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Nonmedical Prescription Drug Use among Adolescents: Global Epidemiological Evidence for Prevention, Assessment, Diagnosis, and Treatment

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Abstract

Purpose of review—This paper reviews the most recent epidemiological evidence on adolescent NMPD use. Particular attention is given to prevention, assessment and diagnosis of disorder, and treatment.

Recent findings—While international in scope, global evidence is only available for NMPD use, morbidity and mortality estimates. Prevention strategies, assessment and treatment are U.S.-centric. The literature on prevention strategies lacks high-quality evidence. Assessment, diagnosis and treatment of NMPD use disorder have more robust evidence bases. Despite this, screening for NMPD (and other drug) use disorders is infrequent and insensitive, leading to incomplete treatment provision. Treatments are shown to be safe and effective, but disparities in provision prevent wide-scale amelioration of the adolescent NMPD use problem.

Summary—Mental health care professionals and primary care physicians with adolescent patient populations should become involved in preventative strategies mentioned in this review. Additionally, higher screening rates will lead to less downstream problems related to NMPD use.

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ⁱⁱDescribed as commonly used traditional Chinese medicines and potentially addictive if used in high doses

Compliance with Ethics Guidelines

Conflict of Interest

Alexander S. Perlmutter, Myrela Bauman, Shivani Mantha, Luis E. Segura, Lilian Ghandour, and Silvia S. Martins declare they have no conflict of interest.

Human and Animal Rights and Informed Consent

This article does not contain any studies with human or animal subjects performed by any of the authors.

Keywords

nonmedical prescription drug use; adolescent; review; prevention; diagnosis; treatment

Introduction

Nonmedical prescription drug (NMPD) use among adolescents is a growing area of concern in many parts of the world. NMPD use is defined as the use of prescription drugs for reasons other than prescribed, for a time period longer than prescribed, or simply, without a doctor's prescription (1). For the past few decades, multiple surveys from the United States (U.S.), Europe, South Asia, Latin America and the Middle East illustrate a rising prevalence in NMPD use among adolescents (2–7).

Adolescence is an important time for neurodevelopmental formation and maturation. Globally, adolescence has multiple definitions. For instance, the World Health Organization (WHO) and two American nationally representative surveys, the National Survey on Drug Use and Health (NSDUH) and Monitoring the Future (MTF), define adolescence to be people between the ages 10–19 years old (8), 12–17 years old (9) and in 8th, 10th or 12th grade (10), respectively. The WHO considers youth to be people aged 10–24 years old. While this review does not adhere to any definition strictly, our goal is to address NMPD use issues among people over a period during which risk-taking behaviors, psychiatric comorbidities and substance use problems increase (11–13). Thus, adolescents are particularly vulnerable to adverse outcomes associated with the use of substances such as addiction (14), academic underperformance (15), sexually transmitted infections and risky sexual behaviors (16), traffic injuries and other chronic health consequences (17). Additionally, research shows that earlier age of first use is associated with an increased likelihood of lifetime substance use disorder (SUD) (14). Thus, adolescence is a critical window of opportunity for delaying or preventing substance use.

This review synthesizes the epidemiology of adolescent NMPD use, and contemporaneous evidence-based strategies for its prevention, assessment and treatment.

Epidemiology of adolescent nonmedical prescription drug use

NMPD use in the U.S. has been considered a growing epidemic (2) and a major public health issue. Prescription drugs rank as the second most prevalent substance misused, following marijuana and excluding alcohol and tobacco products (18). The most commonly nonmedically used prescription drugs in the U.S. are opioids, tranquilizers, stimulants and sedatives (7).

