CAPT Decision Support Tools

Factors Associated with the Non-Medical Use of Prescription Drugs

Using Prevention Research to Guide Prevention Practice

SAMHSA's Center for the Application of Prevention Technologies
October, 2013

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This document was developed under the Substance Abuse and Mental Health Services Administration's Center for the Application of Prevention Technologies contract. Reference #HHSS277200800004C. For training and technical assistance use only.

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Developed under the Substance Abuse and Mental Health Services Administration's Center for the Application of Prevention Technologies contract (Reference #HHSS277200800004C)

FACTORS ASSOCIATED WITH THE NON-MEDICAL USE OF PRESCRIPTION DRUGS: USING PREVENTION RESEARCH TO GUIDE PREVENTION PRACTICE

As part of a strategic planning process, practitioners need to identify the underlying factors that influence the likelihood that an individual will develop a substance abuse or related behavioral health problem. This document presents risk and protective factors related to the nonmedical use of prescription drugs (NMUPD), as identified in the prevention research literature. It also provides recommendations for using the prevention research to inform the selection and prioritization of factors.

Related tools in this toolkit include:

- *Strategies to Reduce the Non-Medical Use of Prescription Drugs: Using Prevention Research to Guide Prevention Practice*

HOW WE IDENTIFIED THE FACTORS INCLUDED IN THIS DOCUMENT

The risk and protective factors included in this document were culled from articles published between 2006 and 2012. This range of dates was dictated by available resources, and the view that more recent (post-2005) articles would be more relevant for planning current prevention activities. The review focused on U.S. samples of adolescents and older adults. While all classes of prescription drugs were examined, specific focus was given to opioid/pain reliever class of prescription drugs, the most common class of prescription drug used for nonmedical purposes.

The search was conducted using PSYCHINFO, PUBMED, and EBSCO. Search terms included "prescription drugs," "opioid," "opiates," "sedatives," "tranquilizers," and "stimulants," in combination with: "adolescents," "older adults," "elderly," "consequences," "risk and protective factors," "availability," "access," "community," "norms," "family," "parental," "mental health," "pain," "chronic pain," and "school."

Articles were selected based on the following criteria:

- The full text was available.
- The article was published in a peer-reviewed journal.
- The study had clearly identified methodologies and results, or was a well-researched literature review.

- At least one of the main findings was specifically related to the non-medical use of prescription drugs.
- The study specifically addressed risk and protective factors or, in the case of a literature review, included a section of the review on factors associated with NMUPD.
- In addition, all entries included in this document were reviewed for clarity by at least two reviewers with post-graduate degrees. Any differences were resolved by consensus.

CAVEATS TO THE SELECTION PROCESS

1. The findings are limited to the time frame, libraries, and search parameters described above.

2. The body of research on risk and protective factors associated with NMUPD is relatively young and meager, so that one or a few studies could dramatically shape our understanding of the association between a risk or protective factor and NMUPD (either positively or negatively).

3. The fact that a given risk or protective factor does not have multiple, well-designed research studies establishing a strong, uni-directional relationship with NMPUD may say less about whether that factor is a potent driver of the problem and more about the current paucity of related literature.

4. The methodological rigor of the studies reviewed varies widely. For example, some studies used longitudinal designs that followed individual subjects over time, but most used cross-sectional designs that cannot determine whether a causal relationship exists between a risk or protective factor and NMUPD.

5. Most of the literature reviewed focused on adolescents or young adults; little has been published about those over 21 years of age.

USING THESE RESOURCES TO GUIDE PREVENTION PRACTICE

This document contains two tables:

- *Table 1: Brief Summaries,* provides a snapshot of identified factors, organized by the domains of the socio-ecological model: Individual, family, school, peer, community/environment.

- *Table 2: Detailed Summaries,* provides a detailed description of each article identified in the search, including sample characteristics, study design, outcome measures, key findings, study limitations, and related prevention strategies.

Although there are several ways to approach and use these tables, the following are suggested steps or guidelines.

Start with a needs assessment. In general, the articles contained in this document should not be a starting point for a local needs and resources assessment. If the reviews are used to identify risk or protective factors that the literature supports, and then local data are collected to determine if or how those selected factors contribute to NMUPD, a danger exists that you will find just what you looked for, rather than find the major factors that operate in your community however weakly they may be supported by research literature. The better place to start is by examining local quantitative and qualitative data to identify the risk and protective factors that drive NMUPD in your community. Those factors may well differ from factors in other communities. For example, in your community most high school students may have low perceptions of the risks associated with the non-medical use of prescription drugs, while this may not be an important risk factor in another community that has a strong and longstanding substance abuse education program that emphasizes their dangers, and a community-wide media campaign that reinforces that message.

Once local risk and protective factors have been identified, use Table 1 to determine which of those factors are addressed in the literature. Targeting those factors, even when evidence from the literature is weak, is more likely to lead to change in NMUPD than targeting local factors the literature does not indicate are associated with NMUPD. Factors in literature can be quickly identified by examining the columns labeled Risk Factor(s) and Protective Factor(s) in *Table I: Brief Summary.* Scan the entire column since a single factor, like "low perception of risk," may appear in several places. Looking at Column 1 may help expedite the scan by searching for the domain in which a risk factor of interest operates.

When other risk and protective factors appear in the same row (in relation to the same single study), this may indicate other factors you may want to target, particularly if they were also identified during your local needs assessment. Keep in mind that it may be possible to implement a single intervention designed to impact these linked or associated factors, an approach that may be cost-effective while increasing the chances of impacting NMUPD. For example, if both lack of parental disapproval of NMUPD and access through unused and/or improperly stored prescription drugs at home are risk factors for adolescent use in your community, a single well-designed parent education intervention could address both factors.

What if a risk or protective factor identified in your local needs assessment doesn't appear in Table 1? Keep in mind that this may simply be due to the way you label the factor versus the way it is labeled in the table. The labels used in the risk and protective factors columns reflects the language used in the articles, and so they may not correspond exactly to more commonly used "standard" terms (see for example National Research Council and Institute of Medicine, 2009, Preventing mental, emotional, and behavioral disorders among young people: Progress and possibilities. Washington, DC: The National Academies Press). If you are not certain whether language in the table represents the same factor(s) of interest to you, you may be able to resolve the issue by examining the entry for the article in Table 2: Detailed Summary, or, if necessary, retrieving the source article (the full citation appears in Table 2). If no entry in Table 1 or 2 corresponds to the risk or protective factor identified in the local needs assessment, you may want to consider shifting to another factor that is supported by the literature, even if your community needs assessment showed it was not as strongly associated with

NMUPD. Another alternative is to examine more literature, as discussed below, for the risk factor you found.

There are some risk and protective factors listed that prevention interventions cannot change (race, gender, age, school or college grade level) or are not easily changed (socio-economic status, rural location). These background or demographic factors may be very useful, however, for selecting those individuals and/or groups, such as females or Whites, which an intervention should focus on or emphasize.

The column labeled *Population* may help you decide how relevant the risk or protective factor (in the same row) is to your local conditions. A study based on high school students that found lack of parental disapproval or monitoring was a risk factor for NMUPD may not be relevant if your local assessment has determined that 19- to 25-year-olds are the population to be targeted. On the other hand, you may have to "settle" for a study that provides support for a risk or protective factor for a population that, while it doesn't match yours, does identify a risk or protective factor selected based on your needs assessment.

Similarly, the *Outcome Measure(s)* column can help determine which articles provide the most direct support for the risk or protective factor(s) in which you are interested (and which you may want to learn more about in Table 2, or by reading the articles.) For example, some studies may show that the risk factors of "peer use" and "peer approval of use" are directly associated with the outcome "misuse of prescription opioids," which is the primary problem of interest in your community. Other studies, however, may provide less support because while they show that these risk factors are linked to the misuse of prescription drugs in general, the studies do not indicate whether they are linked specifically to the misuse of prescription opioids.

Suppose you have identified two or more local risk factors, but your assessment didn't indicate clearly which factor(s) were the most important, and your community doesn't have the resources to implement prevention interventions that address all the factors. In this situation it may be tempting, and you would not always be wrong, to limit the factors you will address, by selecting those that Table 1 shows are associated with highest number of studies. This solution, however, is too simplistic for two reasons. First, some of the sources in Table 1 are literature reviews that include one or more articles that appear separately elsewhere in the table. This means you could be double-counting some studies and not others. Second, a risk factor supported by multiple studies that are all relatively weak (e.g., are cross-sectional surveys that cannot resolve the question of whether the factor is causally linked to NMUPD) may not be as strongly linked to NMUPD as a risk factor supported by a single, but more methodologically rigorous study (e.g., one that studied the same subjects over time and so can show that the risk factor preceded NMUPD). Also, how to compare and weigh the evidence for different studies is beyond the scope of this document, though some of the limitations of the studies are listed in Table 2, and some of the dimensions to consider if you seek out the original articles are discussed in SAMHSA's Center for Substance Abuse Prevention's 2009 *Identifying and Selecting Evidence-Based Interventions Revised Guidance Document for the Strategic Prevention Framework State Incentive Grant Program*.

In general, it is best to leave comparing the rigor of different studies to researchers, evaluators, or others with appropriate training and experience. Fortunately, in responses to conditions of CSAP-funded initiatives, such as the State Incentive Grant, many states have Evidence Based Workgroups that can help assess the literature. Returning to the hypothetical problem we began with, if this literature review can't help you limit the number of risk factors found in your community, what will help? The answer is to reexamine the assessment data (both quantitative and qualitative) and select those factors that seem to be most important contributors to NMUPD locally, and accept that the selection process is often imprecise. The process may be strengthened by convening key community stakeholders to review the data and select the risk factors.

Examine entries for relevant studies in Table 2. Table 2 provides more information about the articles from which Table 1 was generated, and was designed to help you decide whether to focus on one or a few risk and/protective factors. It provides more details about the articles: a full citation so you can locate the original article; other (apart from risk and protective factors) independent variables assessed (e.g., binge drinking, motivations for drug use, age); sample characteristics (e.g., non-random cross sectional sample of 912 secondary students in one school district); the study design including the instrument and time frame (e.g., a 2009 student survey administered in two Appalachian school districts and based on the Communities that care survey); outcomes measured (e.g., past year NMUPD); key findings (e.g., rural adolescents were 26% more likely to have used prescription drugs non-medically); study limitations (e.g., cross-sectional data does not allow causal inferences); and related strategies for preventing NMUPD and related outcomes suggested by the authors (e.g., clinicians should advise students about the risks of prescription drug misuse, including legal consequences of misuse and diversion). Even with the benefit of this more detailed information, consider reading the full text of those articles that seem the most relevant to the risk and/or protective factor(s) on which you plan to focus.

Examine more literature about the risk and protective factors. Also consider searching databases like those discussed above, to retrieve any additional articles of interest. This search might include articles published before and after the time period searched for this review, and articles published in non-refereed journals, many of which use methods as rigorous as articles found in peer-reviewed journals. You might start using the search terms used for this review, but try several variations in language for the factor(s).

The next step. Once you have settled the on risk and/or protective factors you hope to change in order to impact NMUPD, the next step is to select one more interventions designed to change them. There is a CAPT companion document to help with this: *Strategies to Reduce the Non-Medical Use of Prescription Drugs: Using Prevention Research to Guide Prevention Practice***.**

TABLE 1. BRIEF SUMMARIES

Domain (Individual, Family, School, Peer Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcome Measures	Population	Source
Individual	(1) "Impulsive sensation-seeking" personality characteristic, (2) low perception of harm about nonmedical use of stimulants and analgesics	None discussed	(1) Nonmedical use of prescription drugs in past year: (a) stimulants, and (b) analgesics	Undergraduate college students (n=1,253) in mid-Atlantic region	Arria, Caldeira, et al., 2008 (a).
Individual	(1) Alcohol and illicit drug use, (2) risky sexual behavior (e.g., unprotected sex, multiple partners), (3) white students, (4) older students	None discussed	(1) Prescription drug use, (2) alcohol and recreational drug use, and (3) risky sexual behavior (e.g., unprotected sex, multiple partners)	18- to 25-year-old undergraduate college students (n=435) in Rocky Mountain region	Benotsch, Koester, et al., 2011
Individual	(1) Lower socioeconomic status, (2) being unmarried, (3) lifetime or family history of alcohol or other drug use disorders	None discussed	(1) Past-year nonmedical prescription drug use, (2) nonmedical prescription abuse and/or dependence as defined by DSM-IV	Individuals 18 years or older	Blanco, Alderson et al., 2007.
Individual	(1) Current and former non-medical prescription drug use, (2) earlier age of first non-medical use of prescription drugs	Having no history of non-medical use of prescription analgesics	Prevalence of drug use disorders as measured by DSM-IV	National representative sample of households, individuals 18 years of age or older	Boyd, Teter, West, Morales, and McCabe, 2009
Individual	(1) Female, (2) White, (3) older age students	None discussed	(1) Lifetime, and (2) past-year nonmedical use of prescription medications	Students in grades 7-12 in one Michigan school district	Boyd, Young, et al., 2009
Individual	Alcohol or illicit drug use, abuse, or dependence	None discussed	(1) Drug use disorder (past year drug abuse or dependence); (2) mood disorder (past year major depression, generalized anxiety disorder, or posttraumatic stress disorder); (3) no school/work; (4) poor/fair health status; (5) engaged in violent behavior; (6) had committed property offenses	Youth from first or second grade to age 21.	Catalano, White et al., 2011
Individual	(1) Poly-substance use, (2) depressive symptoms	None discussed	30-day nonmedical use of prescription opioids	Young adults between 18-30 years old with history of MDMA/ecstasy use in Columbus, Ohio	Daniulaityte, Falck, et al., 2009

