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Emerging Trends and Innovations in the Identification and Management of Drug Use among Adolescents and Young Adults

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Abstract

One in four youths aged 12 to 17 years and more than half of young adults aged 18 to 25 years in the United States have used an illicit drug in their lifetime. A significant number progress to problematic use, and only 1 in 10 young people who meet criteria for dependence or abuse receive some form of treatment. Despite advances in the field, effectively intervening along the continuum of drug use involvement remains a challenge. In this article, we review the current epidemiology of illicit drug use by young people; describe recent advances in assessment, intervention and treatment; and highlight how technology can help overcome barriers to effective management of drug use among young people.

ADOLESCENT AND YOUNG ADULT DRUG USE: SCOPE OF THE PROBLEM

Illicit drug use among adolescents and young adults continues to be a major public health problem in the United States. The 2 most common substances of abuse among young people, alcohol and tobacco, are addressed in other articles of this volume. The focus in this article is other drugs of abuse, including marijuana, inhalants, hallucinogens, cocaine/crack, heroin, and over-the-counter medications and controlled prescription drugs, such as opioid pain relievers and stimulants. The prevalence statistics derive from the most recent National Survey on Drug Use and Health (NSDUH)¹ and Monitoring the Future Survey (MTF),² 2 of the largest national epidemiological studies of drug use in the United States. The NSDUH survey is conducted in homes with a representative sample of individuals ages 12 and older. MTF is primarily a representative school-based survey of 8th, 10th, and 12th graders. Statistics presented for those aged 12 to 17 and 18 to 25 refer to NSDUH, whereas reference to specific grades in school are MTF.

About 20% of those aged 12 to 17 and 36% of young adults aged 18 to 25 used an illicit drug in the past year.¹ Annual prevalence of any illicit drug use among high school seniors was 38%.² Ten percent of those aged 12 to 17 and 21% of those aged 18 to 25 years reported current illicit use (ie, use in the past 30 days).¹ Although alcohol use among young

people has declined somewhat in recent years, the proportion of young people who use illicit drugs has risen steadily, primarily due to an increase in marijuana use and nonmedical use (NMU) of prescription psychotherapeutic drugs.^{1,2} For this article, we define NMU use as use without a prescription of one's own or solely for the experience or feeling the drug produces. Fourteen percent of teens aged 12 to 17 and 31% of young adults aged 18 to 25 have used marijuana at least once in the past year.¹ Annual prevalence of NMU of prescription drugs is about 8% for those aged 12 to 17 and 15% for those aged 18 to 25.¹

Although marijuana and prescription drugs are, on average, the most common drugs of abuse by young people, use of other illicit drugs remains problematic. Annual prevalence of inhalant use among youth aged 12 to 17 is about 4%.¹ Use is highest among younger grades and decreases over time (8%: 8th grade, 4%: 12th grade).² Annual prevalence of hallucinogen use is relatively low (about 1%) for those aged 12 to 17, but increases with age.¹ Ecstasy (MDMA) use among young people has increased over the past 3 years (annual prevalence 8th grade: 2.4%, 12th grade: 4.5%).² Use incidence of *Salvia divinorum* (also called Diviner's Sage, Seer's Sage), a legal psychoactive plant native to Mexico that produces dissociative and hallucinatory experiences has emerged in recent years (annual use: 1.7%, 3.7%, and 5.5% for grades 8th, 10th and 12th, respectively).² NMU of over-the-counter medications (eg, cough syrup and cold medicines that contain dextromethorphan), also becomes more pronounced with age, with about 3% of 8th graders and 7% of 12th graders reporting past year use.² Use rates of cocaine/crack, heroin, and methamphetamine use are all relatively low among 12 to 17 year olds (less than 1%) and among those aged 18 to 25 (less than 2%), with the exception of cocaine (5%)¹

Among adolescents aged 12 to 17, marijuana is the most commonly used drug, followed by NMU of prescription medications, inhalants, and hallucinogens.¹ An exception to this sequence is those aged 12 to 13 years, for whom the most commonly misused drugs are prescription medications, followed by inhalants and marijuana. Marijuana is the most common drug used by 18 to 25 year olds, followed closely by prescription drugs and more distantly by hallucinogens and cocaine.

