treatment resources.

Consult Mental Health in the ED if Necessary

Suicide and violence risk should be assessed in all patients with substance-use disorders. Particularly when co-occurring with mental illness, substance use confers considerable risk for self-harm and suicide [54, 64]. Patients considered to be at elevated risk for self-harm or violence merit mental health consultation, if available.

Other indications for mental health consultation depend on local resources and the ED clinician's facility with psychiatric care. In general, patients with co-occurring substance use and mental illness may benefit from diagnostic clarification by a psychiatrist or mental health specialist. These patients are often challenging to treat. For exam-

ple, a patient with intense anxiety and a history of substance misuse who is requesting benzodiazepines is more likely to benefit from alternative pharmacotherapy or brief psychotherapy in the ED. Or a patient with a severe substance-use disorder who is not interested in stopping may benefit from an SBIRT consult for motivational interviewing and disposition recommendations according to the ASAM placement criteria.

Develop a Discharge Plan

Most patients with substance-use disorders in the ED will be discharged home. The risk of iatrogenic harm from prescription medication should be managed using the strategies described in this chapter. ED clinicians should also screen for suicide and violence risk; patients and family should be advised to remove firearms from the home and secure dangerous medications [65]. Arranging an appointment for the patient prior to discharge—rather than providing only a phone number—improves the probability of successful follow-up [66, 67].

For patients who are not yet ready to quit using substances, clinicians should consider offering a peer-based recovery resource, such as the local hotline or website for Alcoholics Anonymous (www.aa.org) or SMART Recovery (www.smartrecovery.org). In the United States, the Suicide Prevention Lifeline number (800-273-8255(TALK)) can be provided to patients and families not only for emergencies but also as a resource for identifying substance treatment in the future.

Conclusion

Many ED clinicians feel frustrated treating patients with substance-use disorders, particularly when patients present repeatedly to the ED. These patients share their providers' frustration: Substance-use disorders are deadly diseases that bring patients to the ED and complicate the treatment of other conditions. Good treatment is difficult to access and sometimes of limited efficacy.

Fortunately, ED providers can help patients achieve sobriety, avoid relapse, and live longer. Emergency providers are in a unique position to ascertain substance use among patients who infrequently encounter other healthcare providers and, in a moment, when they may be particularly open to change [2]. An awareness of the risks of substance use helps clinicians practice more safely and effectively. As the science of addiction medicine grows, health care professionals in the ED will play an increasingly vital role in treating substance-use disorders.

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