Domain (Individual, Family, School, Peer Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcome Measures	Population	Source
Individual	Obtaining prescription drugs from dealer/ strangers versus free from friends/relative.	None discussed	(1) Frequency of misuse, abuse and dependence of: (a) pain relievers, (b) stimulants, and (c) tranquilizers	Individuals 12 years or older reporting misuse of pain relievers.	Ford and Lacerenza, 2011
Individual	Mental health status (i.e., depression, anxiety, antisocial behavior)	None discussed	Misuse of sedatives/ anxioulytics (anti-anxiety drugs such as benzodiazepines)	Youth from 32 residential facilities in Missouri for antisocial behavior, average age=15.8 years old.	Hall, Howard, et al., 2010
Individual	(1) White, (2) seniors, (3) male, (4) pain-relief motive	None discussed	Lifetime and past-year nonmedical use of prescription opioids	Sample of 4,580 full- time undergraduate students from one university	McCabe, Cranford, et al., 2007
Individual	(1) Early onset, (2) non-medical use of multiple prescription drugs, (3) family history of alcoholism	None discussed	Prevalence of drug use disorders as measured by DSM-IV. 2001-2002	National representative sample of households, excluding those in institutional settings and transient populations	McCabe, West, et al., 2007
Individual	(1) Motivations for prescription drug misuse, (2) co-ingestion of alcohol, (3) routes of administration (i.e., non-oral vs. oral)	None discussed	(1) Prevalence of past year or lifetime prescription drug misuse by type of drug, (2) past-year use of illicit drugs, (3) drug abuse using DAST-10 screening, (4) binge drinking, (5) drug and alcohol dependence using CAGE screen	Undergraduate students at a midwestern university (n=3,639)	McCabe, Boyd and Teter, 2009
Individual	Past-year simultaneous poly-drug use (NMUPD and alcohol use at same time) or concurrent (used in same year, but not ingested together) poly-drug use (alcohol and/or illicit drugs with NMUPD)	None discussed	(1) Alcohol-related problems, (2) drug-related problems	Undergraduate students in midwestern university (n=4,580)	McCabe, Cranford, et al., 2006
Individual	(1) Male; (2) White; (2) poly-drug use (illicit drugs such as marijuana, alcohol, and cigarettes); (3) no intention to attend or complete college	Proper medication management for ADHD	(1) Illicit stimulant use, (2) prescribed stimulant use, (3) approached to divert prescribed stimulant	Youth in 6th-11th grades from Detroit metropolitan area,	McCabe, Teter, et al., 2004,

Domain (Individual, Family, School, Peer Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcome Measures	Population	Source
Individual	(1) Early onset of NMUPD, (2) early onset of alcohol use, (3) family history of alcoholism, (4) poly-drug use ("alcohol and other drugs")	None discussed	Development of prescription drug abuse and dependence	National cross-sectional sample of individuals 18-years or older, 52% women, 71% white, 12% Hispanic, 11% African American, 4% Asian and 2% Native American or other	McCabe, West, et al., 2007
Individual	(1) Lifetime depression, (2) past-year substance abuse, (3) past- year binge drinking, (4) past-year illicit drug use, (5) past-year marijuana use	None discussed	Past-year non-medical use of prescription drugs	2000 randomly selected college women from 253 schools in 47 states	McCauley, Amstadter, et al., 2011
Individual	(1) Traumatic events (witnessing violence); (2) depression, posttraumatic stress disorder; (3) other lifetime drug or alcohol abuse/dependence; (4) delinquent behavior	None discussed	Lifetime non-medical use of prescription drugs	Adolescents (aged 12- to 17 years) non- institutionalized, English- speaking in homes with a telephone (n=3,614)	McCauley, Danielson, et al., 2010
Individual	(1) Poorer academic performance, (2) past-year major depression, (3) higher risk-taking behaviors, (4) past-year use of: (a) alcohol, (b) cigarettes, (c) marijuana, or (d) cocaine or inhalants. In addition, among users there are two risk factors for a substance abuse disorder: (1) use of cocaine or inhalants, and (2) more than 10 episodes of prescription misuse in the last year.	Being African American or Asian American.	(1) Misuse of prescription drugs, (2) symptoms of abuse and/or dependence of: (a) opioids, (b) stimulants, (c) tranquilizers, and (d) sedatives	Adolescents (aged 12-17 years) in non- institutionalized settings (n=18,678)	Schepis and Krishnan-Sarin, 2008
Individual	(1) Purchasing prescription drugs for misuse versus obtaining them in other ways (e.g., versus having them prescribed by a physician or getting them free from a friend or relative)	None discussed	(1) Lifetime misuse of prescription medications for each drug class: (a) opioids, (b) tranquilizers, (c) stimulants, (d) sedatives; (2) concurrent abuse of drugs and alcohol	Youth between 12- and 17-years-old	Schepis and Krishnan-Sarin, 2009

Domain (Individual, Family, School, Peer Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcome Measures	Population	Source
Individual	(1) Heroin users were less likely to be in school or to have graduated, but opioid users more likely to report being suspended (although age was similar); (2) more concurrent cannabis, alcohol, sedative, and other simulant disorders; (3) more multiple substance disorders; (4) both have criminal histories, but opioid users report more selling drugs and damaging property; (5) mental health: opioid users had higher ADHD and manic episodes, while heroin users had more depression	None discussed	Assessment surveys for demographic and social features, composite diagnoses, psychiatric disorders, Beck Depressive Inventory (BDI), sexual and injection drug use, HIV risk behaviors, general crime scale and global assessment of individual need (GAIN)	94 adolescents (aged 14-18) with past-year opioid use disorder (OUD), sub-divided into heroin (b=53) and non-heroin (n=41) groups and comparison of adolescents with non- OUD cannabis/alcohol use disorders (n=73) in adolescent substance abuse treatment program near Baltimore, Maryland	Subramaniam and Stitzer, 2009
Individual	(1) Poly-drug use (including alcohol, marijuana, stimulants, tranquilizers, ecstasy, sedatives and cocaine); (2) females; (3)Blacks; (4) lower socio-economic status; (5) holding favorable attitudes towards drugs; (6) detached parents; (7) friends use of illicit drugs	None discussed	Past-year opioid misuse	17,709 youth in national survey(s) between 12- and 17- years-old	Sung, Richter, et al., 2005
Individual	(1) Psychological distress/internal restlessness and (2) sensation seeking	None discussed	Use and misuse of prescription stimulants	Students (n=390) at 4- year Northeastern U.S. college	Weyandt, Janusis, et al., 2009
Individual	(1) Poly-drug use, (2) mental health disorder (i.e., major depression), (3) relatively easy access	None discussed	Past-year prevalence of stimulant misuse	Youth and young adults from elementary schools to college students	Wilens, Adler, et al., 2008
Individual	(1) Self-reported fair or poor health, (2) use of mental health services for psychological problems, (3) female, (4) selling illicit drugs, (5) use of multiple drugs	None discussed	Past-year prevalence of non- prescribed prescription pain reliever abuse and dependence	National representative sample of 36,992 adolescents ages 12-17 (National Surveys of Drug Use and Health)	Wu, Ringwalt, et al., 2008

Domain (Individual, Family, School, Peer Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcome Measures	Population	Source
Individual, Family	**Full Sample:** (1) Age; (2) fewer years of education; (3) history of alcohol, marijuana, inhalant use; (4) delinquent behavior **Race/Ethnicity Subgroups:** (1) delinquent behavior (Whites and Hispanic), (2) adolescent alcohol and marijuana use (Whites), (3) adolescent inhalant use (Hispanic), (4) higher ratings of maternal warmth (Hispanic)	Religious attendance (Black subgroup)	Prescription drug misuse [(a) sedatives, (b) tranquilizers, (c) stimulants, (d) pain killers, and (e) steroids]	Elementary and high school students (grades 7-12)	Harrell and Broman, 2009
Individual, School	(1) Availability of prescription drugs, (2) first and second year of college (for initiation)	None	(1) Exposure opportunity; (2) lifetime prevalence, (3) initiation between times one and two, and (4) continuation and cessation of substance use for alcohol, tobacco, and 10 illicit and prescription drugs during the first two years of college	Undergraduate college students (n=1,253) in mid-Atlantic region	Arria, Caldeira, et al., 2008 (b).
Individual, Peer	(1) Age, (2) male, (3) peer anti-social or delinquent behavior, (4) risk-taking behavior, (5) alcohol and marijuana use, (6) cigarette use	(1) Mastery of external world, (2) impulse control, (3) perceived popularity, (4) friends engaged in pro-social behavior	(1) Lifetime, past year, and past 30-day non-prescribed use of: (a) Ritalin, (b) tranquilizers, and (c) narcotics [(i) opium, (ii) morphine, (iii) codeine]; (2) non-users, experimenters and occasional misusers, and frequent misusers	Public and private elementary and high school students (ages 11-18)	Fleary, Heffer, et al., 2011
Individual, Peer	(1) White, (2) Hispanic, (3) age, (4) lower grade point average, (5) sexually active, (6) fair/poor health, (7) binge drinkers, (8) marijuana users, (9) know a member of the faculty or administration, (10) less involvement in conventional activity, (11) normative alcohol beliefs (attitudes or beliefs that excuse, justify, or normalize the misuse of alcohol)	None discussed	(1) Lifetime substance use: (a) non-users, (b) non-medical prescription drug use only, and (c) illicit/street drug use only	Undergraduate college students	Ford and Arrastia, 2008

Domain (Individual, Family, School, Peer Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcome Measures	Population	Source
Individual, Community	(1) Male, (2) White, (3) upper-class (non-freshmen), (4) member of a social fraternity or sorority, (5) Jewish religious affiliation, (6) lower cumulative grade point average, (7) initiation of medically prescribed stimulant use for ADHD during secondary school or in college (versus at a younger age), (8) binge drinking in past two weeks, (9) past- year marijuana, hallucinogen, and ecstasy use	None discussed	Lifetime and past-year prevalence of: (a) medically prescribed use, (b) illicit use, and (c) diversion of prescription stimulants	Random sample of undergraduate students (n=9,161) for one college	McCabe, Teter, and Boyd., 2006
Individual, Family, Community	(1) Obtaining prescription drugs from peers or other (non-family) sources	None discussed	(1) Illicit use of prescription medication, (2) obtaining prescription medication not prescribed (open-ended question)	Random sample of 9,161 undergraduate students at one college	McCabe and Boyd, 2005
Individual, Peer, Family	(1) Binge drinking and other illicit drug use, (2) peer drug use, (3) own attitudes towards use, (4) peer and parent attitudes		Non-medical prescription drug use of: (a) any drug type, (b) pain relievers, (c) stimulants, (d) tranquilizers or sedatives.	12- to 17-year-olds (n=16,780) in national sample	Ford, 2008
Individual, Family, Peer	(1) Higher on measures of depression, (2) best friend uses substances	Mother's knowledge of daughters' companions	Lifetime report of illicit use of prescription drugs	Adolescent girls (mean age 12.6)	Schinke, Fang, et al., 2008

Domain (Individual, Family, School, Peer Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcome Measures	Population	Source
Individual, Peer, School	(1) Low level of acknowledging the risks associated with the misuse of pharmaceuticals, (2) wanting to manage or modify the prescription drug high (e.g., by adding alcohol to prescription drug use), (3) wanting to manage the duration or intensity of another drug's effect, (4) other drug use and taking pharmaceuticals as substitutes for other recreational drugs, (5) "partying" (i.e., consuming prescription drugs while socializing with friends and peers), (6) easy availability of prescription drugs to experiment with for recreational purposes, (7) thinking prescription drugs have legitimate purposes and seeing them used widely to no apparent ill effect, (8) wanting to ease social interactions and activities (relaxation, extroversion), (9) wanting to facilitate interactions with the opposite sex, (10) wanting a common leisurely activity with friends, (11) boredom	Knowing they'd be involved in social interactions and carry on a conversation, talk to people out socially	Socio-recreational use of prescription drugs (qualitative open-ended questions)	Non-random sample of 91 undergraduate and graduate college students	Quintero, 2009
Individual, Peer, Family, School	(1) Frequency of participation in risky behaviors; (2) frequency of friends' involvement in tobacco, alcohol, and marijuana; 3) Hispanic (vs. White or African American)	(1) Frequency of participation in pro-social behaviors; (2) specific parent, teacher, and school factors	NMPDU among youth	54,361 seventh through twelfth grade students in 133 public and private schools in eight counties within the Greater Cincinnati area	King, Vidourek et al., 2013
Individual, Peer, Family, Community	(1) Friends' non-medical use of prescription drugs, (2) perceived availability of prescription drugs, (3) lifetime medical use was the single most important predictor of NMUPD in this sample	1) Perceived risk; (2) Parents' disapproval; (3) school commitment; (4) community norms against youth NMUPD	(1) Lifetime and current (30- day) nonmedical use of prescription drugs divided into: (a) sleeping medications, (b) sedative or anxiety medications, (c) stimulant medications, and (d) pain medications	Public school students (grades 5, 7, 9 and 11)	Collins, Abadi, et al., 2011

Domain (Individual, Family, School, Peer Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcome Measures	Population	Source
Family, School	(1) Binge drinking, (2) other illicit drug use, (3) increased age, (4) female, (5) lower income adolescents, (6) living outside of major metropolitan areas, (7) White (for tranquilizers only)	Social bonding in school and family.	Past-year non-medical use of prescription drugs	12- to 17-year-olds (n=16,780) in national sample.	Ford, 2009
Community/Environment	Diagnosis of depression in two-calendar years preceding opioid use	None discussed	(1) Prevalence and incidence of prescribing opioids for depressed and non-depressed non-cancer subjects, (2) amount of average daily dose and average number of days prescribed to subject	Automated health records for two health plans in Washington (n>200,000 records) and northern California (n > 1 million records); plans include Medicaid and Medicare recipients.	Braden, Sullivan, et al., 2009
Community (with Family and School Protective Factors)	(1) Living in a rural area, (2) depression, (3) decreased health status, (4) other drug (marijuana, cocaine, hallucinogens, and inhalants) and alcohol use	(1) School enrollment, (2) living in a two- parent household	Lifetime non-medical use of prescription drugs	12- to 17-year-olds (n=17,872)	Havens, Young. and Havens, 2011
Individual, Peer, Family, School	(1) Female; (2) older age; (3)White; (4) low income; (5) low academic performance, school dropout, or lack of “school-bonding”; (6) residential instability; (7) rural; (8) poor health; (9) recent major depressive episode; (10) PTSD; (11) mood disorder; (12) mental health service utilization; (13)emergency room use; (14) conflict with parents; (15) peer attitudes supportive of drug use and/or peer use of illicit drugs; (16) other illicit drug use; (17) delinquency; (18) sensation seeking; (19) property crimes and violent behavior; (20) self-medication and recreational motivation	(1) Non-white race, (2) two-parent household, (3) parental bonding	Adolescent nonmedical use of prescription drugs	Adolescents (aged 12–17 years), literature review, exact population varied	Young, Glover, et al., 2012

TABLE 2. DETAILED SUMMARIES

Author(s), Article Title	Domain (Individual, Family, School, Peer, and Community/ Environment)	Risk Factor(s)	Protective Factor(s)	Other Independent Variables	Sample Characteristics	Study Design (Instrument and Time Frame)	Outcome Measure(s)	Key Finding(s)	Study Limitations	Related Strategy
Arria, A. M., Caldeira, K. M., Vincent, K. B., and O'Grady, K. E. (a)*; Perceived Harmfulness Predicts Nonmedical Use of Prescription Drugs Among College Students: Interactions with Sensation-Seeking*; Prevention Science, 2008; 9(3): 191–201	Individual	(1) "Impulsive sensation- seeking" personality characteristic; (2) low perception of harm about nonmedical use of stimulants and analgesics	None discussed	Demographic characteristics [(a) gender, (b) race, (c) mother's educational attainment]	N=1,253; college students ages 17-to19-years old;70.8% white,48.6% male, 73.5% whose mother attained B.A. or higher	Prospective cohort study with 6-month and 12-month follow- up; used baseline interviews and web- based surveys for follow-ups	Nonmedical use of prescription drugs in past year: (a) stimulants and (b) analgesics.	**1) Prevalence**: 62% reported no stimulant use and 11.5% reported one or two days during the past year; 67.6% reported no analgesic use and15% reported one or two days of use during the past year. **2) Perceived harmfulness**: 25.2% reported great risk of harm from nonmedical use of stimulants; 27.8% for nonmedical use of analgesics.**3) Outcomes:** a) individuals with low perceived harmfulness were approximately 10 times more likely to use stimulants or analgesics nonmedically compared to those with high perceived harmfulness; b)high "sensation-seeking" characteristic and low perception of harm were independently associated with prescription drug use	(1) Study conducted in one university, limited generalizability; (2) relatively crude measure of nonmedical use, did not differentiate levels of use; (3) evidence of attrition bias (4) analyses did not include other explanatory variables (i.e., family relationships, academic performance, and mental health).	Authors recommend educational or other intervention strategies that address multiple risk factors including lack of information about the potential harm from nonmedical use of prescription drugs for college students. For individuals with high levels of" sensation-seeking," interventions aimed to substitute activities that stimulate the dopamine system for drug use

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Arria, A. M., Caldeira, K. M., O'Grady, K. E., Vincent, K. B., Fitzelle, D. B., Johnson, E. P., and Wish, E. D. (b)*; Drug exposure opportunities and use patterns among college students: Results of a longitudinal prospective cohort study;* Substance Abuse, 2008; 29(4): 19–38	Individual, Family	(1) Availability of prescription drugs, (2) first and second year of college (for initiation) (Note: this article reports the rates of initiation, continuation, and cessation of substance use. The study did include risk factors in surveys/interviews, but these results are not discussed.)	None discussed	(1) Demographic characteristics; (2) social relationships; (3) mental health; (4) sexual activity; (5) parental monitoring; (6) parents' employment status; (7) religiosity; (8) planned course of study *(Note: the screening survey asked questions about religiosity, planned course of study, sexual activity, and follow-up assessments asked questions about static domains such as parenting style and family history, but these were not discussed further in the article as risk or protective factors.)*	**Non-random cross sectional cohort from one university first year class:** 79.1% of actual first-year undergraduate students aged 17-19 (n=3,291): White 67.3%, Black 11.8%; Female 50.2%; students affiliated with honors groups 37.1%; Students without an academic affiliation45.3%; **Stratified random longitudinal sample for follow- up in second year of college selected for recruitment from first year cross-sectional sample (final sample n=1,253);** oversampled experienced substance users, who were more likely to be White males, other characteristics from this sample not discussed)	**Longitudinal prospective cohort study from 2004-2006:** First screened all incoming students (cross-sectional survey), then systematically selected stratified random sample (stratified by substance use history, race and gender), oversampling experienced drug users for longitudinal follow-up; follow-up assessments, including: semi-annual assessments conducted 6 and 18 months after baseline interview, and self-administered assessments and annual face-to-face interviews conducted at 12 and 24 months	(1) Exposure opportunity; (2)lifetime: (a) prevalence, (b) initiation, and (c) continuation of prescription drugs	(1) Exposure opportunity and initiation of substance use frequently occurred after starting college; (2) by the sophomore year of college, prescription stimulants (for nonmedical use) were the most widely available drug after marijuana and prescription analgesics (for nonmedical use) and hallucinogens were the next most prevalent (data about access to alcohol were not collected); (3) rate of increase in lifetime prevalence during the first two years of college was greatest for cocaine, hallucinogens, prescription stimulants, and prescription analgesics	(1) Sampled students from one university; (2) attrition bias; (3) annual assessments administered on a rolling basis over the duration of the entire academic year, so responses reflect slightly different time periods; (4) ages of initiation and exposure were not collected with sufficient precision to permit determination of whether the event occurred before or after starting college	Authors state that findings clearly demonstrate the need for prevention programs to be sustained throughout all stages of adolescent development. Authors report that most prevention occurs in middle schools, but these findings suggest that most initiation occurs during the high school and college years (at least for college-bound students). Study suggests that prevention programs would be worthwhile during the later years of high school and even into college.

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Benotsch, E. G., Koester, S. (b), Luckman, D. (c), Martin, A. M. (a), and Cejka, A.; *Non-medical use of prescription drugs and sexual risk behavior in young adults;* Addictive Behaviors, 2011; 36(1-2):152–155	Individual	(1) Alcohol and illicit drug use; (2) risky sexual behavior (e.g., unprotected sex, multiple partners); (3) White students; (4) older students	None discussed	Demographics [(a) Race, (b) Sex]	18- to 25-year-old undergraduate college students (n=435) in Rocky Mountain region	Survey administered to college students.	(1) Demo-graphics; (2) ever used prescription drug without doctor's permission [(a) lifetime and past 3- month quantity; (b) class of drugs]; (3) frequency of alcohol and recreational drug use; (4) and sexual behavior	White participants and older students more likely to engage in NMUPD. NMUPD associated with greater use of recreational drugs and alcohol, and high- risk sexual behavior such as multiple partners, unprotected sex and sex after drinking/drug-use in lifetime and over past three months	Convenience sample, not generalizable to other regions. Cross-sectional design does not allow causal inferences	College health clinics may want to ask questions about NMUPD

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Blanco, C., Alderson, D., Ogburn, E., Grant, B. F., Nunes, E. V., Hatzenbuehler, M. L., and Hasin, D. S.*; Changes in the prevalence of non-medical prescription drug use and drug use disorders in the United States: 1991–1992 and 2001–2002*; Drug and Alcohol Dependence, 2007; 90(2-3): 252–260	Individual	(1) Lower socio-economic status; (2) being unmarried; (3) lifetime or family history of alcohol or other drug use disorders	None discussed.	(1) Socio-demographic [(a) age, (b) sex, (c) race/ethnicity, (d) education level, (e) marital status, (f) income, (g) region of residence]; (2) clinical information [(a) lifetime and (b) family history of alcohol or drug disorder, (c) lifetime mental health depression or anxiety disorder	In 1991-1992: N=42,862; 1.5% reported past year nonmedical prescription drug use; 0.3% had nonmedical use disorders (abuse and/or dependence). In2001-2002: N=43,093; 2.3% reported nonmedical use; 0.5% had nonmedical use disorders. All survey participants were 18 or older.	Cross-sectional design using surveys administered to nationally representative sample18 years and older(paper surveys during1991-1992 and computerized surveys during 2001-2002).1991-1992 National Longitudinal Alcohol Epidemiologic Survey (NLAES) and2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC)	(1) Past-year non-medical prescription drug use; (2) non-medical prescription abuse and/or dependence as defined by DSM-IV	(1) From 1991–1992 to 2001–2002, the prevalence of past- year non-medical prescription drugs use disorders increased by 67%; (2) the increase was due to increased non-medical use of these drugs, rather than increased prevalence of non- medical drug use disorders among users; (3) most risk factors for non-medical prescription drug use disorders acted by increasing the risk of non-medical use, although some also increased the prevalence of abuse and dependence among users; (4) past year drug treatment prevalence among individuals with a prescription drug abuse and/or dependence increased by 53% between 1991–1992 and 2001–2002, but were low in both surveys	(1) Sample excluded adolescents and individuals in prison; (2) cross- sectional design does not allow causal inferences	Authors recommend public health or other approaches that balance appropriate access to medications with efforts to prevent potential abuse and dependence

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Boyd, C. J., Teter, C. J., West, B. T., Morales, M., and McCabe, S. E.; *Non-Medical Use of Prescription Analgesics: A Three-Year National Longitudinal Study*; Journal of Addictive Diseases, 2009; 28(3):232–242	Individual	(1) Current and (2) former non-medical user of prescription analgesics at Wave 1; (2) Earlier age of first use of prescription analgesics	Having no history of non-medical use of prescription analgesics	(1) Demographic characteristics [(a) age, (b) sex, (c) race]; (2) diagnosis of lifetime alcohol use disorder; (3) diagnosis of lifetime mood disorder; (4) diagnosis of any lifetime anxiety disorder; (5) any lifetime illicit drug use;(6) any other lifetime non- medical use of prescription drugs	(N=34,653): 52% female, 71% white,12% Hispanic, 11% African American,4% Asian, and 2% Native American or other racial groups. Thirteen percent of the sample was between 18 and 24 years of age and87% was 25 years of age or older.	National survey administered through a structured diagnostic interview at two points in time; National Panel Study:2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) and Wave 2 data (2004-2005)	(1) Non-medical use at Wave 2; (2) Prescription drug abuse and dependence based on DSM-IV criteria for drug use disorders at Wave 2	(1) Prevalence: 5% of the U.S. adult population was lifetime non-medical users of prescription analgesics at Wave 1; (2) Wave 1 current and former non-medical use of prescription analgesics were associated with higher rates of prescription opioid use disorder and substance use disorder at Wave 2 for both men and women; (3) Age of onset: Younger first time users were at greater risk of later abuse/ dependence; (4) A majority of users who had not developed disorders had stopped their non-medical use by Wave 2	(1) Secondary analysis and NESARC fails to distinguish among the different behaviors related to nonmedical use; (2) NESARC did not include several commonly misused drugs at Wave 1 but added them at Wave 2, confounding analysis; (3) findings not generalized to non- United States populations; (4) Small subsamples; and (5) risk groups such as incarcerated homeless, and transient individuals were not included	None