Subgroup Differences in Illicit Drug Use

Although overall data indicate that males are somewhat more likely to use illicit drugs than females, most differences are small and emerge as young people age through high school and young adulthood.^{1,2} In general, white and Hispanic young people are more likely to report illicit drug use than black and other race/ethnicity groups, across age groups and drug types.^{1,2} Overall, young people who do not plan to attend college or who are from lower socioeconomic contexts report slightly higher rates of illicit drug use than those with college plans or from higher socioeconomic backgrounds, but differences are small.^{1,2}

Initiation of Substance Use

Early initiation of drug use (before age 15) is a strong predictor of later substance dependence as well as associated behavioral risks and emotional problems, including unprotected sex, delinquency, and suicide.³ More than 3 million people aged 12 or older initiated illicit drug use in the past year, and a majority (60%) were younger than 18 years.¹

Among adolescents aged 12 to 17, a majority reported that their first drug was marijuana (56%), and nearly one-fourth initiated with NMU of prescription psychotherapeutics, primarily pain relievers or tranquilizers.¹ A substantial proportion (17%) reported inhalants as their first drug, distantly followed by hallucinogens and cocaine.¹ Thus, although marijuana is a gateway drug for most youth, prescription medications and inhalants are also salient initiation substances.

Dependence and Abuse

Approximately 5% of youth aged 12 to 17 and 8% of young adults 18 to 25 met criteria for dependence or abuse of illicit drugs in the past year.¹ Although males are more likely than females to meet criteria for dependence or abuse in young adulthood, there is no gender difference among 12 to 17 year olds.¹ Of those young people who met criteria, only about 1 out of 10 received specialty treatment, and males are more likely to enter treatment than females.¹ Of note, up to 80% of adolescents in substance use treatment have at least 1 co-occurring psychiatric disorder, with depression being the most prevalent.⁴ These statistics do not reflect the substantial number of young people with subclinical dependence or abuse symptoms that go unnoticed and unaddressed.

Consistent with general use trends, more than 86% of adolescent treatment admissions involve marijuana as the primary or secondary drug of abuse.⁵ Nearly 1 out of 4 admissions of those aged 12 to 25 involve prescription medications, most often opioid pain relievers.⁵ We focus the remainder of this article on the emerging knowledge base for marijuana and prescription medication use.

Marijuana

One out of ten 8th graders and nearly one out of four 12th graders reported current marijuana use (past 30 days).² One out of 5 young adults aged 18 to 25 reported current marijuana use.¹ Of particular concern are rising trends in daily or near daily (20 or more occasions in the past 30 days) use of marijuana across age cohorts.² About 1 out of one hundred 8th graders reported daily or nearly daily use of marijuana or hashish, and 1 in 16 high school seniors reported daily or near daily use.² Overall, males are more likely to use marijuana than females, and no gender gap exists for those who use daily.²

Marijuana Dependence and Abuse—As with other drugs, marijuana use before the age of 15 increases risk for other illicit drug use as well as later cannabis dependence.^{1,6} Regular use is associated with escalation of mental health problems, lower educational and occupational achievement, and risk behaviors, including unprotected sex, driving under the influence, and delinquency.⁶ Nearly 20% of all drug-related emergency department (ED) visits by youth aged 12 to 17 years involved marijuana.⁷

Prevalence of marijuana dependence and abuse among young people is higher than with any other illicit drug.¹ Approximately 5% of high school-aged youth met criteria for marijuana dependence or abuse, and dependence/abuse rates tripled from ages 14 (2%) to 18 (7%).¹ Rates were higher among males and Hispanic youth relative to females and other races.¹ Progression from regular marijuana use to dependence may be more rapid for females.⁸

Characterizing Marijuana Use—Recent work to characterize marijuana use by young people has focused on attitudes about use and motives for use.

Attitudes and Accessibility: Concurrent with recent increases in marijuana use are declines in perceived harmfulness of marijuana use and in the proportions of young people who disapproved of use.^{1,2} Current marijuana use was much less prevalent among young people who perceived strong parental disapproval for trying marijuana relative to those who did not perceive such disapproval (5% versus 31%, respectively).¹ Yet, more than 1 out of 5 parents perceived marijuana as a relatively harmless drug.⁹ Perceived accessibility of marijuana is also high. Half of all young people reported it would be “fairly easy” or “easy” to get marijuana.¹ Diversion of medical marijuana is associated with greater perceived access and less perceived risk of regular marijuana use among adolescents in treatment.¹⁰ These data highlight the positive role of parent–teen communication about expectations regarding drug use and for mitigating use and the continued need for effective education of parents about the oft-neglected hazards of marijuana use.