Data from the MTF study allows the study of time trends for each type of prescription drug. Among adolescents in the U.S., past-year nonmedical prescription opioid (PO) use was 3.3% in 1992 and increased dramatically to 10% in 2009, before gradually decreasing to 5.4% in 2015 (10). Nonmedical prescription stimulant (PS) use was prevalent during the late 1970s among 17–18-year-olds, peaking in 1982 to reach 26%, then declining to plateau at around 7% to 11% (10). Younger age groups (13–14-year-olds) were asked about past-year

nonmedical PS use beginning in 1991, when its prevalence was 6.2%. It reached 9.1% in 1996 and dropped steadily to 2.9% in 2012 (10). A slightly elevated prevalence has been observed since then (10). Past-year prevalence of nonmedical prescription tranquilizer (PT), benzodiazepine and non-benzodiazepine use among 13–14-year-olds increased in the 1990s (from 1.8% to 3.3%), and then remained at around 2.8% until 2015, when it decreased to 1.7%.

The Inter-American Drug Abuse Control Commission published a 2015 report compiling drug use prevalence statistics in many North, Central, and South American countries (9). Data sets covering NMPD use are presented in the report covering 28 countries, excluding Mexico and Brazil. Past-year nonmedical PT use prevalence among 13–17-year-old students was highest in Chile (exceeding 9%), followed by Paraguay and Bolivia (both ~7%).

In Canada, recent data comes from the 2010–2011 Quebec Health Survey of High School Students, which was conducted among 63,196 students surveyed from 470 schools. The study found a past-year prevalence of 5.4% for use of any prescription medication without a doctor's recommendation or prescription (19). Stimulants (2.7%) were the most popular class of prescription drugs used nonmedically, followed by opioids (1.9%), sedatives, hypnotics, and other tranquilizers (1.1%), and other drugs (0.1%) (19).

Europe has also been experiencing a similar trend in the past 15 years. A study on 85,000 16-year-old students from 31 European countries participating in the 2003 European School Survey Project on Alcohol and Other Drugs found that the lifetime nonmedical PT or prescription sedative use prevalence was 5.6%ⁱ. The highest prevalence of PT use was in Lithuania (13.6%) and the lowest was in Ukraine (1.5%) (20). A more recent report shows that lifetime PT use remained stable across 25 European countries from 1995 to 2015.

Within Asia, a 2009–2010 study from Guangzhou, China found that 1.8%, 0.8%, 1.8%, and 2.8% of 3,273 students reported nonmedical PO, prescription sedative, PS and any prescription drug use, respectively (21). In a separate cross-sectional study that included 11,906 11–23 year-old Chinese students (mean: 16.7), 11.3% reported nonmedical prescription pain reliever (i.e., opioids and scattered analgesicsⁱⁱⁱ) lifetime use (22). Scattered analgesics were the most prevalently used medications across the entire sample (5.8%), followed by Codeine (5.5%), Percocet (5.4%) and Tramadol (0.6%)ⁱⁱⁱ.

The Australian Institute of Health and Welfare's 2016 National Drug Household Survey provides prevalence and trend data for recent NMPD use in 14–19-year-olds spanning a period between 2001 and 2016 (23). The proportion of survey respondents reporting recent NMPD use has seen a modest increase in recent years, from 3.2% in 2007 to 3.7% in 2016. Considering all data available from 2001 onwards, the average proportion of survey respondents' recent NMPD use was 3.7%, owing to higher reported rates of use in 2001 and 2004.

ⁱNo data on opioids or stimulants was collected in the European School Survey Project on Alcohol and Other Drugs

ⁱⁱⁱCodeine, Percocet and Tramadol are prescription opioids

Middle Eastern data on NMPD use remains scant. A cross-sectional study of 986 high school students attending public and private high schools in Beirut, Lebanon in 2011 found a lifetime NMPD use prevalence of 10%; the lifetime nonmedical prescription pain reliever, PT and PS use prevalence were 8.2%, 5.6% and 3.5%, respectively (24). Another recent school-based survey from Saudi Arabia showed a lifetime NMPD use prevalence of 7.2% (2).