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Boyd, C. J., Young, A. Grey, M., and McCabe, S. E.; *Adolescents' Nonmedical Use of Prescription Medications and Other Problem Behaviors*; Journal of Adolescent Health, 2009;45(6): 543–550	Individual	(1) Female; (2) White; (3) older age students	None discussed	(1) Demographic characteristics [(a) sex, (b) age, (c) race]; (2) parental education; (3) binge drinking; (4) illicit drug use (marijuana, cocaine, LSD, other psychedelics, crystal methamphetamine, heroin, inhalants, ecstasy, GHB, and Rohypnol), index of illicit drug use; (5) medical use of prescription medication; (6) gambling; (7) school discipline [past year (a) detention, (b) suspension, and (c) other forms of school-based discipline); (8) sexual activity; (9) depression; (10) impulsivity; (11) motivations to use prescription medications	Non-random cross sectional sample of secondary students in one school district: (n=912); female (52.6%); Race: African American 53.8%, White 43.5%; Average age (15); Grade: 7th grade (15%), 8th grade (17.4%), 9th grade (21.4%), 10th grade (18.9%), 11th grade (14.8%), 12th grade (12.1%); **NMUPD:** (1) No prescription use (59.9%), (2) Medical use only (29.3%), (3) Self-treaters (7.8%), Sensation-seekers (3.1%)	Secondary data analysis of 2007 Secondary Student Life Survey from one school district in southeastern Michigan	Lifetime and past year non-medical use of prescription medications	(1) Motivations to engage in non-medical use of prescription drugs appear to be associated with adolescent problem behaviors, especially sensation- seekers; (2) 36.8% reported having a legal prescription within the previous 12 months; (3) 59.9% respondents reported ''no annual use'' of prescription medications; (4) 7.8% reported NMUPD for self-treatment motivations in the past year and3.1% reported motivations related to sensation seeking; (5) pain medication was most frequently reported used in the past year, medically (32.5%) and non-medically (10%); (6)16.2% had used at least one illicit drug in their lifetimes, with about 8.7% of the sample reporting at least one binge drinking episode in preceding two weeks; (7) 67% males reported no use of any prescription compared to 54% females. 10.7% female reported greater non-respondents (1%) medical use for self-treating	(1) Sample was drawn from one school district (a geographic region that has higher averages of non-medical use of prescription opioids than national average); (2) sample was disproportionately African-American; (3) cross-sectional design does not allow causal inferences (4) never assessed the quantity of the prescribed medications; (5) index of illicit drug measure did not take into account the frequency of consumption so all illicit drug use were weighted the same	Authors state that NMUPD, whether by a self-treater or sensation-seeker, represents an unacceptable health risk and suggest that: (1) health providers should communicate with their adolescent patients about the health and safety risks associated with diverted medications and the legal risk associated with diverting their own medications; (2) all health providers should alert parents about the importance of "controlling and counting" their children's pills; and (3) parents should restrict availability and not leave medicines on countertops or in unlocked medicine cabinets

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								motives than males (4.4%); (8) a larger percentage of white respondents (5.8%)reported sensation-seeking motives when compared with African American/ nonwhite		

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Braden, J. B., Sullivan, M. D., Rayb, G. T., Saunders, K., Merrill, J., Silverber, M. J., Rutter, C. M., Weisner, C., Banta-Green, C., Campbell, C., and Von Korff, M.; *Trends in long-term opioid therapy for noncancer pain among persons with a history of depression;* General Hospital Psychiatry, 2009; 31(6): 564–570	Community/ Environment	Diagnosis of depression in two-calendar years preceding opioid use.	None	Gender	Automated health records for two plans in Washington (n>200,000 records) and northern CA (n > 1 million records). Plans include Medicaid and Medicare	January 1997-2005 data from health plan records in Washington State and Northern California including older populations enrolled in Medicare and lower income in Medicaid	(1) Prevalence and incident rates of opioid use for depressed and non- depressed non-cancer subjects; (2) amount of average daily dose and average days prescribed to subject	(1) Patients with a previous depression diagnosis had a threefold higher rates of (a) opioid use in the current year incident, and (b) long-term opioid therapy; (2) persons with depression received: (a) higher daily doses, (b) greater number of days' supply, (c) more potent opioids	(1) Not possible to ascertain reasons for greater use among depressed patient since depression and chronic pain may be comorbid factors, so higher rates of use may be appropriate for some subjects; (2) diagnosis of depression based on health care contact (underreported); (3) severity of depression not ascertained; (4) no socioeconomic or race data available; (5) did not include all access to prescription drugs including fee-for- service physicians and pharmacies outside of system	Incorporate persons with depression into future studies

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Catalano, R. F., White, H. R. (b), Fleming, C. B. (a), and Haggerty, K. P.; *Is nonmedical prescription opiate use a unique form of illicit drug use?;* Addictive Behaviors, 2011; 36(1-2):79–86	Individual	Alcohol or illicit drug use/abuse/ dependence		Gender	N=912; first or second grade to age21; 53% male; 82% White, 7% Asian/Pacific Islander, 5% Hispanic/Latino, 5% Black, and 3% Native American;30% received free/reduced price lunch in the first 2 years of study. At age 21 (time when outcomes were measured), 5.7% reported past year drug use disorder;9.8% mood disorder; 18.9% not in school or working; 24.3% poor/fair health status; 30.6% at least one incident of violence; and 12.8% at least one property offense.	Longitudinal cohort study. Surveys conducted annually every spring.	(1) Drug use disorder (past year drug abuse or dependence; (2) mood disorder(past-year major depression, generalized anxiety disorder, or post- traumatic stress disorder); (3) no school/ work; (4) poor/fair health status; (5) engaged in violent behavior; (6) had committed property offenses	(1) Nonmedical use of prescription opiates (lifetime use) was associated with a (a) 7.9 greater odds of having a current drug use disorder, (b) 2.1 greater odds of a mood disorder, (c) 1.6 greater odds of being unemployed or not enrolled in school, (d) 1.4 greater odds of poor/fair health status, (e) 2.6 greater odds of being violent, (f) 2.8 greater odds of committing a property offense; (2) Large degree of overlap between nonmedical use of prescription opiates and use of other licit and illicit drugs (among those who were 'heavy' opiate users, almost all had also used alcohol, tobacco, and marijuana; among 'light' users, most used alcohol, tobacco and marijuana)	(1) Analyses could not differentiate between recreational vs. pain alleviation purposes since surveys did not include questions about source of use or reasons for use; (2) analyses could not examine racial difference due to insufficient subpopulation sample sizes, may not be generalizable.	No recommendations provided

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Collins, D., Abadi, M. H., Johnson, K., Shamblen, S., and Thompson, K.; *Non-Medical Use of Prescription Drugs Among Youth in an Appalachian Population: Prevalence, Predictors, and Implications for Prevention*; Drug Education, 2011; 41(3):309-326	Individual, Peer, Family, Community	(1) Friends' non-medical use of prescription drugs; (2) perceived availability of prescription drugs for non-medical use; (3) lifetime medical use was the single most important predictor of NMUPD in this sample	(1) Perceived risk; (2)parents' disapproval; (3) school commitment; (4) community norms against youth NMUPD	(1) Demographics [(a) Gender, (b) age, (c) race, (d) Hispanic ethnicity]; (2) rural place of residence; (3) ever been prescribed each of the four types of prescription medications; (4) Risk factors: [(a)sensation seeking, (b) antisocial behavior, (c) friends' use, (d) school days skipped, (e) perceived availability of ATOD, (f) perceived availability of prescription drugs (for non-medical use); (g) lifetime and 30-day use of: (i) alcohol, (ii) cigarettes, and (iii) marijuana; (5) protective factors: [(a) perceived risk of use; (b) parental monitoring; (c) parents' disapproval of use; (d) school commitment; (e) school grades; (f) community norms against use]	Same of students in grades 5, 7, 9, and11 from two public school districts in an Appalachian county in Tennessee; [5th graders (73%), 7th graders (77%), 9th graders (80%), and11th graders (100%) in public schools in the county]; Female (57%), White (90%); age >13 (53%); 37% reported having at least one of the four types of prescription medications prescribed to them in their lifetime	Student survey administered in regular class periods (grades 5, 7, 9 and11) from two public school districts in an Appalachian county in Tennessee in 2009; survey measures of lifetime and current30-day NMUPD, alcohol, cigarettes, and marijuana; Survey items regarding NMUPD were adapted from those used by Boyd and colleagues in several of studies (Boyd, et al. 2006; Boyd, McCabe, Cranford & Young2007); Individual characteristics; Risk and protective measures derived largely from the Communities That Care (CTC) survey	Lifetime and past 30-day nonmedical use of prescription drugs[divided into: (a) sleeping medications, (b) sedative or anxiety medications, (c)stimulant medications, and (d) pain medications]	(1) Prevalence of NMUPD (35%) was higher than prevalence of cigarette use (28%) and marijuana use (17%), but lower than lifetime prevalence of alcohol use(46%); (2) risk factors of medical use, friends' non- medical use and perceived availability, and the protective factors of perceived risk, parents' disapproval school commitment, and community norms against youth NMUPD were significant predictors of lifetime prevalence of NMUPD; (3) pain medications were the most often used (27%),followed by sleeping medications (16%), sedatives (10%), and stimulants (6%)	(1) Data are from a single county; (2) population is primarily white, (3) cross- sectional design does not allow causal inferences	Authors note that study suggests that factors in the individual, family, school, and community domains may be protective against youth NMUPD; (1) physicians and pharmacists making their patients aware of the risks associated with NMUPD; (2) seeking to change parental norms may be important to preventive efforts aimed at reducing teen NMUPD; (3) efforts to develop greater bonding with this key institution could be productive; (4) advantageous for community strategies to raise awareness of the issue of NMUPD and to foster community norms that NMUPD is not acceptable

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Daniulaityte, R., Falck, R., Wang, J., and Carlson, R.; *Illicit Use of Pharmaceutical Opioids Among Young Polydrug Users in Ohio*; Addictive Behaviors, 2009; 34(8):649–653	Individual	(1) Polysubstance use; (2) depressive symptoms		Socio-demographics	N=402; young adults between 18-30 years old with history of MDMA/ecstasy use in Columbus, OH;64.2% males;82.1% White;10.7% African American; 82.6% never received treatment; 85.5% no or minimal depressive symptomatology	Longitudinal study; results reported based on baseline structured questionnaire; used respondent-driven sampling. Interviewer-administered baseline questionnaire	30-day nonmedical use of prescription opioids	Study suggests that nonmedical use of prescription opioids is part of poly-drug use practices; nonmedical use of opioids was associated with a 2.02 greater odds of using hallucinogens, 2.26 greater odds of inhalant use; having moderate or severe depressive symptoms was associated with2.15 greater odds of nonmedical use of opioids	(1) Sampling was not randomized, may not be generalizable to broader populations of young, poly-drug users; (2) relied on participants' self-reports of their illicit drug use	

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Fleary, S. A., Heffer, R. W., and McKyer, E. L.; *Dispositional, ecological and biological influences on adolescent tranquilizer, Ritalin, and narcotics misuse*; Journal of Adolescence, 2011;34(4): 653–663	Individual, Peer	(1) Age positively correlated with adolescents' reported Ritalin, tranquilizer, and narcotics misuse; (2) Male (more likely to engage in Ritalin and tranquilizer misuse than females); (3) friends' behavior (correlates of adolescent Ritalin and tranquilizer misuse); (4) adolescents' reported risk-taking behavior (correlates of adolescent Ritalin, tranquilizer, and narcotic misuse); (5) alcohol and marijuana use (more likely to engage in Ritalin, tranquilizer, and narcotics misuse); (6) cigarette use (more likely to engage in narcotics misuse)	(1) Mastery of external world; (2) impulse control (adolescents who scored higher on impulse control were less likely to engage in tranquilizer misuse); (3) popularity (adolescents who perceived themselves to be more popular were less likely to engage in Ritalin and tranquilizer misuse; friends engaged in prosocial behavior (less likely to engage in tranquilizer misuse)	(1) Demographic characteristics; (2) Disposition variables: [(a) impulse control (adolescents' perception of their ability to exercise self-control and to respond to unpleasant situations positively), (b) body and self-image (adolescents' perception of their body, their health and themselves in relation to others), and (c) mastery of external world (adolescents' belief in their capabilities to accomplish tasks regardless of their level of difficulty), (d) popularity and maturity]; (3) Ecological variables (friend subculture); (4) Other substance use (lifetime cigarette smoking, alcohol, and marijuana use); Demographic variables [(a) age, (b) gender]	(n=1672) (16 public schools, 7 private schools); Male (43%), (1) Female (48%); (2) Age:11-13 (15%), 14-15 (28%), 16-18 (49%); PD use (Ritalin 96.2%; Tranquilizers 92.6%; Narcotics 95.6%), followed by experimenters/ occasional misusers (Ritalin 2.4%; Tranquilizers 4.9%; Narcotics 2.3%)and frequent misusers (Ritalin 1.4%; Tranquilizer 2.4%; Narcotics 2.1%)	Cross sectional data were gathered in 2006 using the Adolescent Health Risk Behavior Survey (AHRB) developed by Omori and McKyer in 2005; Data were collected as part of a project entitled "Impacts of Social and Environmental Factors in the Formation of Adolescent Health-Endangering Behaviors" in 2006. Participants for the study were recruited from public and private schools (elementary, middle and high schools) in Indiana. The survey was completely anonymous; students were not required to provide any identifying information and were instructed to complete the survey privately.	(1) Lifetime, past-year, and30-day non-prescribed use of Ritalin, tranquilizers, and narcotics [(a) opium, (b)morphine, (c) codeine]; (2) non-users, experimenter s and occasional misusers, and frequent misusers	The risk factors of friends' non-medical use and perceived availability, and the protective factors of perceived risk, parents' disapproval, school commitment, and community norms against youth NMUPD, were significant predictors of lifetime prevalence of NMUPD	(1) Discrepancies in group sub-sample sizes; (2) race and ethnicity data were not available for all participants; (3) study was conducted in an area where 87% of the population was Caucasian; (4) possibility of participants erroneously being classified as non-users because the item used to measure misuse did not include misuse of one's own prescription; (5) low internal consistencies on the Impulse Control, Mastery of External World, and Maturity subscales; (6) cross- sectional design does not allow causal inferences	Based on these study findings the authors suggest three strategies: (1) prevention programs designed to address prescription drug misuse should incorporate the two sources of risk-taking identified by Irwin et al. (1997) and demographic variables, and should parallel the guidelines currently used for developing effective substance abuse prevention programs; (2)targeting friends' influence is instrumental in prevention program planning and should be given special consideration by program coordinators and policymakers; and (3) program coordinators should also consider variables that distinguish subgroups of misusers in their program planning and marketing.

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Ford, J. A., Arrastia, M. C.; *Pill-poppers and dopers: A comparison of non-medical prescription drug use and illicit/street drug use among college students;* Addictive Behaviors, 2008; 33(7): 934–941	Individual, Peer	**NMUPD vs. non-users:** (1) White; (2) Hispanic; (3) age; (4) lower grade point average (G.P.A); (5) sexually active; (6)fair/poor health; (7) binge drinkers; (8) marijuana users; (9) know a member of the faculty or administration; (10) less involvement in conventional activity; (11) normative alcohol beliefs (attitudes or beliefs that excuse, justify, or normalize the misuse of alcohol); **NMUPD vs. illicit drug users**: (1) male, (2) White, (3) know a member of the faculty or administration; (4) belief that religion is important	None discussed	(1) Demographic characteristics [(a)gender, (b) race, ethnicity, (c) age, (d) marital status); (2) academic success; (3) sexual activity; (4) current state of health; (5) binge drinking; (6) marijuana use; (7) social bonding, peer influence	National sample of U.S. college students (n=10,401): Male (44.5%); White (71.5%), Hispanic (8.4%); under 24 years old (90%); G.P.A. of a B+ or better (50%); sexually active, (70%); fair or poor health. (8.2%)	20-page self-administered questionnaire, from the Harvard School of Public Health College Alcohol Study (CAS) to a random sample of college students from195 U.S. 4-year colleges/universities in 2001 wave of data collection; CAS examines substance use and other health- risk behaviors of college students in the U.S.	Lifetime substance use: [(a) non-users,(b)non-medical prescription drug use only, and (c) illicit/street drug use only]	Gender, race, marital status, sexual activity, marijuana use, and social bonding measures significantly distinguish illicit/street drug use from nonmedical prescription drug use: (1) Whites, Hispanics, and older respondents are more likely to report non-medical prescription drug use; (2) whites, older students, lower G.P.A., sexually active, fair/poor health, binge drinkers, marijuana users, know a member of the faculty or administration, less involvement in conventional activity, and belief that alcohol use is normative are more likely to report non-medical prescription drug use; (3) males, Whites, respondents who know a member of the faculty or administration, and respondents that believe religion is important are less likely to report illicit/street drug use than non-medical prescription drug use	(1) Conceptualization of substance use does not include students who report both non-medical prescription drug use and illicit/street drug use (poly-substance users not included in the analysis); (2) sample is based on college students; (3) cross-sectional design does not allow causal inferences; (5) did not measure medical use of prescription drugs (do not know if students who are prescribed drugs are misusing them)	None discussed

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Ford, J. A., and Lacerenza, C.; *The Relationship Between Source of Diversion and Prescription Drug Misuse, Abuse, and Dependence*; Substance Use & Misuse, 2011;46(6): 819–827	Individual	Obtaining prescription drugs from dealer/ strangers versus free from friends/relative		Socio-demographics [(a) age, (b) gender, (c) white/nonwhite, (d) income]	N=68,736; 12 years or older reporting misuse of pain relievers (n=3,871), stimulants (n=774), tranquilizers (n=1,534)	Cross-sectional design using surveys administered to nationally representative sample12 years and older (NSDUH 2008)	Frequency of misuse, abuse, and dependence of: (a) pain relievers,(b) stimulants,(c) tranquilizers	(1) Source of diversion was significantly associated with frequency of misuse, abuse, and dependence; (2) those who obtained from family or friend for free as most recent source were less likely to also report abusing or being dependent; (3) those who obtained from dealer or stranger as most recent source were more likely to report abuse and dependence	Cross-sectional design does not allow causal inferences; only measured source of diversion based on most recent source	Authors suggest efforts to prevent the sharing of prescription drugs among friends and relatives.

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Ford, J. A.; *Social Learning Theory and Nonmedical Prescription Drug Use Among Adolescents;* Sociological Spectrum, 2008; 28(3):299–316	Individual	(1) Binge drinking and other illicit drug use; (2) peer drug use; (3) own attitudes towards use; (4) peer and parent attitudes	None discussed	(1) Socio-demographics [(a) age, (b) race, (c) family income, (d) population density]; (2) binge drinking.	12-17 year olds (n=16,780) in national sample.	Applies social learning theory to NSDUH 2005	Non-medical prescription drug use of any drug type, pain relievers, stimulants, tranquilizers or sedatives.	Call for greater use of social learning theory in research on NMUPD. Finds key social learning variables (peer behaviors, attitudes, parent and peer attitudes) all correlate with NMUPD except sedatives. Older adolescents more likely report pain relievers; males less likely to report simulants than female; nonwhites less likely to report using tranquilizers; binge drinkers report more NMUPDs	(1) Sample neglects institutionalized populations; (2) cross- sectional data does not determine causality;(3) could not directly operationalize social learning theory	Non-medical use of prescription drug information should be used in prevention programs. More research with theoretical correlates needed.

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Ford, J. A.; *Influence of Bonds to Family and School Nonmedical Prescription Drug Use Among Adolescents: The Influence of Bonds to Family and Schoo*l; Sage Publications,2009; 40(3): 336-352	Family, School	(1) Binge drinking; (2) illicit drug use; (3) increased age; (4) female; (5) lower income adolescents (6) living outside of major metropolitan areas; (7) White (for tranquilizers only)	Social bonding in school and family	(1) Socio-demographics [(a) age, (b) race, (c) family income, (d) population density]; (2) binge drinking.	12-17 year olds (n=18,678) in national sample	Applies social control theory to NSDUH2005 data	Past year non-medical use of prescription drugs	(1) Strong social bonding correlate with less NMUPD; (2) NMUPD likelihood increases with age; (3) females at greater risk than males; (4) lower income adolescents at increased risk; (5) living outside of major metropolitan areas at greater risk for NMUPD; (6) binge drinking and illicit drug use are most robust associations with NMUPD; (7) White race was a significant predictor for tranquilizers, but not painkillers, stimulants, sedatives or overall NMUPD	(1) Sample neglects institutionalized populations; (2) cross- sectional design does not allow causal inferences; (3) definition of NMUPD in data does not distinguish between pain relief and recreational uses	Adolescents, parents, and school officials must be informed of the potential health risks of prescription drug misuse.

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Hall, M. T., Howard, M. O. (b), and McCabe, S. E.; *Subtypes of adolescent sedative/anxiolytic misusers: A latent profile analysis*; Addictive Behaviors, 2010; 35(10):882–889	Individual	Mental health status (i.e., depression, anxiety, antisocial behavior)		(1) Demographic characteristics [(a) gender, (b) race, (c) urban/ rural residence]	N=247 (drawn from723 sample); Missouri youth (average age=15.8 years old) from 32 residential facilities for antisocial behavior; 83.8% male, 70% White, 53.8% resided in rural/small town; all youth reported misusing sedative/anxiolytic (anti-anxiety drugs such as benzodiazepines).	Structured interviews during 2003	Misuse of sedatives/ anxiolytics	(1) Analyses resulted in three classifications of youth suggest significant heterogeneity across measures of psychiatric and behavioral dysfunction: Class 1 (youth with comparatively low levels of current psychiatric symptoms, fewer lifetime traumatic events, less problematic substance use histories, antisocial behavior and impulsivity) used stimulants less frequently than Classes 2 and 3, which differed in severity of current psychiatric symptoms and antisocial behavior; (2) Class2 consisted of self-treatment subtype, had highest proportion of girls, over half reported history of head injury producing unconsciousness	(1) Cross-sectional design does not allow causal inferences; (2) measurement of misuse does not include misuse of youth's own prescription drugs, which could have resulted in underestimates of misuse; (3) may not be generalizable to community-based samples or to the use of prescription drugs other than sedative/anxiolytic	Authors note that universal preventive interventions for middle school age youth reduce prescription drug misuse but institutionalized youth may require alternative or supplemental interventions; need to integrate substance use and mental health treatment

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Harrell, Z. A., and Broman, C. L.; *Racial/ethnic differences in correlates of prescription drug misuse among young adults;* Drug and Alcohol Dependence, 2009; 104(3):268–271	Individual, Family	**Full Sample:** (1) Age; (2) fewer years of education; (3) history of alcohol, marijuana, inhalant use; (4) delinquent behavior; **Race/Ethnicity Subgroups**: (1) delinquent behavior (Whites and Hispanic), (2) adolescent alcohol and marijuana use (Whites); (3) adolescent inhalant use was (Hispanic); (4) higher ratings of maternal warmth (Hispanic)	(1) Religious attendance (Black subgroup)	(1) Demographic characteristics [(a) age, (b) sex, (c) race, (d) education]; (2) alcohol and other drug use; (3) psychosocial dimensions [(a) family structure, (b)parenting relationship, (c) religiousness, (d) depressive symptoms, (e) deviant behavior]	Nationally representative sample of adolescents' grades7-12: Wave I (n=6504; years 1994-1995) and Wave III (n= 4882; years2001-2002): Mean age: Wave I (15.6), Wave III (21.8); Female Wave I (52%), Wave III (54%)	National Longitudinal Study of Adolescent Health (a nationally representative study of adolescents in grades 7–12 in the U.S. Used public use, in-home dataset (randomly generated half sample of the core in-home interviews); In-home interviews from a sample of students participating in the in-school questionnaire of the National Longitudinal Study of Adolescent Health; time frame: Wave I (1994-1995) and Wave III (2001-2002)	Prescription drug misuse (sedatives, tranquilizers, stimulants, pain killers, and steroids)	(1) There are unique racial/ethnic psychosocial profiles for substance use risk behaviors in adolescence; (2) being younger, less educated, as well as history of adolescent substance use, and non-violent delinquency increased the likelihood of nonmedical prescription drug use: (a) alcohol, marijuana, and inhalant use were related to prescription drug misuse in the full sample, (b) adolescent alcohol and marijuana increased the likelihood of prescription drug misuse among Whites, (c) inhalant use was associated with a higher likelihood prescription drug use among Hispanics, while marijuana use decreased the likelihood of use among this subgroup, (d) substance use was not a significant predictor among Black youth, (e) a profile of increased risk associated with a broader range of substance use behaviors emerged among White adolescents	(1) Study unable to further characterize the severity of the abuse of the prescription drugs (not able to determine whether the reported prescription drug misuse was related to self- medication of pain or another physical condition or recreational abuse; (2) prescription drug misuse was only assessed at Wave III (not able to include a baseline measure of prescription drug use to further establish a causal relationship)	None discussed

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Havens, J. R, Young, A. M., and Havens, C. E.; *Nonmedical Prescription Drug Use in a Nationally Representative Sample of Adolescents: Evidence of Greater Use Among Rural Adolescents*. Archives of Pediatrics & Adolescent Medicine, 2011; 165(3):250-255	Community(also School and Family as protective factors)	(1) Living in a rural area; (2) depression; (3) decreased health status; (4) other drug (marijuana, cocaine, hallucinogens, and inhalants) and alcohol use.	(1) School enrollment; (2) living in a two-parent household.	Socio-demographics: [(a) race, (b) family income; (c) sex, (d) age]; (2) health (including mental health); (3) other drug and alcohol use	12- to 1-year-olds (n-17,872)	NSDUH 2008		Rural adolescents 26% more likely to have used PD. Factors associated with use in rural areas include: (1) decreased health status; (2) major depressive episode; (3) other drug and alcohol use. Protective factors included school enrollment and living in a two-parent household.	(1) Traumatic events (witnessing violence); (2) depression, posttraumatic stress disorder (PTSD); (3) other lifetime drug or alcohol abuse/ dependence; (4) delinquent behavior	Points of intervention include preventing school dropout, increased parental involvement, and increased access to health, mental health and substance abuse treatment.

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King, K. A., Vidourek, R. A., and Merianos, A. L.; *Sex and Grade Level Differences in Prescription Drug Use Among Youth.* Journal of Primary Prevention, 2013; 34(4):237-49.	Individual, Peer, Family, School	(1) Frequency of participation in risky behaviors; (2) frequency of friends' involvement in tobacco, alcohol, and marijuana; (3) Hispanic (vs. White or African American)	(1) Frequency of participation in pro- social behaviors; (2) specific parent, teacher, and school factors	Does lifetime use differ based on sex, race/ ethnicity, grade level, and job status?	54,361 seventh through twelfth grade students in133 public and private schools in eight counties within the Greater Cincinnati area	Pride Questionnaire during 2009-2010 academic school year	NMPD use among youth	(1) A total of 13.6 % of youth reported lifetime NMPD use. Hispanic youth were more likely than White or African American youth to report use of NMPDs. (2) Engaging in high levels of pro-social behaviors and having high levels of parent and teacher/school protective factors decreased the odds of use among males, females, 7th and 8th grade students and 9th through 12th grade students. (3) Conversely, engaging in risky behaviors and having friends who used other substances increased the odds for use.	(1) Cross-sectional data does not allow causal inferences; (2) the monothematic format of the survey may have resulted in a response-set bias; (3) study sample comprised students in grades 7 through 12, so caution should be exercised in generalizing; (4) specific nonmedical drugs were not assessed	Develop protective factors and involvement in pro-social activities, as opposed to the implementation of substance-specific interventions

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McCabe, S. E., and Boyd, C. J.; *Sources of prescription drugs for illicit use*; Addictive Behaviors, 2005; 30(7),1342–1350	Individual, Family, Community	Obtaining prescription drugs from peers or other (non-family) sources	None discussed	(1) Demographics [(a) gender, (b) race/ethnicity); (2) class year; (3) living arrangement; (4) fraternity and sorority membership); (5) heavy episodic drinking, alcohol abuse; (6) past- year marijuana use	Random sample of undergraduate college students: (n=9,161); Female (56%); White (68%), Asian (13%), African American (6%), Hispanic (4%); lived in a house or apartment within the university town (45%), university residence hall (44%), fraternity or sorority house(5%); not married(98%); belonged to a social fraternity or sorority (14%)	Student Life Survey (SLS), self-administered Web survey administered to a large random sample of undergraduate college students in 2003 (items from several national studies of alcohol and other drug use)	(1) Non-medical use of prescription medication; (2) obtaining prescription medication not prescribed (open-ended question)	(1) Prevalence of illicit use was highest for pain medication (9.3%) followed by stimulant medication (5.4%), sedative/anxiety medication (2.9%), and sleeping medication (2.0%); (2) sources for obtaining abusable prescription medication for illicit use differed significantly by gender; (3) racial differences in the sources for obtaining prescription pain medication; (4) Illicit users of prescription medication were most likely to obtain prescription medications from peer sources and such individuals were at particularly high risk for alcohol and other drug misuse; (5) illicit users who obtained prescription medication from peer or other (non-family) sources reported significantly higher rates of alcohol and other drug use than non-illicit users or students who obtained prescription medication from family members	(1) Sample was drawn from one university; (2) did not collect information regarding DSM-IV substance abuse or dependence criteria; (4) almost 3 out of 10 illicit users did not specify a source; (5) nonresponse bias; (6) cross-sectional design does not allow causal inferences	Greater prevention efforts are needed to reduce illicit use and diversion of prescription medication: (1) clinicians prescribing abusable medications should exercise caution and not overprescribe these medications to college students. (2) There is a need to educate family and parents about the potential dangers associated with providing abusable prescription medications to their children (but no strategy suggested).