Motives for Marijuana Use: A common reported motive for marijuana use by young people is relief of tension, stress, or anxiety. The relation between generalized anxiety disorder symptoms and frequency of marijuana use among young women was fully mediated by tension reduction expectancies.¹¹ Coping/self-treatment motives mediated the relationship between social anxiety and reported marijuana use problems in a sample of young adult marijuana users.¹² Young people with high levels of anxiety may be particularly vulnerable to initiating marijuana use to relax and manage stress. Those who report more than 1 motive for marijuana use have higher rates of other substance use and marijuana dependence/abuse.¹³

Prescription Psychotherapeutic Medications

Among high school seniors, nearly 1 out of 10 has used prescription opioid pain relievers, 1 out of 15 has used stimulants, and 1 out of 20 has nonmedically used tranquilizers or sedatives in the past year.² Three percent of those aged 12 to 17 and 6% of those aged 18 to 25 reported current NMU.¹ Pain relievers and stimulants are the most frequently misused medications. Hydrocodone (eg, Vicodin) and oxycodone (eg, Oxycontin) products are the most widely prescribed, diverted, and misused pain relievers. Amphetamine-dextroamphetamine (eg, Adderall) is the most widely prescribed, diverted, and misused stimulant, followed by methyl-phenidate (eg, Ritalin).

Among adolescents aged 12 to 17 years, females are somewhat more likely than males to report NMU of pain relievers.^{14–16} Pain reliever use is more likely among young adults who are white, who are low academic achievers, and who engage in other substance use, including alcohol and other nonmedical prescription use.^{17–19} Among young adults, NMU of stimulant medications is more likely among males, whites, or Hispanics; low academic achievers; and those who engage in other substance use.^{20–21} Use of immediate-release, as compared to extended-release, stimulant preparations and self-report of ADHD symptoms also increase risk for stimulant NMU.²¹

There is some evidence that NMU is higher in rural areas relative to other geographic regions, with up to 1 out of 3 teens reporting nonmedical prescription use, primarily of pain relievers.²² Prevalence of NMU is also high among substance use treatment populations. In a sample of adolescents aged 12 to 18 years in treatment for other illicit drug use, 55% had used prescription pain relievers, 38% had used stimulants, and 35% had used sedatives in the past year.²³ Past year NMU of pain relievers or stimulants was associated with more dependence symptoms, over and above frequency of other substance use.²³

Prescription Drug Dependence and Abuse—Recently, more than half of the 2 million drug-related ED visits in the past year involved NMU of prescription drugs, either alone (33%) or in combination with alcohol and/or other illicit drugs (23%).⁷ Nearly 1 out of 4 of these emergency department (ED) visits were young people aged 12 to 24 years, and those aged 21 to 24 had highest prescription-related visit rates of all age groups.⁷ More than half of all drug-related suicide attempts seen in ED involved prescription opioid pain relievers.⁷

More than 1 out of 3 adolescents aged 12 to 17 years who reported past-year NMU of a prescription medication endorsed symptoms of a substance use disorder, and 17% met full criteria for a dependence or abuse problem, primarily for use of opioid pain relievers.¹⁴ Among adolescents with 1 or more symptoms, 33% also met criteria for alcohol and/or cannabis dependence or abuse.¹⁴ Risks for dependence/abuse symptoms included past year use of cocaine or inhalants, a major depression episode in the past year, and frequency of prescription use (ie, more than 10 occasions in past year).¹⁴ Early initiation of nonmedical prescription use (before age 16) increases the risk for prescription abuse and dependence later in life.²⁴ Other characteristics of NMU that influence dependence/abuse potential include co-ingestion with alcohol and other drugs and nonoral routes of administration (ie, intranasal, injection, smoking).²⁵

Overall, past-year prescription dependence or abuse is higher among young adults relative to their younger counterparts.¹ Among young adults, males are more likely to meet criteria for past-year dependence or abuse, whereas among 12 to 17 year olds rates are higher among females.¹ In general, dependence and abuse rates are higher among whites relative to other races/ethnicities.¹ A majority (86%) of young people who met criteria for dependence or abuse of prescription medications did not receive treatment, and those aged 12 to 17 were less likely than older counterparts to receive treatment.¹

Characterizing Nonmedical Prescription Drug Use—A better understanding of portraits of prescription drug use can inform targeted intervention. Recent work has focused on identification of sources of access, attitudes toward use, and motivations for use.

Accessibility: Friends, peers, and family are consistently indicated as the most common sources of prescription drugs for young people.^{15–21,26} Many young people also initiate NMU of a medication for which they previously had a legitimate prescription for a medical condition.²⁶ Acquisition via online pharmacies is not common. Sixteen to 29% of young people with legitimate stimulant prescriptions have been asked to give, sell, or trade medications.²¹

Attitudes: Attitudes about accessibility and use of prescription medications may influence NMU by young people. Recently, more than half of teens reported that prescription drugs were easier to get than other illicit drugs.⁹ Nearly half of young people felt that prescription pain relievers are easy to get from family medicine cabinets.²⁷ About 1 of 3 young people believed there is nothing wrong with occasionally using prescription medications for nonmedical purposes, and 41% agreed that nonmedical prescription drug use is less dangerous than use of other illegal drugs.⁹ One out of 3 teens believed that prescription pain relievers were not addictive.⁹

