CAPT Decision Support Tools

Strategies to Prevent 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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STRATEGIES TO PREVENT THE NON-MEDICAL USE OF PRESCRIPTION DRUGS: USING PREVENTION RESEARCH TO GUIDE PREVENTION PRACTICE

As part of a strategic planning process, practitioners need to select prevention strategies or interventions that address those risk and protective factors associated with their prioritized substance-related problem(s). This document identifies strategies and interventions to reduce 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 strategy selection.

Related tools in this toolkit include:

- *Factors Associated with the Non-Medical Use of Prescription Drugs: Using Prevention Research to Guide Prevention Practice*

HOW WE IDENTIFIED THE STRATEGIES INCLUDED IN THIS DOCUMENT

The prevention strategies and interventions included in this document were culled from articles published between 2006 and 2013. 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 United States samples of adolescents and older adults. While all classes of prescription drugs were examined, specific focus was given to opioid/pain relievers—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," "strategy," "intervention," and "prevention."

Criteria for including articles included the following:

- 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 literature document were reviewed for clarity by at least two reviewers with post-graduate degrees. Any differences in either the application of the selection criteria or the entries in Table 1 and 2 (described below) 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 interventions to reduce NMUPD is relatively young and meager. Thus, one or a few studies could dramatically shape our understanding of effective methods to reduce NMUPD. The fact that the effectiveness of a given intervention is not supported by one or more well-designed research studies may say less about the promise of that intervention and more about the current paucity of relevant literature.
3. 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.
4. Most of the studies reviewed (10 of 15) focused on adolescents versus young adults (e.g., college students) or adults.

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.

There are also two companion documents you should consult. One, mentioned below, identifies the risk and protective factors underlying NMUPDs: *Factors Associated with the Non-Medical Use of Prescription Drugs: Using Prevention Research to Guide Prevention Practice*.

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

Start with risk and protective factors. While NMUPD may be a serious problem across your state, the factors that drive the problem in different communities may vary considerably. For example, in one community, high school students may have low perceptions of the risks associated with NMUPD. However, this may not be an important risk factor in another community that has a strong and longstanding substance abuse education program that emphasizes the dangers of NMUPD, and a community-wide media campaign that reinforces that message. To be effective, prevention strategies or interventions must be linked to the risk and protective factors that drive the problem *in your community.* Therefore, it is critical that you begin your search for appropriate prevention strategies with a solid understanding of these factors, based on a comprehensive review of local quantitative and qualitative data.

Once you have identified local risk and protective factors, use the companion review *Factors Associated with the Non-Medical Use of Prescription Drugs: Using Prevention Research to Guide Prevention Practice* to determine how well supported they are by research, and to make a final selection about which one or ones to focus on. (The risk and protective factor review contains instructions to guide you through this process.)

Next, use *Table 1: Brief Summaries* to determine which of the factors you have identified are addressed by the interventions included in this review. Using interventions that have been evaluated (i.e., those included in this review), even when evidence of their effectiveness is imperfect, is more likely to lead to change in NMUPD than selecting an intervention for which no such evidence exists. To find interventions that address the factor(s) of interest in your community, examine the columns labeled *Risk Factor(s)* and *Protective Factor(s).* Scan the entire column since a single factor, like "low perception of risk," may appear in more than one place. You may also find it helpful to look at the column labeled *Domain* and search for the domain (Individual, Family, School, Peer, Community/Environment) in which the risk/protective factor operates.

When searching for a factor of interest, you may notice that other risk and protective factors appear in the same row in relation to the same single study. This tells you that the intervention being studied may also have had an impact on these linked, or associated, factors. This is important to note, because an Intervention that addresses multiple factors may not only be more cost-effective than an intervention that addresses only one factor, but also increases the chances of

having an impact on NMUPD. For example, a single, family-based intervention may address both adolescent psychological risk factors, such as depression, and the protective factor of strengthening parental monitoring and rules against substance use.

What if a risk or protective factor identified in your local needs assessment doesn't appear in Table 1? This might be due to the way you labeled the factor versus the way it is labeled in the table. The labels used in the *Risk Factor(s)* and *Protective Factor(s)* columns reflect the language used in the articles, and so 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, take a look at the entry for the article in *Table 2: Detailed Summaries,* or, if necessary, try retrieving the original (source) article (the full citation appears in Table 2).

The column labeled *Population* may help you decide how relevant the intervention is to your local conditions. For example, an intervention that was tested with 5th and 6th grade students may not be relevant if your local needs assessment has determined that high school students are the population to be targeted. On the other hand, you may have to "settle" for an intervention shown to be effective for a population that does not match yours exactly, but which does address the risk or protective factor(s) identified through your local needs assessment (see **What if you can't find an appropriate program?** below).

The *Outcome Measure(s)* column can help you determine which interventions to consider based on the outcomes they address. For example, if a risk factor for NMUPD in your community is "over-prescribing of pain medication", then the outcome "improved patterns in prescribing pain medication for emergency room patients" may be of interest to you (see Braehren et al., 2009 in Table 1).

Learn more about the studies that seem relevant. *Table 2. Detailed Summaries* provides more information about each of the articles included in Table 1; it is designed to help you decide which of these interventions (if any) best fits your local conditions. Each entry includes: a full citation, so you can locate the original article (articles are organized alphabetically, by author); the type of intervention (e.g., Project Success, a prevention education program for high risk secondary school students); other (apart from risk and protective factors) independent variables assessed (e.g., age, gender); sample characteristics (e.g., high-risk high school students at one of 14 alternative high schools in Washington); the study design (e.g., random-assignment control study, longitudinal design for two cohorts, survey administered at baseline, program end and one-year follow-up); outcomes measured (e.g., 30-day use of alcohol, marijuana and illegal drugs (including NMUPD); key findings (e.g., students in the control [non-Project Success] group had lower use of illegal

drugs, excluding marijuana than those in the intervention group at post-test); and study limitations (e.g., low response rates on provider surveys). 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.

Once you have reviewed the details of the study supporting the intervention(s) in which you are interested, you will need to decide whether the evidence of its effectiveness is sufficient. Determining this is beyond the scope of this document, though some of the issues to consider are discussed in CSAP's 2009 *Identifying and Selecting Evidence-Based Interventions Revised Guidance Document for the Strategic Prevention Framework State Incentive Grant Program*. Approaches for weighing the evidence of effectiveness for interventions can also be found in the rating systems used by organizations such as the National Registry of Evidence-based Programs and Practices. However, most prevention practitioners would also benefit from the advice of a researcher, evaluator, or others with appropriate training and experience. Fortunately, in responses to conditions of SAMHSA-funded initiatives, such as the Strategic Prevention Framework State Incentive Grant, many states have Evidence-Based Workgroups that can help assess the strength of the evidence for an intervention's effectiveness.

Determine the feasibility of implementation. Once you have identified a strong potential intervention, the next step is to determine how feasible it would be to implement it, given your resources and community conditions (i.e. the community's willingness and readiness to implement). The processes of assessing feasibility and sources that can help with these processes are discussed in: CSAP's 2009 *Identifying and Selecting Evidence-Based Interventions Revised Guidance Document for the Strategic Prevention Framework State Incentive Grant Program.* Additional resources related to feasibility can be found in the CAPT area of SAMHSA's website.

What if you can't find an appropriate strategy or intervention? Given the small number of interventions identified in this literature review, you may not be able to identify an intervention that meets your needs—that addresses the risk and/protective factors associated with NMUPD in your community, for which there is sufficient evidence of effectiveness, and that is feasible to implement. In this situation, consider searching databases in addition to those searched for this review to retrieve more research articles. Also, consider widening your search to include articles published before and after the time period included in this review, and/or to include articles published in non-refereed journals, many of which use methods as rigorous as articles found in peer-reviewed journals, or to include articles for which the full-text was not available. Or simply try using more search terms.

Another way to identify a wider range of intervention "possibilities" is to consider interventions that rigorous studies show can influence your risk and protective factors of interest, but which

do not provide evidence about outcomes related to NMUPD (or for your targeted population). For example, well-designed evaluations of a number of curriculum-based prevention programs have shown reductions in alcohol and other substance abuse among high school students, but have not specifically measured the effects on NMUPD. Before implementing this sort of program, however, consider whether it may need to be adapted to more specifically address NMUPD. For example, information and exercises on refusal skills might need to be altered to incorporate prescriptions drugs. Also keep in mind that an intervention that lacks evidence of effectiveness for NMUPD, even if it is adapted, may fail to impact NMUPD. Given this, your attempt at repurposing the intervention should be carefully evaluated.

TABLE 1. BRIEF SUMMARIES

Domain (Individual, Family, School, Peer, and Community/Environment)	Risk Factor(s)	Protective Factor(s)	Type of Intervention	Outcome Measure(s)	Population	Source
Community	Unsafe prescribing practices of opioid prescription drugs	Not applicable	46 face-to-face presentations of six recommended prescribing practices to health care workers throughout Utah	(1) Confidence in prescribing practices; (2) degree to which providers had adopted the six recommended practices; (3) other behavior change in opioid- related practices	581 physicians attended presentations; follow-up surveys post intervention; baseline (n= 366), 1 month (n=82), 6 month (n=29)	Cochella and Bateman, 2011.
Community/Environment	Over-prescribing pain medication	Use of narcotic registry and Prescription Drug Monitoring Program (PDMP) by prescribers	PDMP data use by prescribers (doctors and health care professionals)	Patterns of prescribing pain medication for emergency room patients	18 prescribers of 199 emergency department patients with painful conditions	Baehren, et al., 2009.
Community/Environment	None discussed	Knowledge of potential dangers of prescription pain medication	Utah Department of Health Prescription Pain Medication Program's two intervention strategies were: (1) statewide media campaign targeting adults ages 25-54, including its "Use Only As Directed" website; (2) clinical educational materials, including development and distribution of opioid-prescribing guidelines, bookmarks, patient information cards, and posters	(1) Public awareness, opinions, and behaviors related to prescription drug behaviors; (2) prescription drug mortality	Utah residents aged 18 and older; pre-campaign n=413, post-campaign n=410	Johnson, et al., 2011.

Domain (Individual, Family, School, Peer, and Community/Environment)	Risk Factor(s)	Protective Factor(s)	Type of Intervention	Outcome Measure(s)	Population	Source
Community/Environment	None discussed	None discussed	Multi-stage community mobilization strategy to engage community leaders, retailers, parents, and school personnel in preventing youth use of inhalants and other harmful legal products in rural Alaska	(1) Community readiness; and (2) dimension readiness	Four participating communities typical of regional centers in rural Alaska; populations range from about 3,000 to 9,000; two of the communities have a majority Alaska Native population; others have ' populations that are over 20% Alaska Native	Ogilvie, et al., 2008.
Community/Environment	None discussed; reviewers infer over- and/or inappropriate- prescribing and doctor-shopping	None discussed	State prescription drug monitoring programs (PDMPs)	The effects of PDMPs over time on: (1) drug overdose mortality; (2) opioid overdose-related mortality; and (3) morphine milligram equivalents	51 jurisdictions (50 states and Washington DC)	Paulozzi, et al., 2011.
Community/Environment	None discussed	None discussed	Prescription drug misuse prevention message strategies	A three-fold categorization (highly resonant, moderately resonant, or not resonant) which define the extent to which a student reports that a message may influence him/her and peers to refrain from misusing prescription drugs	Two focus groups with eight seventh graders and eight eighth graders in the Atlanta metropolitan area in March 2009; no racial, gender, or other demographic information about the participants or their school is provided, nor do authors indicate how the sample was recruited	Twombly, et al., 2011.

Domain (Individual, Family, School, Peer, and Community/Environment)	Risk Factor(s)	Protective Factor(s)	Type of Intervention	Outcome Measure(s)	Population	Source
Community/Environment, Individual	(1) Peer group approval and use; (2) Lifetime substance use	Not applicable	*Think Smart* curriculum in fifth and sixth grade health classes has two components: (1) environmental strategy to reduce access to harmful legal products (HLP)s, including legal prescription, non-prescription and over-the-counter drugs, as well as household products found at home, in schools, and from retail outlets; and (2) school-based curriculum intended to enhance knowledge about HLP use and problems and improve refusal skills and assertiveness	(1) Cognitive and social-behavioral characteristics of students related to HLP use; (2) perceived availability of HLPs from several environmental sources	Fifth-, sixth-, and seventh-grade students in all schools in all three rural Alaskan communities; pretest n=336, posttest n=286	Gruenewald, et al., 2009. (See also Johnson, et al., 2009, Johnson, et al., 2007, and Ogilvie, et al., 2008, below).
Community/Environment and School- based	Availability of harmful but legal products	(1) Rules and regulations in businesses, homes, and schools; (2) anti-drug norms in community, family, school; and (3) social influence, life skills, and cultural identity	Comprehensive community-based prevention intervention, including: (1) community mobilization; (2) retail strategies, home strategies, and school environmental strategies; and (3) school-based prevention education with *Think Smart* curriculum to address risk factors, social influences, intrapersonal factors, and cultural competence	Availability and attitudes of legal but harmful products and substances in four communities	Four Alaska communities with populations ranging from 3,500 to 9,000	Johnson, et al., 2007. (See also Gruenewald, et al., 2009, and Johnson, et al., 2009 above; and Ogilvie, et al., 2008 below).

Domain (Individual, Family, School, Peer, and Community/Environment)	Risk Factor(s)	Protective Factor(s)	Type of Intervention	Outcome Measure(s)	Population	Source
Family, School	Past use of alcohol, cigarettes, or marijuana at baseline	Family and school environments, and youth competencies	Three studies tested different universal interventions (none targeted prescription drug use specifically): **Study 1** looked at family-based interventions and assigned participating schools to either (a) *Preparing for the Drug Free Years (PDFY),* which emphasizes adolescent refusal skills, (b) the *Iowa Strengthening Families Program (ISFP),* which strengthens family protective factors, or (c) a control group. **Study 2** assigned participating schools to either (a) a multi-component family- and school- based intervention that combined the *ISFP* and *Life Skills Training (LST)* in school and families; (b) a school-only LST intervention group, or (c) a control group. **Study 3** assigned participating schools to either (a) *PROmoting School-community-university Partnerships to Enhance Resilience* (PROSPER) model, which links community teams, public schools, and Cooperative Education System of land-grant universities to implement the ISFP curriculum, or (b) a control group.	Prescription drug misuse was assessed using questions about lifetime use of barbiturates, tranquilizers, amphetamines, and/or narcotics.	Middle school students from rural communities in Iowa and Pennsylvania participating in three studies: Study 1: 446 families of sixth graders; Study 2: 226 families of seventh graders from 24 schools; Study 3: Two consecutive cohorts of sixth graders and families (n=1064 families) from 28 school districts.	Spoth, et al., 2013.

Domain (Individual, Family, School, Peer, and Community/Environment)	Risk Factor(s)	Protective Factor(s)	Type of Intervention	Outcome Measure(s)	Population	Source
Individual	(1) Behavioral problems; (2) past 30-days use of alcohol, marijuana and illegal drugs, including NMUPD	Not applicable	*Project Success,* a prevention education program for high-risk secondary school students	30-day use of alcohol, marijuana and illegal drugs (including NMUPD)	High-risk high school students at one of 14 alternative high schools in Washington	Clark, et al. 2010.
Individual	College students with (a) involvement in a fraternity or sorority; (b) grade point average below 3.5; (c) binge drinking in the past 2 weeks; (d) past-month cannabis use	Perceived harmfulness of stimulant use	A mock study was used as a means for intervening with college students; participants received a placebo that they were told was methylphenidate and asked to complete tasks and then assess their mood and cognitive abilities; in second visit, participants were told about the placebo and informed of risks of drug use; effect on drug use over six-months was assessed	(1) Past 6-month nonmedical prescription stimulant use including: (a) incidence, (b) frequency, (c) specific drug used, (d) motivations for use; and (2) prescription stimulant-related effects of expectations	College students (n=96) without any lifetime use of prescription stimulant medication and at least two relevant risk factors	Looby, De Young and Earleywine, 2013 (in press).

Domain (Individual, Family, School, Peer, and Community/Environment)	Risk Factor(s)	Protective Factor(s)	Type of Intervention	Outcome Measure(s)	Population	Source
Individual, Family	Peer and psychological risks (depression and low self-efficacy)	(1) Close maternal relationship, (2) parental monitoring and rules against substance use	Family-oriented, web-based substance use prevention program with interactive exercises that require the joint participation of mothers and daughters	(1) Alcohol use; (2) cigarette use; (3) marijuana use; (4) NMUPD in past 30 days; (5) intention to use substances in future	108 Asian American mother/daughter (mean age 13) dyads; control group n=50; intervention group n=54	Fang, Schinke and Cole, 2010.
Individual, Family	None discussed	Close maternal relationship, parental monitoring, and rules against substance use	Computer-delivered program for mother/daughter dyads to prevent substance use among adolescent girls	(1) Substance use; and (2) risk and protective factors	Adolescent girls (ages 11-13) and their mother dyads from greater New York City area (n=916)	Schinke, Fang, and Cole, 2009.

Domain (Individual, Family, School, Peer, and Community/Environment)	Risk Factor(s)	Protective Factor(s)	Type of Intervention	Outcome Measure(s)	Population	Source
Individual, Family, School	Use of gateway drugs (alcohol, cigarettes, or marijuana) at baseline	Family and school environments, and youth competencies	**Study 1** was a family-focused intervention assigned participating schools to either (a) *Preparing for the Drug Free Years (PDFY),* which emphasizes adolescent refusal skills, (b) the *Iowa Strengthening Families Program (ISFP),* which strengthens family protective factors, or (c) a control group. **Study 2** assigned participating schools to either (a) a multi-component family- and school-based intervention that combined the *ISFP* and *Life Skills Training (LST)* in school and families; (b) a school-only *LST* intervention group, or (c) a control group.	Self reports of lifetime and past-year prescription drug misuse	Rural Iowa communities with mostly White, middle-income, middle school students. Study 1 began in 1993, with 667 sixth-graders and families. Study 2 began in 1998 with seventh-graders and families.	Spoth, et al., 2008.

Domain (Individual, Family, School, Peer, and Community/Environment)	Risk Factor(s)	Protective Factor(s)	Type of Intervention	Outcome Measure(s)	Population	Source
Individual, School, Peer, Community/Environment	(1) Peer use of harmful legal products (HLP)s; (2) peer normative beliefs about HLPs	(1) Refusal skills; (2) knowledge of drug-related consequences; (3) assertiveness skills; (4) cultural identity	Think Smart, designed to reduce use of HLPs, including legal prescription, non-prescription, and over-the-counter drugs as well as household products found at home, in schools, and from retail outlets among fifth- and sixth-grade students in frontier Alaska; curriculum targets six risk and protective factors	(1) Past 30-day HLP use of (a) inhalants; (b) prescription medicine; (c) over-the-counter medications; and (d) common household products, and/or other drug use (tobacco, alcohol, and marijuana or hashish)	Program administered in classroom settings in 14 Alaskan frontier communities to a mixture of white and Alaskan Native fifth and sixth grade students	Johnson, et al., 2009. (See also Johnson, et al., 2007, Ogilvie, et al., 2008 below; and Gruenewald, et al., 2009 above).

TABLE 2. DETAILED SUMMARIES

Author(s), Article title	Domain (Individual, Family, School, Peer, and Community/ Environment)	Risk Factor(s)	Protective Factor(s)	Type of Intervention	Other Independent Variable(s)	Sample Characteristics (Target Population)	Study Design (Instrument and Time Frame)	Outcomes Measure(s)	Key Finding(s)	Study Limitations
Baehren, David F., Marco, Catherine A., Droz, Danna E., Sinha, Sameer, Callan, Megan, Akpunonu, Peter. (2009). A statewide prescription monitoring program affects emergency department prescribing behaviors. *Annals of Emergency Medicine, 51(*1), 19-23.	Community/ Environment	Over-prescribing pain medication	Use of narcotic registry and PDMP by prescribers	Prescription Drug Monitoring Program (PDMP) data use by prescribers (doctors and health care professionals)	Patient age, ethnicity, gender, insurance status, employment, and chief complaint	18 prescribers of 199 emergency department patients with painful conditions	Quasi-experimental, surveys of prescribers before and after reviewing Ohio Automated Rx Reporting System (OARRS) data and prescribing (or not) to patient	Patterns of prescribing pain medication for emergency room patients	High numbers of narcotics prescribed. Physicians changed their opioid prescription- writing behavior in 41% of prescriptions. Specifically, they changed the number of prescriptions per patient after reviewing OARRS data, resulting in fewer or no opioid medicines prescribed in 61% of prescriptions over a one year period.	(1) Study completed at a single institution; (2) few and uneven practice of prescribers (4 treated 63% of patients in study); (3) possible Hawthorne effect (people alter their behavior due to an awareness of being studied).

Author(s), Article title	Domain (Individual, Family, School, Peer, and Community/ Environment)	Risk Factor(s)	Protective Factor(s)	Type of Intervention	Other Independent Variable(s)	Sample Characteristics (Target Population)	Study Design (Instrument and Time Frame)	Outcomes Measure(s)	Key Finding(s)	Study Limitations
Clark, Heddy Kovach, Ringwalt, Chris L., Hanley, Sean, Shamblen, Stephen R., Flewelling, Robert L., Hano, Mary C. (2010) Project SUCCESS' effects on the substance use of alternative high school students. *Addictive Behaviors, 35,* 209–217.	Individual	Behavioral problems; past 30-day use of alcohol, marijuana, and illegal drugs, including NMUPD	None discussed	*Project Success,* a prevention education program for high-risk secondary school students	Age, gender, race, and ethnicity; school (urban) and percentage of students in school receiving free/reduced lunch	High-risk high school students at one of 14 alternative high schools in Washington	Random-assignment control study; longitudinal design for two cohorts; survey administered at baseline, program end, and one-year follow-up; hierarchical linear modeling was the primary analysis	30-day use of alcohol, marijuana and illegal drugs (including NMUPD)	Students in the control (non-*Project Success*) group had lower use of illegal drugs, excluding marijuana, than those in the intervention group at post-test. The effect did not persist at follow-up.	(1) Power of sample was small; (2) program participation rates were low compared to other studies of *Project Success;* (3) implementation challenges

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Cochella, Susan, Bateman, Kim. (2011) Provider detailing: An intervention to decrease prescription opioid deaths in Utah. *Pain Medicine, 12,* S73–S76.	Community	Unsafe prescribing practices of opioid prescription drugs	None discussed	46 face-to-face presentations highlighting six recommended prescribing practices were presented to health care workers throughout Utah; clinic-based presentations including use of prescription database	Not applicable	581 physicians attended presentations: follow-up surveys post intervention: baseline (n=366), 1 month (n=82), 6 month (n=29)	One-hour presentation; three survey administration periods [baseline, 1-month, and 6-months post presentation (August of 2008 and October of 2009).	(1) Confidence in prescribing practices; (2) degree to which providers had adopted the six recommended practices; (3) other behavior change in opioid-related practices	(1) The number of unintentional overdose deaths in Utah involving prescription opioid medications dropped 14% in 2008 from 2007; (2) overall, 60–80% of respondents reported avoiding prescribing long-acting opioids for acute pain, or with sleep aids or benzodiazepines; (3) providers who participated in the project reported improvements in their prescribing behaviors and increased confidence in their ability to describe the epidemic and safe prescribing behaviors	(1) Other efforts aimed at decreasing opioid-related deaths were implemented simultaneously and could be responsible for the improvement in the number of deaths; (2) lack of ongoing funding in that the intervention was supported by a one-time state grant; and (3) low response rates on provider surveys.

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Fang, Lin, Schinke, Steven P., Cole, Kristin C.A. (2010) Preventing substance use among early Asian–American adolescent girls: Initial evaluation of a Web-based, mother–daughter program. *Journal of Adolescent Health, 47,* 529–532.	Individual, Family	Peer and psychological risks (depression and low self-efficacy)	Close maternal relationship; parental monitoring; rules against substance use	Nine-session (45 minutes each) Web-based substance use prevention program delivered via voiceover narration, animated graphics, and games; session content includes skill demonstrations and interactive exercises that require the joint participation of mothers and daughters; mother/daughter dyads were asked to complete one session per week	(1) Alcohol use; (2) cigarette use; (3) marijuana use; (4) NMUPD; (5) depression; (6) self-efficacy; (7) refusal skills; (8) mother/ daughter closeness; (9) mother/daughter communication; (10) maternal monitoring; (11) family rules against substance use; (12) intention to use substances in future	108 Asian American mother/daughter dyads; control group n=50, intervention group n=54; girls' age: control group 13.25 years, intervention 12.99 years; mothers' age: control 41.06 years, intervention 39.42 years.	September and December 2007; randomized control trial; pretest and posttest measurements; Intervention groups completed a 9-session Web-based substance use prevention program; generalized estimating equations	(1) Alcohol use; (2) cigarette use; (3) marijuana use; (4) NMUPD; (5) intention to use substances in future	Participants in a family-oriented, Web-based substance use prevention program at posttest showed less depressed mood, and improved self-efficacy and refusal skills; had higher levels of mother-daughter closeness, mother-daughter communication, and maternal monitoring, and reported more family rules against substance use compared to comparison group. They also reported fewer instances of alcohol, marijuana, and illicit prescription drug use in past 30 days and expressed lower intentions to use substances in the future.	(1) Intervention program was delivered in English and was inaccessible to non-English speaking participants; (2) participating mother/daughter dyads were required to have computer access at home; (3) online recruitment; (4) program content was not designed expressly for Asian Americans and lacked cultural specificity

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Gruenewald, Paul J., Johnson, Knowlton, Shamblen, Steven R., Ogilvie, Kristen A., Collins, David. (2009). Reducing adolescent use of harmful legal products: Intermediate effects of a community prevention intervention. *Substance Use Misuse, 44*(14), 2080–2098.	Community/ Environment, School.	(1) Peer group approval and use; (2) Lifetime substance use	Lack of availability among peers; lack of formal availability in retail establishment; refusal skills for teens	*ThinkSmart:* 15 sessions taught as weekly one-hour sessions or bi-weekly 30- minute sessions in fifth and sixth grade health classes. *Think Smart* has two primary components: (1) environmental strategy (ES) to reduce access to reduce access to harmful legal products (HLPs), including legal prescription, non-prescription, and over-the-counter drugs as well as household products found at home, in schools, and from retail outlets; and (2) school-based curriculum intended to enhance knowledge about HLP use and problems, and to improve refusal skills and assertiveness.	(1) Intent to use and use of HLPs; (2) cognitive and social-behavioral measures [(a) knowledge of HLPs use and consequences, (b) refusal skills, (c) assertiveness, (d), Native Alaskan cultural identify, (e) peer normative beliefs, (f) peer use]	Fifth, sixth, and seventh grade students in all schools in all three rural Alaskan communities; Pre-test n=336, post-test n=286	Pretest- post-test design; fifth, sixth, and seventh grade students in all schools in all three rural Alaskan communities; Pretest surveys given in classrooms in each school, the ES and *ThinkSmart* interventions were fielded, then a posttest was given one year later; Hierarchical Generalized Linear Models and Hierarchical Linear Models used to analyze data	(1) Cognitive and social-behavioral characteristics of students related to HLP use; (2) perceived availability of HLPs from several environmental sources	An effective community prevention model for the reduction of HLP use incorporates environmental strategies to reduce supply of HLPs in combination with a cognitive-behavioral life skills curriculum that focuses on demand reduction. Evidence was found for significant increases in knowledge about HLP use and risks, and decreases in perceived availability of HLP products in the home and at school. These effects were differentiated across grade groups, reflecting differential exposure to the *ThinkSmart* program.	(1) No comparison group used; (2) only assessed three rural Alaskan communities; (3) doesn't differentiate between outcomes for prescription drugs versus other HLPs

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Johnson, Erin M., Porucznik, Christina A., Anderson, Jonathan W., Rolfs, Robert T. (2011) State-level strategies for reducing prescription drug overdose deaths: Utah's prescription safety program. *Pain Medicine, 12,* S66–S72.	Community/ Environment	Non Applicable	Knowledge of potential dangers of prescription pain medication	Utah has used a multipronged approach to address problems related to prescription opioid use by educating providers, patients, and the general public to increase knowledge of the potential dangers of prescription pain medication. The Utah Department of Health's Prescription Pain Medication Program includes two intervention strategies: (1) a statewide media campaign targeting adults ages 25-54, including its "Use Only As Directed" website; and (2) clinical educational materials, including the development and distribution of opioid prescribing guidelines, bookmarks, patient information cards, and posters.	Not applicable	Utah residents aged 18 and older [pre-campaign (n = 413) and post-campaign (n = 410)]	Random pretest/posttest design; two telephone-based public opinion surveys: (1) pre-campaign survey (baseline data, guided development of program goals, and campaign materials), and (2) post-campaign survey to evaluate any changes in public awareness, opinions, and behaviors related to prescription pain medications). February 2008-May 2009. Responses from identical questions on the pre- and post-campaign were compared using tests of proportions.	(1) Public awareness, opinions, and behaviors related to prescription drug behaviors; (2) prescription drug mortality	The state-funded educational campaign may have contributed to a reduction in overdose deaths. Collaboration among state agencies are important aspects of a successful prevention campaign. Other findings: 52% of respondents said media messages made them less likely to share their prescription medications; 51% said that media messages made them less likely to take prescription medications not prescribed to them; and 29% reported an increased understanding of the dangers of prescription pain medication during the past year.	(1) Program interventions lacked a method to demonstrate a causal linkage between the program and improvements in public health; (2) a lack of monitoring or evaluation framework to assess program impact meant that outcomes were reported based on descriptions; (3) duration of the program was insufficient to monitor output or consequences to establish any longitudinal trends.

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Johnson, Knowlton W., Shamblen, Stephen R., Ogilvi, Kristen A., Collins, David, