Substance use disorder in adolescents: Treatment overview

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Literature review current through: **Oct 2023.**
This topic last updated: **May 16, 2023.**

INTRODUCTION

Substance use is pervasive and endemic among adolescents in the United States. Although most use by adolescents will attenuate over time, many youth who use alcohol and other drugs suffer negative health and social consequences. Some advance to more severe levels of use and impairment, meeting the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) criteria for substance use disorders (SUDs) during adolescence or later as adults.

Although the general approach to the treatment of adolescents with SUD is similar in some respects to the assessment and treatment of adults with SUD, developmental considerations require an assessment and interventional approach tailored to the cognitive, social, and legal status of adolescents. (See "Substance use disorder in adolescents: Epidemiology, clinical features, assessment, and diagnosis".)

This topic reviews treatment of SUD in adolescents. The epidemiology, pathogenesis, clinical manifestations, course, assessment, and diagnosis are reviewed separately. Treatment of specific SUDs in adults is also reviewed separately.

- (See "Substance use disorder in adolescents: Epidemiology, clinical features, assessment, and diagnosis".)
- (See "Opioid use disorder: Pharmacologic management".)

- (See "Opioid use disorder: Psychosocial management".)
- (See "Opioid withdrawal: Clinical features, assessment, and diagnosis".)
- (See "Cannabis use disorder: Clinical features, screening, diagnosis, and treatment".)
- (See "Cannabis withdrawal: Epidemiology, clinical features, diagnosis, and treatment".)
- (See "Management of moderate and severe alcohol withdrawal syndromes".)
- (See "Stimulant use disorder: Treatment overview".)
- (See "Alcohol use disorder: Treatment overview".)
- (See "Management of smoking and vaping cessation in adolescents".)

GOALS FOR TREATMENT

The primary and explicit goal for the treatment of adolescents with substance use disorder is achieving and maintaining abstinence from substance use. The limited ability of interventions to reach this goal and the frequently self-limited nature of the substance use during adolescence suggest that harm reduction (ie, reducing use and adverse consequences) may be an acceptable outcome of treatment. In addition to substance use, associated problems should be targeted for treatment. Problems may involve individual behaviors, family functioning, peer and interpersonal relationships, and academic or vocational functioning.

INITIAL TREATMENT

Medically supervised withdrawal — Adolescents with opioid use disorder, alcohol use disorder, and benzodiazepine use disorder who experience or are at significant risk to experience withdrawal upon stopping use should undergo medically supervised withdrawal. Medically supervised withdrawal generally uses agonists or other medications that provide symptomatic relief. In the absence of well tested withdrawal treatment protocols for the adolescent population, it is reasonable to use protocols developed for adults [1,2].

- **Alcohol withdrawal** – Symptoms of alcohol withdrawal include: autonomic hyperactivity (eg, sweating, pulse rate greater than 100), increased hand tremor, insomnia, nausea or vomiting, transient visual, tactile, or auditory hallucinations, psychomotor agitation, anxiety, and grand mal seizures [3].

  Supportive care (reassurance and encouragement in a quiet environment with limited interpersonal interactions, plenty of fluids and good nutrition, and administration of thiamine and multivitamins) is sufficient to manage mild alcohol withdrawal.

In severe cases, particularly when an alcohol withdrawal scale exceeds a specific threshold and/or if the risk of seizures is high (eg, history of previous seizures, abnormal electrolytes), as in adults, benzodiazepines are suggested for first-line treatment of alcohol withdrawal symptoms in adolescents. This can be done either on a fixed schedule (doses are given at specified amounts and intervals) or, preferably, following a symptom triggered regime (benzodiazepines are administered if the score in an alcohol withdrawal rating scale is above a specified threshold). (See "Alcohol withdrawal: Epidemiology, clinical manifestations, course, assessment, and diagnosis" and "Management of moderate and severe alcohol withdrawal syndromes".)

- **Opioid withdrawal** – Tolerance and physical and psychologic dependence on opioids usually occur after three weeks of daily usage. The abstinence syndrome or withdrawal symptoms usually are noted if opioid use is discontinued after several months of daily usage and include:

  - Three to four hours after blood levels decline – Drug craving, anxiety, fear of withdrawal.

  - Eight to 14 hours – Anxiety, restlessness, insomnia, yawning, rhinorrhea, lacrimation, diaphoresis, stomach cramps, and mydriasis.

  - One to three days – Tremor, muscle spasms, vomiting, diarrhea, hypertension, tachycardia, fever, chills, and piloerection.

  Clinical trials support the use of buprenorphine for treatment of opioid withdrawal symptoms in adolescents using dosing protocols developed for use in adults. (See "Opioid withdrawal in adolescents" and "Opioid withdrawal: Clinical features, assessment, and diagnosis" and "Opioid withdrawal: Medically supervised withdrawal during treatment for opioid use disorder".)

Selecting maintenance treatment — Efficacy data from clinical trials, either comparing interventions with each other or with controls, are insufficient to guide the selection among maintenance treatments for substance use disorder (SUD) in adolescents. Of medications for adolescents with SUD, only buprenorphine for opioid use disorder has been tested in a clinical trial. Additional research influencing treatment decisions has been limited to trials of adults with links to those topics below.

Based on our clinical experience, we generally select among treatment options based on factors such as the substance used, severity of the SUD, the degree to which the adolescent is motivated to participate in treatment, and whether or not they live with family:

Opioid use disorder

Mild — For adolescents with mild opioid use disorder who are motivated to achieve abstinence, we suggest first-line treatment with naltrexone in conjunction with addiction counseling and participation in a mutual help group.

As an example of a mild disorder, the adolescent may be using opioids intermittently, reporting craving and social isolation, but not reporting other consequences of opioid use and not demonstrating withdrawal symptoms.

There are no clinical trials supporting the efficacy of naltrexone in adolescents; naltrexone appears to be helpful in our clinical experience and in published case series [4,5]. Clinical trials of the oral formulation in adults suggest that supervised medication taking may be needed for effective treatment.

Further information on the efficacy, side effects, and administration of naltrexone is reviewed below. (See 'Naltrexone' below.)

Moderate to severe — For adolescents with moderate to severe opioid use disorder (ie, the presence of 6 or more of the 11 possible symptoms of DSM-5 opioid use disorder), we suggest first-line treatment with buprenorphine with adjunctive psychosocial treatment rather than with methadone, clonidine, or with psychosocial intervention alone. In adolescents, two clinical trials have found that buprenorphine reduced opioid use compared with treatment as usual following medically supervised withdrawal [6,7]. Further information on buprenorphine's efficacy, side effects, and dosing in adolescents is reviewed below. Further evidence in support of buprenorphine has been conducted in adults and is reviewed separately. (See 'Buprenorphine' below.)

As an example, a clinical trial comparing buprenorphine with clonidine in adolescents with opioid use disorder found buprenorphine to be effective in a larger proportion of patients [6]. The trial randomly assigned 36 adolescents with DSM-IV opioid dependence, aged 13 to 18, to receive either transmucosal buprenorphine or a transdermal clonidine patch for four weeks. High rates of abstinence were seen among completers in both the buprenorphine and clonidine groups (78 versus 81 percent), but nearly twice as many buprenorphine as clonidine recipients completed the four-week treatment (72 versus 39 percent).

Dosing and adverse effects of these medications are the same as that for adults. Information on the efficacy, side effects, and administration of these medications in adults is reviewed separately. (See "Opioid use disorder: Pharmacologic management".)

For patients who are treated with medication for opioid use disorder, we suggest adjunctive treatment with individual or group addiction counseling and participation in a mutual help groups such as Narcotics Anonymous. Augmentation of pharmacotherapy with a program employing contingency management is suggested in patients for whom opioid agonists and antagonists are ineffective or when motivation is an issue. (See "Opioid use disorder: Psychosocial management".)

Regulatory requirements in the United States and other countries require that patients receiving methadone also receive psychosocial treatment. Clinicians providing patients with buprenorphine in office-based practice are required to have the capacity to provide or refer patients for psychosocial care, but patients are not required to receive such care. (See "Opioid use disorder: Pharmacologic management", section on 'Regulation of methadone in United States' and "Opioid use disorder: Pharmacologic management", section on 'Regulation of buprenorphine in United States'.)

Mild alcohol use disorder — For adolescents with a mild alcohol use disorder, we suggest initial treatment with a brief intervention, alcohol counseling, and participation in a mutual health group. Brief interventions have not been tested specifically in adolescents with mild alcohol use disorder, but systematic reviews have generally found brief interventions to be efficacious in adolescents with unhealthy drinking [8-10]. As an example, a meta-analysis of randomized clinical trials and controlled quasi-experimental trials found brief intervention led to small reductions to alcohol consumption and other drug use [8,9]. The research is reviewed in detail separately. (See "Substance use disorder in adolescents: Psychosocial management", section on 'Screening and brief intervention'.)

Other substance use disorders

Mild — For adolescents with mild SUDs (ie, the presence of 2 to 3 of the 11 possible symptoms of a DSM-5 SUD) other than opioid use disorder or alcohol use disorder (eg, cannabis use disorder, stimulant use disorder), we favor initial psychosocial treatment with addiction counseling and participation in a mutual help group.

Clinical research is insufficient to evaluate the efficacy of addiction counseling (as typically provided) or mutual help groups in adolescents with SUD. Evidence-based models of addiction counseling have been developed but are not widely available. (See "Substance use disorder in adolescents: Psychosocial management" and "Substance use disorders: Psychosocial management", section on 'Addiction counseling'.)

Moderate to severe

Psychosocial interventions — For adolescents with a moderate to severe SUD (ie, the presence of 4 or more of the 11 possible symptoms of a DSM-5 SUD) other than opioid use disorder (eg, alcohol use disorder, cannabis use disorder, stimulant use disorder), we suggest that first-line treatment include a structured psychosocial intervention with evidence of efficacy in this population, such as:

- Family based treatment [8]
- Cognitive-behavioral therapy (CBT) [9,11]
- Motivational interviewing [12,13]
- Contingency management [14]
- Multimodal interventions customized to meet treatment needs of adolescents with SUD

The interventions and clinical trials of their efficacy in adolescents are reviewed separately. Their efficacy in adults is also reviewed separately. (See "Substance use disorder in adolescents: Psychosocial management" and "Substance use disorders: Psychosocial management".)

Brief intervention has not been sufficiently studied to determine its efficacy in adolescents with moderate to severe alcohol use disorder. (See "Substance use disorder in adolescents: Psychosocial management", section on 'Screening and brief intervention' and "Brief intervention for unhealthy alcohol and other drug use: Efficacy, adverse effects, and administration", section on 'Adolescents'.)

Treatment planning and recommendations should consider family functioning, including communication and conflict, in deciding on a primary modality. As an example, CBT might be the best choice for a motivated adolescent who has little parental support, while family therapy may be the best choice for an unmotivated adolescent with an involved family.

In adolescents treated for an SUD, structured interventions are typically augmented with addiction counseling and participation in a mutual help group.

Availability and patient preference play key roles in the selection of psychosocial interventions. A key question is, what type of treatment is the adolescent willing to participate in? Patients with SUD vary widely in their motivation for treatment and willingness to follow through on clinical recommendations.

We favor starting with certain interventions for patients with particular characteristics and needs:

- **Low motivation** – For adolescents with an SUD who lack motivation to reduce substance use, we suggest treatment with motivational interviewing. Motivational interviewing is

often added to another psychosocial intervention rather than provided as monotherapy. (See "Substance use disorder in adolescents: Psychosocial management", section on 'Motivational interviewing'.)

- **Living with family** – For adolescents with an SUD who live with family, we suggest treatment with a family-based intervention. Higher functioning family systems, higher parent motivation, and the presence of other disruptive adolescent behaviors favor treatment with family based therapy. (See "Substance use disorder in adolescents: Psychosocial management", section on 'Family-based treatment'.)

- **Capability and motivation** – Higher adolescent motivation for treatment and behavior change, greater adolescent capabilities for participating, low parent motivation, or the absence of family/guardians favor treatment with CBT. (See "Substance use disorder in adolescents: Psychosocial management", section on 'Cognitive-behavioral therapy (CBT)'.)

- **Lesser capability, substantial social needs** – Lesser capabilities of the adolescent and/or greater social needs favor treatment with case management, targeted communities resources combined with a structured psychosocial intervention, or the use of such multimodal interventions as the assertive continuing care and community reinforcement approach interventions for adolescents. (See "Substance use disorder in adolescents: Psychosocial management", section on 'Adolescent assertive continuing care' and "Substance use disorder in adolescents: Psychosocial management", section on 'Adolescent community reinforcement approach'.)

Other treatment options — Naltrexone can be considered on a case-by-case basis for an adolescent with a severe alcohol use disorder, particularly if accompanied by alcohol withdrawal.

The author and editors have mixed views on treating cannabis use disorder with N-acetylcysteine as an adjunct to psychosocial treatment. A clinical trial found evidence for increased cannabis abstinence in adolescents compared with placebo [15]; however, another trial in adults did not find a reduction in cannabis use [10]. Favoring treatment with N-acetylcysteine are the minimal side effects associated with the medication. (See 'N-acetylcysteine' below.)

TREATMENT RESPONSE

The majority of adolescents receiving substance use disorder (SUD) treatment do not achieve or maintain abstinence. In a review of treatment for adolescent SUD, an average of 38 percent at

six months (range of 30 to 55 percent) maintained abstinence and 32 percent at 12 months (range of 14 to 47 percent) [16].

Monitoring — We suggest systematic monitoring of the patient's status and adjustment of treatment intensity as SUD severity and risk of relapse changes over time. The intensity of psychosocial treatment for SUD can be increased by increasing the frequency of sessions, increasing the level of care, or increasing the number of concurrent interventions. (See "Continuing care for addiction: Implementation".)

Robust response — For an adolescent patient with SUD who maintains abstinence (or an agreed upon level of controlled drinking) with first-line treatment, the duration of treatment varies based on the treatment modality used, the patient's clinical status, and risk of relapse. Community-based psychosocial treatment should last at least 90 days. The use of booster sessions over the course of a year to reinforce skills obtained in acute treatment may also be helpful. Based on principles of continuing care, we favor occasional "check ins" (eg, by phone) to monitor the patients' status and encourage further treatment as needed, rather than termination of treatment. (See "Continuing care for addiction: Implementation" and "Continuing care for addiction: Components and efficacy".)

Inadequate response — Throughout acute treatment (and subsequent to it), continuing evaluation of the adolescent's substance use, as well as individual and family functioning, is critical to appraising treatment effectiveness and guiding further treatment decisions.

The general strategy for adolescents who do not maintain abstinence with first-line psychosocial treatment is to increase the intensity of existing treatment, usually through more frequent sessions, at a higher level of care (eg, intensive outpatient or residential treatment) and/or by adding additional psychosocial interventions that are supported by clinical trials (eg, cognitive-behavioral therapy), followed by third-line treatment with family therapy. As with the initial intervention, there is a lack of comparative efficacy data to guide the selection among available interventions. Patient features, preferences, and treatment availability may influence choices.

Opioid use disorder — For patients whose opioid use is not adequately controlled with buprenorphine and adjunctive psychosocial treatment, we favor more intensive psychosocial treatment, described previously. (See 'Inadequate response' above.)

Treatment with methadone can be considered on a case-by-case basis if available for the patient's age group in the prescriber's locality.

TREATMENT RESISTANCE

For adolescents with substance use disorder (SUD) who do not respond to trials of multiple psychosocial interventions, the clinician should assess motivation for treatment and behavior change and adherence. Having parents/guardians monitor medication administration may inform the prescriber that the medication is or is not being taken as directed. Beyond the access of higher levels of care, the prescriber may consider medications with less empirical support on a case-by-case basis. (See "Alcohol use disorder: Pharmacologic management" and "Opioid use disorder: Pharmacologic management".)

Aversive interventions, such as disulfiram, blocking strategies (eg, naltrexone for opioid use disorder), and anticraving medications (naltrexone, acamprosate, and topiramate for alcohol and buprenorphine for opioids) require medication adherence and are likely most effective among patients with high motivation [1,2], which is usually low is treatment-resistant youth. With the exception of buprenorphine, only modest evidence supports their use in adolescents. These agents should be prescribed to youth only after a thorough consideration of the success or failure of previous treatment attempts without the medications above.

Dosing and adverse effects of these medications is the same as that for adults. Information on the efficacy, side effects, and administration of these medications in adults is reviewed separately. (See "Opioid use disorder: Pharmacologic management" and "Alcohol use disorder: Pharmacologic management".)

PSYCHOSOCIAL INTERVENTIONS

Psychosocial interventions for substance use disorder in adolescents are reviewed separately. (See "Substance use disorder in adolescents: Psychosocial management".)

PHARMACOTHERAPY

Pharmacotherapy to maintain abstinence or reduced consumption is preceded by medically supervised withdrawal when possible for patients with physiologic dependence on alcohol, benzodiazepines, and prior to some medications, for opioids. (See "Opioid withdrawal in adolescents" and "Management of moderate and severe alcohol withdrawal syndromes".)

The extent of evidence supporting maintenance pharmacotherapy for substance use disorder (SUD) in adolescents varies by class of substances:

Opioid use disorder

Buprenorphine — Buprenorphine, an opioid partial agonist and an effective medication for opioid use disorder in adults, has shown evidence of efficacy in two randomized clinical trials of adolescents [6,7]. As an example, a randomized clinical trial in 152 patients aged 15 to 21 years with DSM-IV opioid dependence found that participants assigned to 12 weeks of buprenorphine-naloxone reported less opioid use, less injecting, and less addiction treatment outside the study, compared with participants assigned to a 14-day medically supervised withdrawal using buprenorphine [7]. High levels of opioid use occurred in both groups at follow-up.

In case reports, sudden cessation of buprenorphine/naloxone at various doses and after variable durations of treatment resulted in mild opiate withdrawal lasting one to two days that did not require additional opioid medication [17].

Buprenorphine-related deaths have occurred primarily when buprenorphine is taken in combination with other substances, especially benzodiazepines and alcohol [18].

The preferred transmucosal formulation is the combination product buprenorphine/naloxone. Naloxone has poor transmucosal bioavailability, but if the combination product is injected, naloxone will compete with buprenorphine at the receptor and reduce any euphoric effects of the injection. Dosing of buprenorphine is the same as that for adults. Information on its efficacy, side effects, and administration in adults is reviewed separately. (See "Opioid use disorder: Pharmacologic management" and "Alcohol use disorder: Pharmacologic management".)

Dental problems including dental caries, abscesses, and damaged teeth, many of which have required extraction, may have been associated with the use of buprenorphine formulations dissolved in the mouth [19,20]. Patients who use oral dissolving buprenorphine should rinse around the teeth and gums with water once the film has completely dissolved. Individuals taking buprenorphine formulations should notify their dentist that they are taking the drug and follow up with routine scheduled dental care. The US Food and Drug Administration has issued a safety advisory for this issue and will be mandating a related label change for buprenorphine. Other side effects of buprenorphine include sedation, headache, nausea, constipation, and insomnia. Adverse effects include respiratory depression, but its clinical impact is typically negligible due to the partial agonist properties of buprenorphine that prevent complete activation of the mu-opioid receptors.

Naltrexone — Naltrexone, an opioid antagonist with efficacy in opioid use disorder in adults, was associated with decreased opioid use in an uncontrolled case series of 16 adolescents and

young adults with DSM-IV opioid dependence [5]. Oral naltrexone was used during withdrawal, and long-acting injectable naltrexone (380 mg intramuscularly once per month) was used during maintenance treatment.

Naltrexone has few side effects or adverse effects. Occasionally patients will report nausea, headache, dizziness, or fatigue. More severe adverse effects include liver damage, but this is very rare (seen with supra-therapeutic doses) and has always resolved with discontinuation of naltrexone.

Dosing of naltrexone in adolescents is the same as in adults. The pharmacology, efficacy and administration of naltrexone in opioid use disorder in adults is reviewed separately. (See "Opioid use disorder: Pharmacologic management", section on 'Naltrexone: Opioid antagonist'.)

Alcohol use disorder — Naltrexone, which has additionally been found to be efficacious in the treatment of alcohol use disorder in adults, has shown preliminary evidence of tolerability, safety, and efficacy in adolescents with alcohol use disorder:

- An open-label trial followed five adolescents meeting DSM-IV criteria for alcohol dependence treated with naltrexone (flexible dosing 25 to 50 mg/day) for six weeks [4]. Average drinks per day and alcohol-related obsessions and compulsions decreased during that time. Naltrexone was well tolerated in all subjects.

- A small crossover study randomly assigned 28 non-treatment-seeking heavy drinking youth (ages 15 to 19 years) to receive naltrexone (oral, 50 mg/day) or placebo for 8 to 10 days followed by a washout period and then a switch to the opposite medication for 8 to 10 days [21]. Naltrexone, as compared with placebo, decreased the likelihood of heavy drinking (odds ratio 0.5).

Trials of other medications for alcohol use disorder has been even more limited:

- A prospective, uncontrolled study of ondansetron (4 mcg/kg twice daily) in 12 adolescents with DSM-IV alcohol dependence found that the medication was well tolerated and associated with decreased drinking [22].

- A clinical trial randomly assigned 26 adolescents, aged 16 to 19 years, to receive disulfiram or placebo with assessment on days 30 and 90 of treatment [23]. At the end of treatment, more patients (seven versus two) had a greater mean cumulative days abstinent with disulfiram compared with placebo (68.5 [standard deviation 37.5] versus 29.7 [19.0] days).

Cannabis use disorder — N-acetylcysteine (NAC) and topiramate have been evaluated for efficacy in adolescents with cannabis use disorder:

N-acetylcysteine — NAC is an antioxidant precursor to glutathione that modulates glutamatergic, neurotropic, and inflammatory pathways. Its use, as an adjunct to psychosocial treatment, is supported by a clinical trial in adolescents.

The trial randomly assigned 116 adolescents with DSM-IV cannabis dependence to either NAC or placebo [15]. Dosing of NAC was 1200 mg twice daily with no titration needed or contraindications reported. Participants assigned to receive NAC had more than twice the odds, compared with those receiving placebo, of having negative urine cannabinoid test results during treatment (odds ratio 2.4, 95% CI 1.1-5.2). NAC was well tolerated with minimal adverse events, although a few subjects reported vivid dreams.

Other — Topiramate has not been found to be efficacious for cannabis use disorder in adolescents. A 2017 randomized clinical trial compared topiramate with placebo in 66 adolescent heavy cannabis users (ages 15 to 24 years) who were additionally treated with motivational interviewing [24]. Patients in the topiramate group were titrated over four weeks to 200 mg/day and stabilized at 200 mg/day for two weeks, prior to the trial's six-week treatment interval. All patients received three motivational interviewing sessions. Topiramate was poorly tolerated. Completion of the trial was lower with topiramate compared with placebo (48 versus 77 percent). Topiramate was associated with a reduction in the number of grams of cannabis smoked per day but was not associated with abstinence, days of cannabis use, or urine cannabis testing.

The pharmacology, side effects, and efficacy of these medications in adults are reviewed separately. (See "Cannabis use disorder: Clinical features, screening, diagnosis, and treatment", section on 'Potentially beneficial medications' and "Cannabis use disorder: Clinical features, screening, diagnosis, and treatment".)

Other substance use disorders — There is an absence of clinical trials supporting the efficacy of pharmacotherapy in adolescents with other drug use or use disorder in adolescents (eg, cocaine, other stimulants, sedative/hypnotics, or club drugs is not supported).

Co-occurring substance use disorder and mental disorders — Clinical trials and our clinical experience suggest that mental disorders (eg, depression, bipolar disorder, attention deficit hyperactivity disorder) should be treated with appropriate pharmacotherapy when present in adolescents with a co-occurring SUD [6,7]. Trial results suggest that there is little added medical risk or increase in adverse effects when treating co-occurring mental disorders in adolescents. The results of these trials provide little evidence of improvement of the SUD when the mental disorder is treated, particularly in trials without concurrent, specific interventions targeting the SUD.

Prescription drug misuse — Some commonly used medications, including psychostimulants, benzodiazepines, and opioid analgesics have inherent potential for misuse. General principles regarding prescription drug misuse in adolescent patients include:

- Suspicions of diversion and/or misuse of a prescription drug by the adolescent, their peer group, or family members should prompt a thorough assessment of risk factors for and clinical manifestations of misuse. (See "Prescription drug misuse: Epidemiology, prevention, identification, and management", section on 'Patient risk assessment'.)
- Parental or adult supervision of medication administration can alleviate concerns about potential misuse.
- In treating attention deficit hyperactivity disorder in adolescents with or at risk for SUD, the clinician should consider alternative agents to psychostimulants, such as atomoxetine, alpha-2 adrenergic agonists, or bupropion, which do not have potential for misuse. (See "Attention deficit hyperactivity disorder in children and adolescents: Treatment with medications".)
- Long-acting stimulant preparations may offer less potential for misuse or diversion due to their form of administration, the reduced reinforcement of a longer, more gradual time to maximum plasma concentration, and to more easily monitored once daily dosing.
- Due to their formulations, both osmotic-release oral system methylphenidate and lisdexamfetamine have minimal, if any, effects if snorted or injected.

SUMMARY AND RECOMMENDATIONS

- **Initial treatment** – We generally treat adolescents with mild substance use disorders (SUD) with addiction counseling and participation in mutual help groups rather than other psychosocial interventions or medication. (See 'Mild' above.)
  - **Mild alcohol use disorder** – For adolescents with mild alcohol use disorder, we prefer brief intervention in addition to addiction counseling and participation in mutual help groups (See 'Mild' above.)
  - **Mild opioid use disorder** – For adolescents with mild opioid use disorder who are motivated to achieve abstinence, we suggest additional first-line treatment with naltrexone rather than psychosocial treatment alone (**Grade 2C**). Clinical trials of naltrexone in adults suggest that effective use of the medication may require supervised medication taking. (See 'Mild' above.)

- **Moderate to severe opioid use disorder** – For adolescents with moderate to severe opioid use disorder, we suggest first-line treatment with buprenorphine and adjunct addiction counseling and participation in a mutual help group rather than other medication or psychosocial treatment alone (**Grade 2C**). (See 'Moderate to severe' above.)

- **Other moderate to severe use disorder** – For adolescents with a moderate to severe SUD other than opioid use disorder, we suggest first-line treatment with a structured psychosocial intervention with evidence of efficacy in this population, along with addiction counseling and participation in a mutual health group, rather than addiction counseling and a mutual health group alone (**Grade 2C**). Patient characteristics (eg, low motivation) may influence our choice of one intervention over another. (See 'Moderate to severe' above.)

- **Robust response** – For an adolescent with SUD who maintains abstinence (or an agreed upon level of controlled drinking) with first-line treatment, the duration of treatment varies based on the treatment modality used, the patient's clinical status, and risk of relapse. (See 'Robust response' above.)

- **Inadequate response** – The general strategy for adolescents who do not maintain abstinence with first-line psychosocial treatment is to increase the intensity of existing treatment, usually through more frequent sessions, by providing treatment at a higher level of care (eg, intensive outpatient or residential treatment) and/or by adding additional psychosocial interventions supported by clinical trials. (See 'Inadequate response' above.)

  For patients whose opioid use is not adequately controlled with buprenorphine and adjunctive psychosocial treatment, we favor more intensive psychosocial treatment. Treatment with methadone can be considered on a case-by-case basis if available for the patient's age group in the prescriber's locality. (See 'Inadequate response' above.)

  For adolescents with an SUD who do not respond to trials of multiple psychosocial interventions, the clinician should assess motivation for treatment and behavior change, and adherence. Beyond the access of higher levels of care, the prescriber may consider medications with less empirical support on a case-by-case basis. (See 'Treatment resistance' above.)

Topic 120005 Version 14.0