Despite the risks, 1 out of 5 parents of teens indicated 1 or more situations in which it would be OK to give a prescription medication to their child without a prescription.²⁷ Only 1 out of 3 parents had discussed the risks of prescription drug misuse with their teen, whereas a majority (60%) indicated that they had discussed the risks of marijuana.⁹ Lack of awareness about risks of prescription misuse, low confidence for discussing these risks, and beliefs about prescription medication use as less dangerous than other drug use all contribute to parents reluctance to discuss risks of nonmedical prescription use with their teens. Given that youth who learn about the risks of drugs from parents are up to 50% less likely to use drugs, a critical prevention target is education of parents about prescription medication access and use risks, as well as effective strategies to foster conversations about risks with their teens.⁹ The Partnership (www.drugfree.org) offers a wide variety of education and support resources for parents.

Motives for Nonmedical Prescription Drug Use: Motives for NMU are generally differentiated along the dimensions of coping/self-treatment and recreation. The most common motives for NMU of pain relievers by adolescents aged 12 to 17 years were coping focused (eg, “relieve pain,” “aid sleep” and “reduce stress/anxiety”).²⁸ Among high school seniors, “relaxation and tension relief,” “feel good/get high,” and “to experiment” were the most frequently reported motives for pain reliever use in the past year. Nearly 45% reported “to relieve pain.”²⁹ Those who reported pain relief as the sole motive for use were less likely to be involved in heavy drinking and other illicit drug use and more likely to have a history of medical use of pain relievers before NMU was initiated, relative to those who reported pain relief with other motives or other motives only.³⁰ Those who reported “pain relief” alone were also less likely to co-ingest medication with other drugs and to use nonoral routes of administration.³⁰ A self-treatment subtype for nonmedical pain reliever use among young adults (pain as sole motive, indicated route of administration, no congestion) was more prevalent among females and blacks relative to their male, white, and Hispanic peers.²⁵

Young adults who reported “to cope with depression” and/or “to manage chronic pain” as motives for nonmedical pain reliever use were significantly more likely than those who endorsed other motives to have used pain relievers regularly (once a month or more) in the past year.¹⁹ Consistent with other work,^{15,25} females were more likely than males to report self-treatment motives, and males were more likely to report recreational motives for NMU.¹⁹ Those who misused pain relievers regularly were more likely to have peers involved in NMU, to prefer the effects of prescription medications over other drugs, and to

perceive lower risk associated with regular NMU of pain relievers relative to less frequent misusers.¹⁹

The most frequently reported motivations for NMU of stimulants by young people are coping/performance-based (eg, “improve concentration,” “increase alertness”), although a subset of young people also report recreational motives (eg, “to get high,” “to experiment”).^{21,25} Weight loss has also been reported by a subset of youth as a motive for NMU of stimulants, particularly by young women.¹⁸ There is also evidence that depression may underlie some NMU of stimulants, particularly for those that misuse frequently and by nonoral routes.³¹

Summary: Current Knowledge Base For Marijuana And Nonmedical Prescription Drug Use

Recent work has shed light on factors associated with patterns of drug use among adolescent and young adult populations, particularly with regard to marijuana use and NMU of prescription medications. The current knowledge base highlights potential individual and social targets of prevention and intervention, including teen and parent attitudes and social norms linked to illicit drug access and use behaviors. Current knowledge also underscores that there are subgroups of young people who use marijuana and prescription medications as self-treatment for untreated or undertreated conditions, including anxiety, depression, attention difficulties, and acute or chronic pain. Early identification and management of co-occurring conditions are critical to prevent escalation of use to among these subgroups of young people.

Although headway has been made on reducing alcohol and other illicit drug use, recent increases in the prevalence of marijuana use and NMU of prescription drugs indicate that, despite best efforts, prevention efforts have fallen short in addressing these particular substances. There are still substantial numbers of young people initiating use, continuing use, and experiencing adverse consequences from such use. Further, a majority of young people who are at risk for developing problems from drug use, or who have already developed problem drug use, do not receive needed care. In the next sections, we review current trends in evidence-based prevention, screening, and intervention and describe how the emerging knowledge base can inform the next generation of intervention approaches.

Prevention and Intervention Efforts to Mitigate Adolescent Substance Use

A number of prevention and intervention programs have been developed to ward off initiation of substance use, prevent escalation of use, minimize risks associated with substance use, and support decreased use or full abstinence. In the following sections we highlight several of the most widely used evidence-based approaches. Criteria for inclusion were at least 1 published randomized, controlled evaluation study and substance use as one of the primary targets.

Universal Prevention—Life Skills Training (LST)³² is a comprehensive school-based curriculum delivered by trained educators. Grounded in competence enhancement theory, the program (which includes 10 to 15 core sessions, plus booster sessions in subsequent years) targets 3 main areas: (1) personal skills management, (2) general social skills, and (3)

drug resistance skills. Material is delivered via lecture, discussion, coaching, and practice (role playing). LST has been evaluated in numerous controlled studies with diverse demographics and has demonstrated positive effects on substance use initiation and reduction.^{33,34} Results are strongest for students who receive at least 60% of the curriculum with fidelity.³⁴ Curricula have been developed for elementary, middle, high school, and transition from high school years.

Project ALERT is an 11-session school-based program for middle school and junior high students that targets tobacco, alcohol, and marijuana.³⁵ Delivered by trained instructors, the curriculum uses discussion, behavioral rehearsal, and small group activities to foster motivation to avoid drug use, build resistance skills, and establish nonuse attitudes and beliefs.³⁵ Project ALERT has been evaluated in multiple controlled studies with diverse populations, with positive and sustained effects on marijuana use initiation and reduction.^{36,37}

Keepin' it REAL (KiR) is a 10-session, culturally grounded, school-based prevention curriculum for middle-school students. Like other programs, the curriculum uses group discussion, activities and games, and behavioral rehearsal to convey material.³⁸ A key element is use of video stories with diverse characters that dramatize drug use situations and successful resistance. KiR produced sustained lower alcohol and marijuana use compared to controls.^{38,39} Positive outcomes were found only for those participants who had viewed at least 4 of the 5 resistance scenario videos, underscoring not only the importance of intervention fidelity, but also the power of culturally relevant re-enactment video for demonstrating and reinforcing drug use resistance skills in ways that are translated from screen to real life.

Selective Prevention—Although the programs discussed previously were originally developed for middle/junior high school audiences, corresponding to when use initiation is most likely to occur, Project Towards No Drug Abuse (Project TND) was developed specifically for at-risk high school youth.⁴⁰ The 9-session group curriculum consists of health motivation, social skill building, and decision-making material targeting tobacco, alcohol, marijuana, and other illicit drug use (eg, cocaine, hallucinogens, inhalants). Project TND has demonstrated marked and sustained reductions in marijuana and other drug use.^{41,42}

Prevention: Barriers to Implementation

Despite promising results, the majority of school-based group prevention approaches are time- and labor-intensive for both staff and participants. Successful implementation typically requires that the facilitator (teacher, health educator, nurse) be trained to implement with fidelity. In a recent review only about 1 in 4 schools consistently used an evidence-based curriculum with students, and only about 17% of educators implemented curricula with fidelity.⁴² As such, most young people are not exposed to prevention material in schools in ways that effectively influence substance use. The resource intensity of such programming also makes translation to other youth service settings unrealistic. In addition, most current prevention approaches are group-delivered and universal (ie, all get the same content). Few

prevention initiatives are targeted to older adolescents and young adult populations, and most do not specifically target nonmedical prescription drug use.

Current Intervention Trends

Current trends in adolescent substance use intervention have moved toward brief, client-centered approaches that can readily identify potential problems and deliver individual, tailored material to young people across a wide array of service settings. Motivational enhancement is one such approach.

Motivational Enhancement—Motivational enhancement (ME) interventions are brief interventions (1 to 5 sessions) that target behavior change through emphasis on building motivation to change.⁴³ Grounded in client-centered therapy, social learning theory, and cognitive-behavioral therapy (CBT), effective motivational interventions: (1) promote client engagement and a candid appraisal by an individual of his/her drug use experiences through personalized feedback about the target behavior (eg, cannabis use) and associated effects and consequences, (2) facilitate an individual's perception of a discrepancy between his/her drug use behavior and important personal goals incompatible with the behavior, (3) foster arguments favoring change and provide strategies and options for change, (4) support self-efficacy to change, and (5) offer an empathic and nonjudgmental stance.⁴³ Motivational Interviewing (MI) is a specific approach used within ME models of care. The brevity and portability of motivational interventions lend to ready delivery in diverse settings, including schools, EDs, primary care offices, jails or correctional settings, and community health centers, by a range of peers and professionals. In the following sections we describe the evidence base for motivational approaches with youth populations in diverse settings.

College Populations—In a study with nonhelp-seeking, substance-involved, nontraditional education students (aged 16 to 20), those that received a 1-hour single-session MI intervention demonstrated significantly higher reduction rates in use of cigarettes, alcohol, and cannabis at 3-month follow-up relative to those who received education-as-usual.⁴⁴ Results were strongest for cannabis use, and among those who were the heaviest users, which is a subpopulation often the most in need and the least likely to seek treatment.⁴⁴

In a study of college students mandated to an alcohol and drug assistance program, there was no difference between a 2-session MI intervention and a brief personalized feedback (PF) intervention on significant reductions in alcohol use, cessation of marijuana use, and reduction in drug-related problems at follow-up.⁴⁵ For both interventions, students completed a baseline risk assessment in the first session, from which a personalized feedback profile (PFP) was generated. Participants in the MI arm discussed the PFP with the clinic counselor in a second session, whereas those in the PF arm only received a copy of their PFP in a second contact. The study demonstrates that effectively presented personalized feedback can alone affect behavior change.

Medical Patient Populations—Primary care and other medical system arenas are fertile ground for identification and management of adolescent and young adult patient substance

use issues. In a recent study of young people in an urban primary care system, 11% screened positive for an alcohol or drug problem and a majority (76%) reported some willingness to reduce their substance use.⁴⁶

Primary Care: In a study conducted at an urban clinic for underserved populations, teens aged 12 to 18 that screened as “high risk” for substance problems received a 15-minute MI intervention (Project CHAT:PC⁴⁷) or usual care. At 3-month follow-up, teens that received PC reported significantly less marijuana use, lower perceived norms of marijuana use, fewer friends who used marijuana, and lower future intentions to use marijuana compared with teens in the usual care control group.⁴⁷ The intervention, delivered by clinic case managers trained in the protocol, targeted motivation and creation of an action plan for change. All participants received a 1-month post-intervention booster call to review the action plan and progress.

Emergency Departments: A 20-minute MI intervention was delivered via peer educators to patients aged 14 to 21 years during pediatric ED visits to a large inner-city hospital.⁴⁸ Those who received the intervention were more likely to report marijuana abstinence or greater reduction in frequency of use at 12-month follow-up relative to control participants. Intervention participants were also more likely to report efforts to cut back or quit using marijuana.⁴⁸ The intervention included a booster call to review the change plan and progress.

Community Populations—A brief 2-session MI intervention (Adolescent Cannabis Check-Up) with nontreatment seeking youth aged 14 to 19 years who used cannabis yielded greater reductions in marijuana use frequency and dependence symptoms at 3-month follow-up relative to controls.⁴⁹ Importantly, the majority (90%) reported being very satisfied with program participation and considered it useful.⁴⁹ In another study, a brief 2-session MI intervention with young women aged 18 to 24 years who were not seeking treatment for their cannabis use yielded significant and sustained (6 months) reductions in frequency of marijuana use relative to controls, particularly among women who expressed a desire to quit using marijuana.⁵⁰

Treatment Populations—Motivational interventions are among the most cost-effective treatment approaches for young people in treatment.⁵¹ In a large randomized trial conducted at 4 sites to evaluate the effectiveness and cost-efficiency of 5 short-term outpatient interventions for adolescent cannabis use, a 5-session motivational enhancement therapy/cognitive behavioral therapy (MET/CBT5) intervention was as effective as other individual- and family-based interventions at 12-month follow-up in terms of days of abstinence and percent recovery.⁵¹ The intervention consisted of a 2-session MET and a 3-session CBT component that targeted basic refusal skills, strategies for building a support network, a plan to replace cannabis-related activities, coping with triggers, and recovery from relapse.⁵¹

Integrative Treatment Approaches: Individual and Family

Emerging evidence indicates that behavioral interventions such as Contingency Management (CM) can produce positive outcomes among adolescent treatment

populations.⁵² CM involves provision of rewards for abstinence and has a strong evidence base among adult substance-dependent populations.⁵² An integrated MET/CBT, CM, and parent psychoeducation approach for adolescents in outpatient treatment for problem cannabis use yielded larger and more sustained improvements in marijuana abstinence over the 9-month study period relative to usual care.⁵² The approach also produced greater improvements in parenting related to post-intervention outcomes.⁵²

Another empirically supported behavioral intervention is the Adolescent Community Reinforcement Approach (A-CRA), which teaches youth (and parents via a companion intervention) strategies to restructure their environment with pro-social activities that compete against continued substance use.⁵³ A-CRA also teaches communication, problem solving, and related self-management skills. A-CRA has been shown to produce high rates of abstinence from a variety of substances among youth.^{53,54}

Integrative Behavioral and Pharmacological Treatment

Although use of pharmacotherapies with behavioral therapy has been limited in the treatment of adolescent drug abuse, a few studies have examined combined buprenorphine (Subxone®, Subutex®) and behavioral treatment with opioid-dependent youth. Opioid-dependent adolescents provided with a 28-day taper of buprenorphine along with individual, A-CRA-based counseling had significantly greater opioid abstinence and treatment retention relative to those provided with a clonidine taper and behavioral treatment.⁵⁵ Positive treatment outcomes were comparable for both youth dependent on opioid pain relievers and youth dependent on heroin.⁵⁶ Longer treatment durations of combined buprenorphine-behavioral treatment produce better outcomes relative to rapid detoxifications among opioid-dependent youth.⁵⁷

SUMMARY: INTERVENTION APPROACHES

Brief motivational interventions are effective and can be successfully delivered across a range of settings in which young people live (eg, schools, medical settings, community organizations, criminal justice setting) and by a variety of service providers. There is support for integrated motivational-behavioral and behavioral-pharmacotherapeutic approaches for young people whose drug use has progressed to the level of more extensive treatment. Of note is that existing evidence for MET and skills-based behavioral therapy target marijuana. Although behavioral treatments have been used in combination with pharmacotherapies to target nonmedical pain reliever use among opioid-dependent adolescents, no studies to date have examined the relative effectiveness of motivational and behavioral strategies for nonmedical prescription drug use.

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

To effectively address the heterogeneous problem of substance use among young people, it is critical to screen, identify, and appropriately intervene in line with where a young person is at on the continuum of use. The Institute of Medicine recommends the use of brief screening instruments as an essential first step for assessing drug use among all patient populations, especially adolescents and young adults. The American Medical Association's

Guidelines for Adolescent Preventive Services and the American Academy of Pediatrics both recommend screening of all patients for substance use. Those that screen positive for a problem should complete a more comprehensive assessment to evaluate problem severity, as well as co-occurring conditions. Intervention approach depends on the individual's level of risk, and can range from advice/education, to brief intervention, to more comprehensive outpatient or inpatient treatment (eg, see American Society for Addiction Medicine Patient Placement Criteria). The Drug and Alcohol Services Information System (DASIS) of the Substance Abuse and Mental Health Services Administration (SAMSHA) maintains an up-to-date treatment facility locator for treatment sites in all states throughout the country. What follows is a brief description of several of the most widely used and psychometrically sound screening and assessment tools for evaluating substance use among young people.

Screening—The CRAFFT is a 6-item self-report survey of lifetime alcohol and other drug problems among adolescents.⁵⁸ CRAFFT has been validated with adolescents in primary care and drug treatment settings and demonstrates excellent sensitivity and good specificity.⁵⁸ There is no training required, and the tool can be used free of charge.

The Problem-Oriented Screening Instrument for Teenagers (POSIT)⁵⁹ is a 139-item self-report of 10 problem areas, including substance use, physical health, and social relations. The instrument has demonstrated strong validity within both clinical and community adolescent populations, as well as excellent sensitivity and good specificity.⁶⁰ Implementation and scoring can be time-consuming (ie, paper and pencil). Computerized scoring is available. English and Spanish language versions of the hardcopy instrument are in the public domain.

The Drug and Alcohol Screening Test (DAST)⁶¹ is a 27-item self-report screener to assess problems due to drug use. The tool has been demonstrated to be reliable and valid with adolescent and young adult populations.⁶¹ Administration and scoring are user-friendly and use is free.

The Personal Experience Screening Questionnaire (PESQ)⁶² is a 40-item self-report survey that taps drug use history and psychosocial problems as well as problem severity. The tool is validated for use with clinic, drug treatment, and school populations. Administration is paper-and-pencil, and there is a fee for use (see Western Psychological Services).

Comprehensive—The Global Appraisal of Individual Needs (GAIN)⁶³ is a semi-structured interview that assesses recent and lifetime problems in a number of domains, including substance use, legal and school life, and mental health. The instrument has good validity and reliability with clinical and community youth populations. Administration is long (60 to 120 minutes) and requires special training. A comprehensive report is provided.

The Personal Experience Inventory (PEI)⁶⁴ is a self-administered assessment that taps drug use problem severity, psychosocial risk, and problem screens of mental health, physical/sexual abuse, and parental history of drug use. The instrument demonstrated good validity in clinical and community samples. This assessment is text-intensive, and some young people

may require assistance with reading while completing the assessment. Scoring is computerized, and a narrative report with norm comparisons is provided.

The Teen Addiction Severity Index (T-ASI-2)⁶⁵ consists of 18 assessment domains that include current substance use, mental health service utilization, treatment satisfaction, psychosocial functioning, relationships, and family substance use. The instrument, which can be administered via Internet or automated telephone, is user-friendly and has demonstrated good psychometric properties with clinical populations aged 12 to 19.⁶⁵

The Comprehensive Health Assessment for Teens (CHAT)⁶⁶ is a computer-delivered, multimedia-enhanced, and self-directed assessment that measures current substance use and problem severity, reasons for use, and readiness to change, as well as mental health, family and peer relationships, family substance use, and school and legal functioning. A flexible interactive text-audio format accommodates different reading and learning levels. The instrument has demonstrated excellent internal consistency, test-retest reliability, and construct validity with treatment and community samples.⁶⁶ An automatically generated computerized report depicts problem severity in each domain.

HARNESSING TECHNOLOGY TO ENHANCE MANAGEMENT OF DRUG USE AMONG YOUNG PEOPLE

Technology can help overcome typical implementation barriers to effective management of substance use among youth. The cost of technology-delivered programming is relatively minimal once developed, and program fidelity is maintained through standardization of content delivery. Technology-delivered interventions can be disseminated to broad audiences *and* tailored to individual characteristics and experiences (eg, gender, drug type, motives, readiness to change). Rich media and interactivity can enhance learning and accommodate different learning styles. Technology solutions also allow for flexible dissemination within and between service settings, which can increase access to care for young people most at risk who might not otherwise receive treatment. There is emerging empirical support for technology-based prevention approaches. We describe several of these programs next.

HeadOn is a 15-session computer-based substance use prevention program for early adolescents (6th to 8th grade).⁶⁷ The program includes games, activities, and fluency-based computer-assisted instruction to encourage mastery of material before progressing in the program. Students that used *HeadOn* over the academic year demonstrated positive knowledge, attitudes, and behavior outcomes comparable to the Life Skills Training curriculum.⁶⁷

Drugs4Real is an online drug abuse prevention program for youth aged 12 to 14.⁶⁸ The program includes self-assessments that provide tailored motivational feedback, interactive games, audio and video peer stories, and information consolidation quizzes to foster relevant prevention knowledge, support motivation to avoid substance use, and build refusal self-efficacy. Adolescents that used *Drugs4Real* demonstrated greater sustained increases in prevention knowledge and intentions to avoid future tobacco and alcohol use relative to

controls.⁶⁸ Low drug use base rates prohibited examination of substance use behaviors. An educator companion program provides strategies for integration of material in schools and other service settings.

Early adolescent girls that participated in a 9-session computer-delivered mother-daughter dyadic program reported lower intentions to use and greater refusal self-efficacy, as well as less past 30-day use of alcohol, marijuana, prescription drugs, and inhalants at 2-year follow-up, relative to the control arm.⁶⁹ Mothers reported more communication, closeness, established rules around substance use, and monitoring relative to control group mothers.⁶⁹ The program included voice over narration, skills demonstration via animated characters, and joint interactive activities to promote a positive relationship and communication.

RealTeen is a 12-session online drug use intervention for early adolescent girls.⁷⁰ Grounded in skills-based prevention and using an older female animated character guide, sessions targeted decision-making, goal-setting, and drug refusal skills. Girls that used *RealTeen* were less likely to report past 30-day use of alcohol, marijuana, and poly-drugs at 6 months and achieved greater gains in normative beliefs and refusal self-efficacy, relative to control participants.⁷⁰

Marsch and colleagues⁷¹ recently developed and evaluated a prototype of a Web-based, prescription opioid abuse prevention program for high school-aged youth. Targeted to factors associated with NMU of pain relievers, the program employs informational technologies effective in promoting relevant knowledge and skills and presents program content using strategies demonstrated to be appealing to adolescents. Prevention-relevant knowledge markedly increased from low baseline levels to perfect or near perfect levels after completing the program, and teens rated the program very highly, underscoring the promise of this approach for prevention of prescription pain reliever abuse among teens.⁷¹

PROMISING DIRECTIONS

Technology has the potential to enhance the ability of providers to identify and manage adolescent and young adult drug use along the continuum of care, including primary prevention, screening and early intervention, treatment, and aftercare and relapse prevention. Self-contained online prevention programs can serve as resources for patients and parents to access across care settings or at home. Screening and brief motivational interventions can readily be delivered via technology platforms, either as self-contained client-directed experiences or to augment treatment with a provider. Technology solutions can be integrated into behavioral treatment approaches (eg, delivery of contingency management rewards, skill rehearsal) so that providers can focus on other treatment components. Text messaging can be used as care reminders or treatment “boosters” to help sustain behavior change. Finally, online training programs can educate providers about current drug use trends among young people and provide training for evidence-based best practices, such as MI.

With the explosion of mobile smartphones and tablets and their associated capabilities, including text messaging, global positioning systems (GPS), and self-contained applications, “real-time” intervention and support for substance use issues (such as coping with cravings and triggers) are possible.⁷² Social media outlets, such as Facebook, can serve as innovative

platforms for intervention delivery, patient–provider communication, and peer support for treatment and recovery. The potential of technology solutions to support providers in treatment of substance use issues with their young clientele and to build efficiencies in health care delivery is extraordinary.

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Fig 1.
Comprehensive Health Assessment for Teens (CHAT)

Fig. 2.
HeadOn: Substance Abuse Prevention for Middle School Youth

Fig. 3.
Drugs4Real: Online Alcohol and Drug Prevention for Early Adolescents