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McCabe, S. E., Cranford, J. A., Boyd, C. J., and Teter, C. J.; *Motives, diversion and routes of administration associated with nonmedical use of prescription opioids;* Addictive Behaviors, 2007;32(3): 562-575	Individual	(1) White; (2) seniors; (3) male; (4) pain relief motive	None discussed	(1) Demographic characteristics; (2) nonmedical use of prescription opioids; (3) motives for nonmedical use of prescription opioids; (4) sources of prescription opioids; (5) routes of administration; (6) past-month use of marijuana and other drugs; (7) Drug Abuse Screening Test (DAST-10); (8) binge drinking; (9) potential alcohol abuse and dependence (CAGE screening instrument)	Sample of 4,580 full-time undergraduate students from one university: After weighting: Male (50%); White (65%); Asian (13%); African American (7%); Hispanic (5%); Mean age (19.9); Aged 18-24 (98%); Freshman (28%);Sophomores (25%); Juniors (23%); Seniors (25%)	A self-administered, cross-sectional Web survey was conducted in 2005 at a large public Midwestern 4-yearuniversity in the U.S. using a probability- based sampling approach	Lifetime and past-year nonmedical use of prescription opioids	(1) NMUPD represents a problem for subgroups of college students; (2) lifetime prevalence of NMUPD opioids was 14.3% and past- year prevalence of non-medical use was 7.5%; (3) hydrocodone, codeine, oxycodone and propoxy-phene are the prescription opioids most likely to be used non-medically; (4) three most common motives associated with the nonmedical use of prescription opioids were to relieve pain, get high, and experiment (leading reason provided by college youth for nonmedical use of prescription opioids was to relieve pain and for those endorsing this motivation as the sole reason for use); (5) leading sources of prescription opioids were friends and parents although there were gender differences in reports of primary sources; (6) nonmedical users of prescription opioids who used for motives other than to relieve pain, obtained	(1) sample was drawn from one university;(2) cross-sectional data does not allow causal inferences	(1) Prevention and intervention efforts should begin well before college; (2) health professionals working with college youth should inquire about motives; (3) health education efforts should inform parents about the potential dangers associated with providing prescription medications to their children; (4) Individuals who are identified as using prescription opioids intra-nasally or via other non-oral routes of administration should be informed about the potential severe consequences of use; (5) self-treatment with opioid analgesics must be considered in

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								these drugs from non-parental sources, or used these drugs via non-oral routes of administration were significantly more likely to experience substance use related problems.		future policy and research efforts

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McCabe, S. E., West, B., Morales, M., Cranford, J., and Boyd, C. J.*; Does Early Onset of non-medical use of prescription drugs predict subsequent prescription drug abuse and dependence? Results from a national study*; Addiction, 2007; 102(12):1920-1930	Individual	(1) Early onset (before age 13) of non-medical use of prescription drugs (NMUPD); (2) non-medical use of multiple prescription drugs; (3) family history of alcoholism	None	(1) Demographic characteristics; (2) range of drug use behaviors [(a) alcohol use, (b) NMUPD, (c) patterns of drug abuse and dependence]; (3) family history of alcoholism	National representative cross-sectional sample of civilian non-institutionalized adults aged 18years or older in the U.S.: Women (52%), white (71%), Hispanic (12%), African American (11%), Asian (4%) and Native American or of other racial background (2%).	National survey administered through a structured diagnostic interview; 2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC)	Prescription drug abuse and dependence based on DSM-IV criteria for drug use disorders (DUDs) : (a) prevalence of use; (b) prevalence of abuse; (c) type of drug	(1) Prevalence: 9.1% of U.S. adults' life-time non-medical *users* in 2001–2002. Among life-time non-medical users of prescription drugs, 27.4% developed prescription drug *abuse;* (2) Age of onset: Among non-medical users, the prevalence of abuse was higher among early initiators for all prescription drug classes; (3) Odds of developing drug abuse among non-medical users were reduced by about 5% with each year non-medical use was delayed; (4) Drug type: Early non-medical users of a type of drug were more likely to become non-medical users of other prescription drug classes; (5) Gender: Males were more likely to develop prescription drug abuse, but females were more likely to develop prescription drug dependence; (6) Family history of alcoholism increased likelihood of abuse/dependence; (7) Poly- drug use (NMUPD with alcohol and/or other drugs) increased risk of abuse/dependence	(1) Secondary analyses, the survey items in the NESARC, excludes commonly misused prescription drugs (e.g. Vicodin, OxyContin, Ritalin, Adderall); (2) different terminology used in survey from other surveys (i.e., painkillers vs. pain relievers, etc.); (3) under-represented transient populations; (4) self-reported age of onset subject to memory bias; (5) limited to U.S. population; (6) cross- sectional design does not allow causal inferences	Study recommends drug education and prevention programs designed for middle school and high school students, despite their acknowledgement that many such programs are not effective.

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McCabe, S. E., Boyd, C. J., and Teter, C. J.; *Subtypes of nonmedical prescription drug misuse*; Drug and Alcohol Dependence, 2009; 102(1-3): 63–70	Individual	(1) motivations for prescription drug misuse; (2) co-ingestion of alcohol; (3) routes of administration (i.e., non-oral vs. oral)	Treatment for substance use		Undergraduate students at a Mid-western university (n=3,639)	Web-survey, survey2005	(1) Prevalence of past year or lifetime prescription drug misuse by type of drug; (2) past year use of illicit drugs (3) Drug abuse using DAST-10 screening; (4) binge drinking; (5) drug and alcohol dependence using CAGE screen.	(1) Non-medical prescription drug misuse subtypes differentially associated with other drug use and drug related problems; (2) college women reported higher prevalence of pain and sedative/anxiety medications (3) Black college students reported highest rates of pain medicine self-treatment, but lowest recreational and mixed sub-types.	(1) Results may not generalize to other populations; (2) assessment of routes of administration did not includes dative/anxiety medicines; (4) measures used to assess motives and routes did not specify timeframes; (5) motivation items require validation; (6) non-responses may introduce bias; (7) cross-sectional design does not allow causal inferences	Strategies should consider patterns of drug misuse by sub- types

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McCabe, S. E., Cranford, J. A., Morales, M. and Young, A.; *Simultaneous and Concurrent Polydrug Use of Alcohol and Prescription Drugs: Prevalence, Correlates, and Consequences;* Journal of Studies on Alcohol, 2006; 67(4): 529-537	Individual	Past-year simultaneous poly-drug use (NMUPD and alcohol use at same time, ingested at same time), or concurrent (used in same year, but not ingested together) polydrug use (alcohol and/or illicit drugs with NMUPD)	None	(1) Socio-demographics [(a) gender, (b) race, (c) living arrangement, (d) social fraternity,(e) family income]; (2) alcohol and drug use; (3) gambling behavior; (4) mental health	Undergraduate students in Mid-western university (n=4,580)	Student Life Web-survey, Jan-Feb 2005	(1) Alcohol-related problems; (2) drug-related problems	Prevalence of poly-drug use involving alcohol and prescription drugs was 12.1%, mostly simultaneous. Simultaneous use more prevalent by male, White, and early- initiated alcohol users. Simultaneous poly-drug use associated with more alcohol- related and other drug-related problems than concurrent use.	NMUPD sample was too small (n=10) so not analyzed separately. Also, (1) nonresponse may be a bias; (2) not generalizable to other campuses or non- college populations;(3) quantity of alcohol and prescription drug consumed is unknown; (4) limited to unprescribed prescription drugs; (5) cross-sectional design does not allow causal inferences	Attend to simultaneous drug use due to increased risks

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McCabe, S. E., Teter, C. J. and Boyd, C. J.; *Medical Use, Illicit Use and Diversion of Prescription Stimulant Medication*; Journal of Psychoactive Drugs, 2006; 38(1): 43–56	Individual, Family, Community	**Being prescribed stimulant**: (1) White; (2) a member of a social fraternity or sorority; (3) annual family income more than $250,000; (4) Jewish religious affiliation; (5) low cumulative grade point average; **Non-medical use of stimulant:** (1) male; (2) White; (3) upper-class (non-freshmen); (4) member of a social fraternity or sorority; (5) resident of a fraternity or sorority house; (6) resident of an off-campus house or apartment; (7) Jewish religious affiliation; (8) no religious affiliation; (8) lower cumulative grade point average; (9) initiation of exposure to stimulant medication for ADHD during	None discussed	(1) Demographic characteristics [(a) gender, (b) race/ethnicity]; (2) class year; (3) social fraternity and sorority status; (4), living arrangement; (5) family income; (6) religious affiliation; (7) GPA; (8) medically prescribed use of stimulant medication measures; (9) illicit use of prescription stimulant medication measures; (10) diversion of prescription stimulant medication; (11) obtaining prescription stimulant medication not prescribed; (12) binge drinking; (13) monthly alcohol use; (14) annual marijuana use; (15) annual illicit drug index	Random sample of undergraduate students (n=9,161); Female (56%); White (68%), Asian (13%), African American (6%), Hispanic (4%);lived in a house or apartment within the university town (45%), university residence hall (44%), fraternity or sorority house (5%); not married (98%); belonged to a social fraternity or sorority (14%)	Student Life Survey (SLS), self-administered web survey administered to a large random sample of undergraduate college students in2003 (items from several national studies of alcohol and other drug use)	Stimulant use and diversion: (1) lifetime and past-year stimulant use: (a)prevalence of medically prescribed use, (b) illicit use; and (2) diversion of prescription stimulants	Illicit use of prescription stimulants is a problem among undergraduate college students, especially: (1) White males and fraternity and sorority members; (2) students with lower grade point averages and higher family incomes were also more likely to have been prescribed stimulants; (3) Jewish students and students without a religious affiliation; (2) being White, male, lower grade point averages, Jewish, and a fraternity or sorority member were associated with illicit use of prescribed stimulants; (3) those who initiated medically prescribed use in secondary school or later showed increased risk for all substance use behaviors/ the earlier stimulant medication was prescribed (e.g., elementary age versus secondary school or college age), the less likely the child was to abuse substances in college, including both illicit use of prescription stimulants as well as other drugs of abuse	(1) Study sample derived from one university; (2) sample predominantly White and relatively affluent; (3) nonresponse bias may have impacted the results; (4) did not collect information regarding the quantity of illicit stimulant medication that students were using on each occasion, context of use, or route of administration; (5) cross-sectional data does not allow causal inferences	(1) Early detection and proper pharmacotherapy medication management; (2) pharmaceutical delivery systems that are less prone to abuse (e.g., extended release tablets for ADHD); (3) non-stimulant alternative medications for ADHD (e.g., atomoxetine, bupropion) may be particularly useful for reducing the illicit use and diversion of prescription stimulants among college students; (4) for young adults attending college who are diagnosed with ADHD complicated by a substance use disorder, bupropion may be appropriate

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		secondary school or in college; (10) binge drinking in past 2 weeks; (11) past-year marijuana, hallucinogen, and ecstasy use								

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McCabe, S. E., Teter, C. J., and Boyd, C. J.; *The Use, Misuse and Diversion of Prescription Stimulants Among Middle and High School Students*; Substance Use and Misuse, 2004; 39(7): 1095–1116	Individual	(1) Male; (2) White (3) poly-drug use (illicit drugs such as marijuana, alcohol, and cigarettes); (4) no intention to attend or complete college	Medication management for ADHD	Socio-demographics [(a) grade, (b) gender, (c) race/ethnicity, (d) parental educational levels]	N=1,536; students in grades six to eleven from Detroit metropolitan area;57% White, 40% African American,3% Other; 4.5% reported illicit use of stimulant drugs;80.7% planned to attend college	Cross-sectional design; Web-based survey	(1) Non-medical stimulant use; (2) prescribed stimulant use; (3) approach to divert prescribed stimulant	(1) Males more likely than females to report prescribed stimulant use, illicit stimulant use, and combined use; (2) White students more likely than African American students to be prescribed stimulant medications, to report illicit stimulant use; (3) students without plans for college more likely (to report illicit stimulant use; (4) middle school students more likely to receive prescribed stimulants but high school students were almost six times more likely to be approached to divert their medications	Study did not assess the quantity or frequency of prescribed or illicit use, current use (e.g., past 30 days or past 12 months), or reasons for illicit use; analyses based on small sample for prescribed and illicit stimulant users (n=26) and illicit users only (n=37); cross- sectional design does not allow causal inferences	Authors suggest need for proper medication management for students with ADHD; school policies should be developed to help prevent diversion among school-age children

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McCabe, S. E., West, B. T., Morales, M., Cranford, J. A., and Boyd, C. J.; *Does early onset of non-medical use of prescription drugs predict subsequent prescription drug abuse and dependence? Results from a national study;* Addiction, 2007; 102(12):1920–1930	Individual	(1) Early onset of nonmedical use of prescription drugs; (2) early onset of alcohol use alcohol; (3) family history of alcoholism; (4) poly-drug use ("alcohol and other drugs")		(1) Socio-demographics [(a) age, (b) gender, (c) race, (d) current marital status]	N=43,093 (study analyzed subset of those reporting any nonmedical use of prescription drugs); non-institutionalized adults 18 years or older; 52% women,71% White, 12% Hispanic/Latino, 11% African American, 4% Asian, 2% Native American or other racial background.	Study used data from the 2001-2002National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) which included the National Institute on Alcohol and Alcoholism (NIAAA) Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM IV version, a fully structured diagnostic interview. (N=43,093) and included people living in households, military personnel, and people living in the following group quarters: boarding or rooming houses, non- transient hotels, shelters, facilities for housing workers, colleges, and group homes	Development of prescription drug abuse and dependence	(1) Early onset of NMUPD significant predictor for development of abuse or dependence; (2) one-year increase in age at onset of NMUPD reduces the odds of developing diagnosis of abuse by 5% and dependence by 2%; (3) NMU of stimulants associated with highest rates of stimulant use disorders relative to other prescription drugs; (4) males more likely to develop abuse diagnosis while females more likely to develop dependence diagnosis; (5) strong association between early onset of alcohol use and family history of alcoholism with development of prescription drug use disorders; (6) poly-drug use was associated with increased odds of prescription drug abuse and dependence	Prevalence estimates may represent underestimation of abuse and dependence due to omission of commonly misused drug examples (Vicodin, OxyContin, Ritalin, Adderall) in survey; cross-sectional design does not allow causal inferences	Authors suggest prevention efforts aim at young children and adolescents to reduce NMUPD.

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McCauley, J. L., Amstadter, A. B., Macdonald, A., Danielson, C. K., Ruggiero, K. J., Resnick, H. S., and Kilpatrick, D. G.; *Non- medical use of prescription drugs in a national sample of college women*; Addictive Behaviors, 2007; 36(7): 690–695	Individual	(1) Lifetime depression; (2) past-year substance abuse; (3) past-year binge drinking;(4) past-year illicit drug use; (5) past- year marijuana use	None discussed	Demographics [(a) gender, (b) race/ethnicity, (c) family income]; (2) rape history; (3) health status	2000 randomly selected college women from 253 schools in 47 states;71.4% between 18-20 years old; 75% White; 95.7% good/very good/ excellent health status; 7.8% prevalence of NMUPD (n=155)	Cross-sectional study using telephone survey interviews	Past-year non-medical use of prescription drugs	Final multivariate logistic regression model results were: (1) lifetime major depressive episode; (2) past- year substance abuse; (3) past-year binge drinking; 4) past-year illicit drug use; 5) past-year marijuana use were all significant predictors of NMUPD	Cross-sectional design does not allow causal inferences; small sub- sample size (150 involved in NMUPD) limited ability to parse out factors associated with specific class of prescription drugs	Authors recommend that colleges incorporate NMUPD screening, prevention, and treatment programs; college counselors should be aware of prevalence of NMUPD and tools to address issues of NMUPD

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McCauley, J. L., Danielson, C. K., Amstadter, A. B., Ruggiero, K. J., Resnick, H. S., Hanson, R. F., Smith, D. W., Saunders, B. E., and Kilpatrick, D. G.; *The Role of Traumatic Event History in Non-medical Use of Prescription Drugs among a Nationally Representative Sample of U.S. Adolescents*; Journal of Child Psychology and Psychiatry, 2010; 51(1):84–93	Individual	(1) Traumatic events (witnessing violence); (2) depression, posttraumatic stress disorder (PTSD); (3) other lifetime drug or alcohol abuse/ dependence; (4) delinquent behavior	None	Socio-demographics [(a) Age, (b) white race, (c) gender,(d) rural vs. urban settings, (e) family income]	Adolescents (aged 12-17 years) non-institutionalized, English speaking in homes with a telephone(n=3,614)	2005 National Survey of Adolescents - Replication (NSA-R)	Lifetime non-medical use of prescription drugs	(1) Lifetime prevalence of NMUPD was 6.7%; (2) Lifetime PTSD, other forms of substance use/abuse, lifetime history of delinquent behavior, and history of witnessed violence significantly associated with increased NMUPD	(1) Cross-sectional data does not allow causal inferences; (2) adolescents in homes without telephones, in institutional settings and homeless adolescents not part of sample; (3) low base rates of PTSD limited analysis to overall drug misuse, not by type of drugs; (4) survey language for NMUPD does not distinguish prescribed vs. non-prescribed uses; (5) lifetime prevalence of NMUPD did not assess every medication by trade and generic name	Risk reduction strategies for NMUPD should target adolescents who witness violence, endorsed PTSD, delinquent behavior or abuse other substances. Interventions should include treatment.

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Quintero, G.; *Rx for a Party: A Qualitative Analysis of Recreational Pharmaceutical Use in a Collegiate Setting*; Journal of American College Health, 2009; 58(1): 64–70	Individual, Peer	(1) Low level of acknowledging the risks associated with the misuse of pharmaceuticals; (2) wanting to manage or modify the prescription drug high (e.g., by adding alcohol to prescription drug use); (3) wanting to manage the duration or intensity of another drug's effect; (4) other drug use and taking pharmaceuticals as substitutes for other recreational drugs; (5) "partying" (i.e., consuming prescription drugs while socializing with friends and peers); (6) easy availability of prescription drugs to experiment with for recreational purposes; (7) thinking prescription drugs have legitimate	Knowing they would be involved in social interactions and need to carry on a conversation, talk to people when out socially	Demographic characteristis	Non-random sample of college students (n=91); Race: White (73%); Hispanic (31%); Average age (22); Female (52%); lived off-campus (91%); roommates (75%); employed at least part time (53%); Upper division students or grad students (55%)	Exploratory qualitative study; semi-structured interviews conducted between May 2004 and December 2005 were audio recorded, transcribed, and examined for themes related to the socio-recreational use of prescription drugs	Socio-recreational use of prescription drugs (qualitative open-ended questions)	Prescription drugs used for a number of purposes, including to experience pleasure, to manage the duration/intensity of drug's effects, to "party" with friends and peers in leisure settings, to facilitate socio-recreational activities, and to help structure free time: (1) 55% reported at least one episode of socio-recreational use of prescription drugs within the last year; (2) recreational use of a wide variety of prescription drugs, including narcotic analgesics, central nervous system stimulants, anxiolytics, and anti-depressants; (3) analysis emphasizes discernible patterns of pharmaceutical misuse: (a) hedonistic patterns of use, (b) social patterns of use; (4) individuals characterized the risks associated with these patterns of use in two ways: (a) emphasizing the possible physical harms they might experience, or (b) not acknowledging any risks; (5) strategies employed in an attempt to	(1) Small, non-representative sample of recruited participants through ads and snowball mechanisms; (2) interview methods subject to mode of interview effects (e.g., subjects may have felt compelled to offer socially desirable responses); (3) average age of the sample, twenty-two, is lower than the average age of students enrolled; (4) sample does not include significant numbers of individuals from higher risk groups, such as dorms, and fraternity or sorority houses; (5) small, non- representative sample recruited participants through ads and snowball mechanisms	Promote health in the collegiate setting and correct the cultural assumption that it is safe to misuse pharmaceuticals by all campus-based health professionals. Rethink and transform current prevention research and intervention efforts on college campuses (e.g., current efforts focus on binge drinking, but should address NMUPD).

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		and seeing them used widely to no apparent ill effect; (8) wanting to ease social interactions and activities (relaxation, extroversion); (9) wanting to facilitate interactions with the opposite sex; (10) wanting a common leisurely activity with friends; (11) boredom						address risks: (a) self-control strategies intended to limit the physiological harm, and (b) socially oriented strategies (e.g., “using drugs in social settings unlikely to produce situations where use would result in serious physical detriment or social liability")		

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Schepis, T. S. and Krishnan-Sarin, S.; *Characterizing Adolescent Prescription Misusers:A Population-Based Study;* Journal of the American Academy of Child and Adolescent Psychiatry,2008; 47(7): 745-754	Individual	(1) Poorer academic performance; (2) past- year major depression; (3) higher risk-taking behaviors; (4) past-year use of: (a) alcohol, (b) cigarettes, (c) marijuana or (d) cocaine or inhalants; In addition, among users there are two risk factors for a substance abuse disorder:(1) use of cocaine or inhalants; and (2) more than 10 episodes of prescription misuse in last year.	Being African American or Asian American	Demographics [(a) Age, (b) race ethnicity, (c) sex,]; (2) household composition; (3) grades in school; (4) recent household moves	Adolescents (aged12-17 years) in non-institutionalized settings (n=18,678)	NSDUH 2005	(1) Misuse of prescription drugs; (2) having symptoms of abuse and/or dependence of: (a) opioids, (b) stimulants, (c) tranquilizers, and (d) sedatives	(1) 8.2% of adolescents misused a medication; (2)3.0% reported symptoms of substance abuse disorder; (3) poorer academic performance, enjoyment of risk taking, a past year major depressive episode, and use of cigarettes, alcohol, marijuana and cocaine and/or inhalants were associated with prescription misuse and having one or more symptoms of a substance use disorder	(1) Cross-sectional design does not allow causal inferences; (2) measures not designed by investigators imposed limitations on conclusions; (4) self- selection bias possible with 76% response rate	(1) Clinicians should include screen adolescents for addictive substance abuse; (2) clinicians should educate parents; (3) careful screening of patients before prescribing

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Schepis, T. S., and Krishnan-Sarin, S.; *Sources of Prescriptions for Misuse by Adolescents: Differences in Sex, Ethnicity, and Severity of Misuse in a Population- Based Study*; Journal of the American Academy of Child Adolescent Psychiatry, 2009; 48(8):828-836	Individual	(1) Purchasing prescription drugs for misuse versus obtaining them in other ways (e.g., versus prescribed by a physician or freeform a friend or relative).	None discussed	Demographics [(a) gender, (b) race/ethnicity]	N=36,992; youth between 12- and17-years-old	Cross-sectional, nationally representative survey design. 2005-2006 NSDUH	Lifetime misuse of prescription medications for each drug class [(a) opioids, (b) tranquilizers, (c) stimulants,(d) sedatives]	General finding: Race/ethnic and gender differences found in source of prescription drugs for misuse, particularly of opioids; 1) females more likely than males to steal medications or obtain them for free; 2) males more likely than females to purchase medications or obtain them from a physician; 3) Whites more likely than African Americans and Hispanic/Latinos to purchase opioids; 4) African Americans more likely than Whites and Hispanic/Latinos to misuse opioids obtained from a physician; 5) youth who recently obtained a prescription drug by purchasing it had the worst risk profile for concurrent substance use and severity of NMUPD	Cross-sectional design does not allow causal inferences; analyses based on the most recent source of prescriptions for misuse, not the more common source; 2005-2006 NSDUH response rate of about 75% may have resulted in self-selection bias	Authors recommend educational strategies for youth and their parents about risks of prescription drugs; parents should monitor medications used by youth; physicians should screen all adolescents for prescription drug misuse.

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Schinke, S. P., Fang, L., and Cole, K. C.; *Substance Use among Early Adolescent Girls: Risk and Protective Factors*; Journal of Adolescent Health, 2008;43(2): 191–194	Family	(1) Higher on measures of depression; (2) best friend uses substances	Mother's knowledge of daughters' companions	(1) Race/ethnicity; (2) school grades; (3) mother's places of birth; (4) education and natures of employment	Pairs of adolescent girls (average age 12.6) and their mothers (n=781 pairs) in New York City	Cross-sectional design; adolescent daughter/mother pairs recruited through advertisements in greater New York City; consenting mothers and assenting girls who had parental consent received usernames and passwords to access online surveys. Survey items came from previously validated questionnaires on adolescent and adult substance use and related risk and protective factors	Girls reported use of: (a) alcohol, (b) prescription drugs, (c) inhalants.	(1) Girls who engaged in unstructured activities after school drank more and used more inhalants; (2) girls who reported a positive image of their bodies were less likely to drink; (3) girls who were depressed reported more use of alcohol, prescription drugs, and inhalants; (4) girls whose best friend used substances were more likely to drink, take prescription drugs, or use inhalants; (5) maternal alcohol use related to girls drinking and inhalant use; (6) knowledge of daughters' companions predicted girls' reduced alcohol and prescription drug use; (7) girls' ability to always contact mother related to reduced drinking, illicit drug use and inhalant use; (8) girls whose families had rules against substance use were less likely to drink and use inhalants; (9) girls whose parents encouraged them to abstain from substance use reported lower rates of alcohol and inhalant use	(1) Self-selection of mother-daughter pairs; (2) cross-sectional design does not allow causal inferences; (3) cannot assess gender differences because study limited to girls; (4) lifetime use reports of drinking and drug taking not the most sensitive indicators	Authors suggest the importance to further access parent involvement, especially the participation of girls' mothers in adolescent substance use and prevention research

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Subramaniam, G. A., and Stitzer, M.; *Clinical Characteristics of Treatment-Seeking Prescription Opioid versus Heroin using Adolescents with Opioid Use Disorder*; Drug Alcohol Dependence,2009; 101(1-2): 13-19	Individual	(1) Heroin users were less likely to be in school or to have graduated, but opioid users more likely to report being suspended (although age was similar); (2) more concurrent cannabis, alcohol sedative and other simulant disorders; (3) more multiple substance disorders; (4) both have criminal histories, but opioid users report more selling drugs and damaging property; (5) mental health: opioid users had higher ADHD and manic episodes, while heroin users more depression	None discussed	(1) Demographics [(a)gender, (b) age, (c) race]; (2) family characteristics	94 adolescents (aged 14-18) with past year opioid use disorder (OUD),sub-divided into heroin (b=53) and non-heroin (n=41) groups and comparison of adolescents with non-OUD cannabis/alcohol use disorders (n=73) in adolescent substance abuse treatment program near Baltimore, Maryland	Comparison study of OUD heroin and non-heroin adolescents with comparison of cannabis/alcohol use disorders	Assessment surveys for demographic and social features, composite diagnoses, psychiatric disorders, Beck Depressive Inventory (BDI), sexual and injection drug use, HIV risk behaviors, general crime scale and global assessment of individual need (GAIN).	(1) Demographics of heroin and non-heroin users were similar; (2) rates of concurrent past year diagnosis for substance use disorder (SUD) different, with prescription OUD group more likely to have concurrent cannabis, alcohol, sedative and other stimulant use disorders and multiple SUD diagnoses (e.g., Opioid Use Disorder with, Stimulant Use Disorder, etc.); (3) age of onset for cannabis and cocaine use lower for prescription OUD group than heroin group; (4) more recent substance use in past 30 days in OUD prescription group than heroin and prescription OUD group more diverse drugs; (5) high rates of past year criminal behaviors; (6) high rates of psychiatric disorders for both groups; (7) high depressive symptoms for both groups; (8) heroin users more likely to have prior SUD treatment; (9) heroin users more likely to engage in intravenous drug use; (10) prescription users more likely to be court ordered into treatment	(1) Sample is treatment seeking; (2) small sample size; (3) cross-sectional design does not allow causal inferences; (4) residential treatment sample may have higher severity and co- occurrence of disorders	Implications for treatment

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Sung, H., Richter, L., Vaughan, R., Johnson, P. B., and Thom, B.; *Nonmedical use of prescription opioids among teenagers in the United States: Trends and correlates*; Journal of Adolescent Health, 2005;37(1): 44–51	Individual	(1) Poly-drug use (including alcohol, marijuana, stimulants, tranquilizers, ecstasy, sedatives and cocaine) (2) females; (3) Blacks; (4) lower socio-economic status; (5) holding favorable attitudes towards drugs; (6) detached parents; (7) friends use of illicit drugs	None discussed	(1) Demographics [(a) gender, (b) age, (c) race/ethnicity, (d) family income]	N=17,709; youth between 12 and 17 years old	Cross-sectional, nationally representative survey design. Historical trend analysis used1965-2002 NSDUH; Incidence and prevalence of NMUDP used 2002 NSDUH	Past-year opioid misuse	(1) Majority of opioid misusers were poly-drug users; (2) use of illicit substances was best predictor of prescription opioid abuse; (3) youth who engaged in selling drugs were disproportionately misusing opioid prescription drugs; (4) low parental involvement and positive peer attitudes toward drug use were predictive of prescription opioid misuse.	Cross-sectional design does not allow causal inferences	Authors suggest broadening current substance abuse prevention strategies targeting youth at risk for substance abuse to include focus on prescription drugs and focus on improving family bonds and peer-resistant skills.

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Weyandt, L. L., Janusis, G., Wilson, K. G., Verdi, G., Paquin, G., Lopes, J., Varejao, M., and Dussault, C.; *Nonmedical Prescription Stimulant Use Among a Sample of College Students: Relationship With Psychological Variables*; Journal of Attention Disorders, 2009; 13(3):284-296	Individual	(1) Psychological distress/internal restlessness; (2) sensation seeking	None	None	Students (n=390) at4-year Northeastern U.S. college.	Brief Symptom Inventory (BSI) of psychological symptoms, Internal Restlessness Scale (IRS), Sensation Seeking Scale-V, Stimulant Survey Questionnaire (SSQ) administered in group settings over 20-40 minutes. (Date/year not reported).	Use and misuse of prescription stimulants	(1) College students who reported higher stimulant misuse also reported higher psychological distress and internal restlessness;(2) students reporting higher rates of prescription stimulant use and knowledge of atypical stimulant use among peers were likely to report higher rates of psychological distress; (3) negative correlation between G.P.A. and stimulant use; (4) for students without ADHD, stimulant use correlated with all subscales of BSI of psychological symptoms, while for students with ADHD only correlated with obsessive compulsive disorder; (5) no gender differences; (6) stimulants are readily available to students; (7) most students know others who misuse stimulants	(1) Sample from single college may not generalizable; (2) gender imbalance in sample (72% female); (3) mostly white students; (4) Greek system over-represented due to sampling strategy; (5) items in SSQ scales include legitimate reasons for taking prescription drugs; (6) student self-reported ADHD (not tested).	Effective prevention and education programs needed

Author(s), Article Title	Domain (Individual, Family, School, Peer, and Community/ Environment)	Risk Factor(s)	Protective Factor(s)	Other Independent Variables	Sample Characteristics	Study Design (Instrument and Time Frame)	Outcome Measure(s)	Key Finding(s)	Study Limitations	Related Strategy
Wilens, T. E., Adler, L. A., Adams, J., Sgambati, S., Rotrosen, J., Sawtelle, R., Utzinger, L., and Fusillo, S.; *Misuse and Diversion of Stimulants Prescribed for ADHD: A Systematic Review of the Literature*; Journal of the American Academy of Child Adolescent Psychiatry, 2008; 47(1): 21-31	Individual	(1) Poly-drug use; (2) mental health disorder (i.e., major depression); (3) relatively easy access	None discussed		N=113,105 across 21 studies; youth from elementary schools to college students (n=17 studies), from substance abuse treatment centers (n=2 studies), from national drug use surveys (n=2)	Literature review from 1995 to 2006	Past-year prevalence of stimulant misuse	(1) Students with or without ADHA misuse stimulant medications; (2) misuse and diversion of stimulant medications seem to be more prevalent among older adolescents and college age students (studies found 5% to35% of misuse); (3) higher risk in individuals with history of substance abuse or conduct disorder; (4) common motivations for misuse include both performance enhancement and for euphorogenic effects	Literature review found that most studies were based on self- report surveys or interviews (n=20)while one was based on a chart review	Authors suggest that educators, practitioners and others working in junior and senior high schools, colleges, study skills centers, health care centers, etc. should be made aware of scope and context of problem; need to develop prevention and monitoring programs for prescription drug misuse and diversion; clinicians should advice students on prescription drug misuse risks as well as potential legal consequences of misuse and diversion.

Author(s), Article Title	Domain (Individual, Family, School, Peer, and Community/ Environment)	Risk Factor(s)	Protective Factor(s)	Other Independent Variables	Sample Characteristics	Study Design (Instrument and Time Frame)	Outcome Measure(s)	Key Finding(s)	Study Limitations	Related Strategy
Wu, L. T., Ringwalt, C. L., Mannelli, P., and Patkar, A. A.; *Prescription Pain Reliever Abuse and Dependence among Adolescents: A Nationally Representative Study;* Journal of the American Academy of Child Adolescent Psychiatry,2008; 47(9): 1020–1029	Individual	(1) self-reported fair or poor health; (2) use of mental health services for psychological problems; (3) female, selling drugs; (4) use of multiple drugs	None discussed	(1) Demographics [(a) age, (b) sex, (c) race/ethnicity, (d) school status]; (2) access to prescription pain relievers [(a) annual family income, (b) health insurance status]; (3) alcohol use disorders; (4) use of multiple drugs; (5) criminal activities; (6) perceived health status; (7) health care use; (8) mental health-related variables	Nationally representative sample (N =36,992); (1) Male(51.1%); (2) Age:12-13 (32.0%), 14-15 (34.6%), 16-17 (33.5%); (3) Race: White (60.4), Hispanic (17.6%), African American (15.3%), American Indian (0.6%), Asian (4.6%); (4) Student (98.6%); (5) Health insurance coverage (91.4%)	Cross-sectional 2005-2006 National Surveys of Drug Use and Health (public use file). Interviews consist of computer- assisted personal interviewing and audio computer-assisted self-interviewing	Past-year prevalence of non-prescribed prescription pain relievers (PPRs); *(Note: Past- year abuse of and dependence on PPRs were specified by DSM-IV criteria)*	(1) Among this representative national sample of adolescents aged 12–17 years, about 7% (n= 2,675) reported PPR use without a prescription in the previous 12 months, and approximately 1% (n = 400) met criteria for past-year PPR abuse or dependence. Among the subset of past-year non-prescribed users, 16% of users met criteria for abuse (7%) or dependence (9%), and an additional 20% exhibited sub- threshold dependence; (2) Regular PPR use, major depressive episodes, and alcohol use disorders were associated with each diagnostic category; (3) Compared with asymptomatic non-prescribed PPR users, increased odds of abuse were noted among non-students, users of mental health services, and those reporting poor or fair health; (4) Increased odds of dependence were observed among females, those who were involved in selling illicit drugs, and users of multiple drugs; disorders, and use of	(1) Cross-sectional data does not allow causal inferences; (2) study does not include incarcerated, institutionalized, and homeless adolescents; (3) diagnoses of abuse and dependence assessed by standardized questions administered by trained interviewers, but were not validated by clinicians; (4) non-prescribed prescription pain reliever use is defined broadly and may have led to the inclusion of users who had a legitimate medical condition but lacked a prescription for various reasons.	Given the research findings, the authors state that family members and friends constitute sources of PPRs for adolescents and suggest that issues concerning the health risk of unsupervised use of prescription PPRs be included in adolescent drug prevention education efforts among families and in the community.

Author(s), Article Title	Domain (Individual, Family, School, Peer, and Community/ Environment)	Risk Factor(s)	Protective Factor(s)	Other Independent Variables	Sample Characteristics	Study Design (Instrument and Time Frame)	Outcome Measure(s)	Key Finding(s)	Study Limitations	Related Strategy
								multiple drugs. (5) Sub-threshold dependent users resembled dependent users in major depressive episodes, alcohol use		

Author(s), Article Title	Domain (Individual, Family, School, Peer, and Community/ Environment)	Risk Factor(s)	Protective Factor(s)	Other Independent Variables	Sample Characteristics	Study Design (Instrument and Time Frame)	Outcome Measure(s)	Key Finding(s)	Study Limitations	Related Strategy
Young, A. M., Glover, N., and Havens, J. R.; *Nonmedical Use of Prescription Medications Among Adolescents in the United States: A Systematic Review*; Journal of Adolescent Health,2012; 51(1): 6–17	Individual, Peer, Family, School	(1) female ; (2) older age; White; (3) low income ; (4) low academic performance, school dropout, or lack of "school-bonding;' (5) residential instability (6) rurality; (7) poor self- reported health; (8)major depressive episode; (9) posttraumatic stress disorder; (10) mood disorder; (11) mental health service utilization; (12) emergency room use; (13) adolescents' reported level of conflict with parents; (14) Peer attitudes supportive of drug use and/or peers' use of illicit drugs; (15) other illicit drug use; (16) delinquency; (17) sensation seeking; (18) property crimes and violent behavior; (19) self-medication and recreational motivation	(1) Non-Whiterace; (2) two-parent household; (3) parental bonding	N/A	N/A	Literature review of 30 quantitative research articles published in peer – reviewed journals between January 2000-June 2011	Non-medical use of prescription drugs among adolescents aged 12–17 years	Thirty publications met inclusion criteria and 25 studies were represented; 15 involved nationally representative samples: (1) The prevalence and correlates of NMUPD varied across studies and by drug class; (2) Non-medical use of pain relievers was more prevalent than stimulants, sedatives, and tranquilizers; (3) Female gender was generally associated with pain reliever use and, to a lesser degree, with tranquilizer use; (4) White adolescents also appeared to have a higher prevalence of NMUPD, although there was some evidence to the contrary; (5) Older age, illicit drug use, and delinquency were consistently associated with NMUPD across studies	(1) Given the strong association between NMUPD and other illicit drug use, readers should keep in mind that consequences that are reported to result from NMUPD may in fact be arising from poly-drug use; (2) comparisons of prevalence and correlates across studies should be made with caution; (3) few studies on non-medical use of sedatives and tranquilizers	This review article identified several areas for further research, including that of racially/ ethnically diverse samples of adolescents, more focus on sedative and tranquilizer use, and longitudinal research to examine temporal patterns in NMUPD and other illicit drug use, delinquency, and substance abuse and dependence

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