Sources of adolescent NMPD acquisition

Adolescents' primary source of nonmedically used prescription drugs are legitimate prescriptions for the adolescents, their family members or friends. For example, the U.S. Secondary Student Life Survey interviewed 501 8th and 9th graders (typically 13–14-year-olds) one year after a baseline survey (2009–10) (25). Nearly half (45.9%) had been prescribed different types of medications in the previous six months, among whom 14.3% had been prescribed pain medications, 9.6% stimulants, 1.7% anti-anxiety medications, and 0.9% sedatives (25). Among those with a prescription, 73.7% had unsupervised access to medications with abuse potential (25). Lebanese data from 2010–11 found that 21.6% of 15–19-year-old students ever used prescription sleeping, pain, anxiety and stimulant medications nonmedically (26). Parents of lifetime nonmedical users were the primary source for all drug classes except for stimulants, for which friends were the primary source (26). Parents were not a source of stimulants (26). In addition, recent NSDUH data (2016) shows that, among 12–17-year-old past-year nonmedical PO, PT or PS users, their most recent nonmedically used POs, PTs or PSs came mostly from friends or relatives for free (38.8%, 42.4%, 49.5%, respectively), followed by a single doctor (PO: 22.9%) or through purchasing from a friend (PT: 18.1%; PS: 19.6%) (18).

Adolescent NMPD use prevention strategies

A number of strategies can be employed to prevent NMPD use among adolescents. Family-based programs are one kind of NMPD use prevention strategy. One such program featured by the Substance Abuse and Mental Health Services Administration (SAMHSA) is the Iowa Strengthening Families Program (ISFP), an evidence-based prevention program for parents and their children (27). The ISFP recruited families of 6th graders (11–12-year-olds) from 22 rural Iowa schools in 1993 and assigned them to either the program intervention or a control condition. The intervention's first six sessions' first hour had separate parental and child skills training. Parents were encouraged to focus on skills related to communication and management of their child's emotions, while children focused on skills including refusal and peer resistance. Joint sessions focused on family cohesiveness. The intervention was modeled on two theoretical frameworks, the biopsychosocial vulnerability model and the resiliency model^{iv}. At age 25, the intervention arm was associated with nearly three-fold reductions in the odds of NMPD and opioid use compared to the control arm (27).

^{iv}The biopsychosocial vulnerability model suggests that coping and effective family management protects against family conflict and financial strain. The resiliency model emphasizes seven skills: emotional management, interpersonal/social, reflection, academic/professional, restoration of self-esteem, planning and problem-solving.

Other important prevention strategies include prescription drug monitoring programs (PDMP). If more than 35% of licensed prescribers registered to use PDMPs (28) and if providers checked PDMP databases more often for opioid prescriptions (29), adolescents' risk of being given legitimate prescription drugs prescribed for older adults easily may reduce (29).

Take-back programs allow the public to deposit unused prescription drugs at safe locations, including doctors' offices. One study (30) found that only 10% of respondents returned medications to pharmacies or doctors' offices. Doing so may have prevented accumulation of prescription drugs at home or in waste that adolescents could access. Hawaii's implementation of a take-back program recovered mostly non-prescription drugs, but POs were the second-most recovered prescription drug (30). A similar intervention in Tennessee (31) recovered 1.39 pounds per 1,000 residents, 5% being controlled substances.

Limited evidence involving small samples also suggest two other tactics, which prescribers and mental health professionals could follow. A 2013 U.S. study (32) involving 44 parents or guardians of 40 adolescents found that parents did not properly store their prescription drugs, mainly because they believed the drugs' abuse potential was low. Prescribers are in a prime position to change those beliefs. Separately, a 2011 U.S. study (33) used discussion from two focus groups comprised of 16 12–13-year-olds to assess which types of prevention messages about prescription drugs resonated with teens. Of the 20 messages from 10 categories of drug prevention messages, three messages involving scare tactics had the highest resonance among the adolescents.

Screening and diagnosis of NMPD use disorders

Pediatricians and adolescents' primary health care providers are in a crucial position to identify adolescent substance use at an early stage and prevent its negative consequences. Substance use screening rates of adolescents vary (25%–85%) (34, 35), and, even among experienced clinicians, failure to detect SUDs is substantial upon clinical impression alone (36).

Contradictions exist with regards to adolescent substance use screening recommendations. For instance, the most recent report of the U.S. Preventive Services Task Force concludes that there is insufficient evidence to recommend routine adolescent substance use screening (37). Contrarily, the American Academy of Pediatrics (AAP) (38), the National Institute on Alcohol Abuse and Alcoholism (NIAAA) (39), and SAMHSA recommend routine universal substance use screening, brief intervention, and referral to treatment (SBIRT) for adolescents (40). SBIRT aims to identify adolescents on a continuum from abstinence to addiction and to use this information to guide individualized interventions (38).

Assessment of NMPD use and disorder is considered among the tools used for screening for substance use in adolescents. The first element of SBIRT, screening, can be done using several validated questionnaires in clinics, emergency departments (EDs), or other settings (38). Clinicians should select one that is suitable, appropriate and relevant to their particular adolescent patient population. The Car, Relax, Alone, Friends/Family, Forget, Trouble

(CRAFT) questionnaire received special attention in the 2011 AAP statement for its focus on high-risk behaviors of adolescents who are already engaged in substance use (39). However, since 2016, the AAP now recommends the use of the Brief Screener for Tobacco, Alcohol and Other Drugs (BSTAD) or Screening to Brief Intervention (S2BI) tools, which focus on early detection of substance use before becoming problematic (38). The S2BI tool^V assesses the frequency of past-year prescription and other drug use. Moreover, the S2BI differentiates among no use, substance use, and SUD categories, which align with criteria from the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition^{VI} (DSM-5) (38).

A study of 2,135 14–20-year-olds presenting to the ED at the University of Michigan Medical Center from 2010–2011 assessed NMPD use (41). It found that 185 (8.7%) and 115 (8.7%) of young people reported nonmedical PO and prescription sedative use, respectively. Among nonmedical PO users, only 14.6% had a current home opioid prescription. Among nonmedical prescription sedative users, only 12.3% had a current home sedative prescription. Seventy-eight (3.7%) ED-admitted adolescents used both POs and prescription sedatives nonmedically (41). ED personnel could screen admitted youth for NMPD use using tools described in this section. Among those screening positive, the ED should find ways to intervene, even if NMPD use was not the reason for ED admission (41).

Prior to interviewing the adolescent patient, the clinician must ensure confidentiality of the information shared by the adolescent and the parent/guardian (39). Breaching confidentiality depends upon the clinician's judgement to protect the patient or someone else and prevent immediate harm. Parent participation is advised under certain circumstances, particularly if it were to benefit the adolescent patient. The clinician should discuss first with the adolescent patient what, when and how to disclose specific details about their substance use. Laws that protect patient confidentiality vary by state and the clinician should be aware and knowledgeable about them (38).

The second element of the SBIRT is the brief intervention, which is a conversation between the health professional and the adolescent aimed to encourage healthy behaviors and choices to prevent, reduce or stop risky behaviors (38). Two studies show that a brief motivational interviewing intervention reduced alcohol and marijuana consumption at 12 months among adolescents presenting to hospital EDs. Alcohol intake was reduced by one drink per drinking occasion (from 4.53 to 3.56), though standard care (not described by authors) had a similar effect (from 4.77 to 3.67) (42). Past 30-day marijuana use abstinence at 12 months

^VS2BI uses forced-choice questions in which an affirmative answer for NMPD use results in a follow-up question about its frequency, which must be answered.

^{VI}The diagnosis of SUD, including NMPD use disorder, is made using the DSM-5. The DSM-5 is used for clinical, policy, research and insurance reimbursement purposes. The DSM-5 made the following changes to address concerns from the DSM-IV (43) First, substance abuse and dependence criteria were combined into a unidimensional construct called SUD. Research showed that abuse and dependence factored into the same latent construct and that maintaining the two dimensions created an underdiagnosed category of patients called “diagnostic orphans”. Second, the abuse criterion related to trouble with the law was dropped. Evidence suggested that it was not useful in diagnosing SUDs (43). A craving criterion was added on its relevance from behavioral, imaging, pharmacological, epidemiological and genetic studies. Third, a diagnostic threshold of endorsing at least two criteria was accepted. Fourth, an overall severity indicator was derived from the criteria, with increasing numbers of endorsements indicating a more severe diagnosis. Fifth, specifiers of physiological dependence were eliminated due to lack of utility. Sixth, changes were implemented to meet the diagnosis of substance-induced mental disorder (i.e., evidence that the substance used is capable of producing the attributed psychiatric symptoms). Seventh, the use of drugs' metabolites as biomarkers was discouraged to establish a diagnosis of SUD. Finally, a dependence diagnosis had to have at least two criteria attributable to one substance. A dependence diagnosis could no longer be made if two criteria were endorsed based on use of two substances (43).

post-intervention was 45% versus 22% comparing intervention and control groups. (43). A systematic review found that five heterogeneous studies completed before 2013 showed insufficient evidence of brief intervention reducing NMPD use or associated harms (44). The source populations for the studies included both adolescents and adults. Recent research on SBIRT for NMPD use and harms is lacking. In SBIRT, brief intervention is agnostic to the screening tool chosen by the clinician. It is advised that the clinician incorporates positive reinforcement using normative correction statements when the adolescent reports no substance use, medical advice to those reporting substance use but no SUD symptoms, motivational interventions when the adolescent reports mild SUD, and referral to specialized treatment to those reporting severe SUDs (38).

If there is a high suspicion that the adolescent suffers from a SUD, the patient should be referred for a comprehensive evaluation by a trained substance use specialist. It should be noted that only 10% of adolescents in need of referral to specialty substance use are actually referred (45), and, to date, the majority of the referrals in the U.S. are from the justice system (46). It is important to make sure that a mental health evaluation takes place and that appropriate treatment is started early. Certain substance use practices (e.g., injection drug use, withdrawal symptoms, a history of ED visit(s) for drug related issues, using different sedatives with alcohol, benzodiazepines, barbiturates or opioids, frequent or excessive binge drinking, and operating motor vehicle under the influence of alcohol and/or drugs) are associated with acute risk of imminent harm and immediate action is warranted (including screening for suicidal or homicidal ideation) (38). Where to refer an adolescent could be complicated by several factors including treatment availability, insurance, and patient/family personal preference. Sociodemographic and socioeconomic treatment disparities will be discussed in the next section.

Assessment of any SUD is complex and often involves multiple stages. As described by Allen and Mattson's assessment model, the three main goals in assessment are to: 1) extract relevant information that helps form an individualized treatment plan^{vii}, 2) match patients with appropriate interventions in the case that multiple are available, and 3) select the appropriate individual measurements to monitor progress and evaluate effectiveness (47).

Epidemiology of treatment utilization among adolescents for NMPD use

According to the NSDUH, a total of 198,000 12–17-year-olds received substance use treatment services in 2016 in the U.S. (18). Of these individuals, the percentage of adolescents who last received or were currently engaged in treatment for nonmedical PO, PS and prescription sedative use were 14.3%, 4.4%, and 3.5%, respectively. Published research on treatment utilization among adolescents with NMPD use disorders is minimal.

Adolescent PO treatment utilization

In one of the few studies available, which used data from 2005–2008 NSDUH, 12.4% of 12–17-year-olds met the Diagnostic and Statistical Manual of Psychiatric Disorders (4th Edition,

^{vii}Resources to help identify treatment options in the U.S. are available from the SAMHSA's website: www.samhsa.gov/treatment/index.aspx

DSM-IV) criteria for prescription opioid dependence, abuse, or subthreshold dependence (48). Past longitudinal research has demonstrated that subthreshold dependence may escalate into SUDs later in life (48). Past-year treatment utilization and perceived need of treatment for PO use disorders were highest among adolescents with past-year PO dependence (17.4% and 4.2%, respectively), followed by those with those with PO abuse (16.1% and 2.4%); treatment utilization was lowest among adolescents with subthreshold nonmedical PO dependence (8.9% and 0.9%) (48). Of those who reported PO abuse, dependence or subthreshold dependence, only 13% actually received treatment; however, it was unknown if treatment was for their PO symptoms (48).

Across nonmedical PO abuse, dependence and subthreshold dependence, having public or no health insurance (versus private insurance), residence in large metropolitan (versus nonmetropolitan) areas, criminal justice involvement, nicotine dependence, talking to parents/guardians about substance use, and meeting the criteria for other SUDs were all associated with increased odds of treatment utilization (48). Perceived need for substance use treatment was lowest among black adolescents (1.8%); involvement with the criminal justice system, and having alcohol or other SUDs were associated with increased odds of perceived need for substance use treatment (48). Within the group of adolescents who reported perceived need for treatment, 87% did not actually seek treatment. The reasons for not seeking treatment included were: lack of readiness to stop using and concerns of others finding out about treatment use and potential negative opinions (48).

Adolescent prescription stimulant treatment utilization

The Drug Abuse Warning Network (DAWN) collects data on hospital ED visits involving dextroamphetamine-amphetamine (e.g., Adderall) and methylphenidate (e.g., Ritalin) directly from patient medical records. From 2006–11, DAWN collected 1,648,992 visits from its network of over 250 hospitals that monitor drug-related visits to hospital EDs. From 2006–11, a total of 9,181 visits involved dextroamphetamine-amphetamine and 2,483 involved methylphenidate (49). Overall, ED visits involving dextroamphetamine-amphetamine increased by 155.9%. In adolescents, 14.1% of ED visits involving dextroamphetamine-amphetamine and 16.4% of those involving methylphenidate were related to nonmedical use of these drugs (49).

Another study examined 6,841 prescription and over-the-counter (OTC) treatment admissions in California between 2006–2007 by using the California Outcomes Measurement System (50). Adolescents aged 12–17 accounted for only 287 of the treatment admissions, of which most (45.3%) were for prescription stimulants, followed by OTC drugs (32.1%), opioids (15%), antidepressants (6.6%), and sedatives/tranquilizers (50). It is unknown whether the treatment admissions were the result of nonmedical use.

Medication-assisted treatment (MAT) for adolescents with Opioid Use Disorder (OUD)

Efficacy of MAT among adolescents

The Cochrane Collaboration has conducted two reviews of randomized controlled trials concerning the efficacy of medication for maintenance and detoxification treatments for opioid-dependent^{viii} 13–18-year-old American patients (51, 52). One review demonstrated that, among opioid-dependent adolescents, those with heroin dependence taking either methadone and levo-methadyl acetate hydrochloride had similar 12-month opioid use and social functioning^{ix} outcomes (52). The other review concerning detoxification among heroin-dependent adolescents found that no difference in drop-out rate or treatment acceptability existed between buprenorphine and clonidine. Buprenorphine-randomized patients were more likely to commence naltrexone following detoxification (51).

One study found that buprenorphine maintenance was more effective than buprenorphine detoxification with regards to patient retention in treatment and both 12-month opioid use and enrollment in other SUD treatment (53). Duration of MAT is important. A U.S. study found that receiving 12 versus two weeks of buprenorphine/naloxone detoxification resulted in higher rates of treatment retention among opioid-dependent 15–21-year-olds (8% versus 36% dropout by end of week 4)^x (54).

Epidemiology of MAT use among adolescents

Adolescent MAT use varies sociodemographically. One study assessed time trends and disparities in buprenorphine versus naltrexone treatment utilization among 13–25-year-olds with OUD in the U.S. from 2001–2014 (55). Only 26.8% received either buprenorphine (89.2% of patients) or naltrexone (10.8%) within six months of their diagnosis. Treatment receipt was less likely among females (20.3%) versus males (24.4%), among non-Hispanic black (14.8%) and Hispanic (20.0%) youth versus non-Hispanic white (23.1%) youth, and among younger versus older youth (1.4% of 13–15-year-olds, 9.7% of 16–17-year-olds, 22.0% of 18–20-year-olds, 30.5% of 21–25-year-olds) (55). Treatment receipt within six months of OUD diagnosis increased from 3% in 2002 to 31.8% in 2009, and then declined to 27% in 2014 (55).

Conclusions

Adolescent NMPD use is a global public health matter. Despite its global significance, most of the evidence surrounding its prevention, assessment and treatment are U.S.-centric. Evidence for prevention of NMPD use among adolescents is limited. SAMHSA's adolescent NMPD prevention recommendations are not abundant. Among them is only one family-based program (ISFP), though its generalizability is questionable. More evidence concerning the assessment and treatment of NMPD use exists compared to prevention. Though evidence for the assessment of SUDs exists, screening, the first element of the SAMHSA-

^{viii}All opioids

^{ix}Social functioning is measured as integration at school or at work, family relationships

^xBoth interventions included 12 weeks of psychosocial treatment

recommended SBIRT strategy, is not commonly completed in primary care, even for nonprescription drugs, or hospital EDs, which are source populations for those with potentially more risky behaviors than the general population. Adolescents with dependence symptoms are more receptive to treatment than those with abuse symptoms; however, safe and effective treatment (i.e., psychosocial therapy and pharmacotherapy) utilization and perceived need for treatment are differential based on socioeconomic circumstances. Stigmatization can arise as part of treatment utilization and treatment seeking behavior, so confidentiality is crucial. Mental health providers, physicians and other adolescent health stakeholders may consider using some of the interventions in this review paper, including preventative screening and getting involved with community preventative programs. When doing so, they should consider the interventions' limitations and the particular characteristics of their population in order to maximize effectiveness and minimize harm.

Abbreviations

| | |
|---------------|---|
| BSTAD | Brief Screener for Tobacco, Alcohol and Other Drugs |
| CRAFFT | Car, Relax, Alone, Friends/Family, Forget, Trouble |
| DSM-5 | Diagnostic and Statistical Manual of Mental Disorders, 5th Edition |
| DSM-IV | Diagnostic and Statistical Manual of Psychiatric Disorders, 4th Edition |
| DAWN | Drug Abuse Warning Network |
| ED | Emergency department |
| ISFP | Iowa Strengthening Families Program |
| MAT | Medication-assisted treatment |
| MTF | Monitoring the Future |
| NIAAA | National Institute on Alcohol Abuse and Alcoholism |
| NSDUH | National Survey on Drug Use and Health |
| NMPD | Nonmedical Prescription Drug Use |
| ODU | Use Opioid use disorder |
| OTC | Over-the-counter |
| PO | Prescription opioid |
| PT | Prescription tranquilizer |
| PS | Prescription stimulant |
| S2BI | Screening to Brief Intervention |
| SBIRT | Screening, brief intervention, and referral to treatment |

| | |
|---------------|---|
| SAMHSA | Substance Abuse and Mental Health Services Administration |
| SUD | Substance use disorder |
| AAP | The American Academy of Pediatrics |
| U.S | United States |
| WHO | World Health Organization |

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middle-aged people who use medically are those most likely to die from PO-related overdoses, while 15–24-year-olds are most likely to use POs nonmedically, consistent with DSM-IV abuse. PDMPs, if widely adopted by states, and subsequently, physicians, have the capability to limit distribution to both adolescents and adults. This of course depends on linking overprescribers with PO education and patients themselves with chronic care. PDMPs, more so than other prevention interventions, are important due to their scale and automatability.

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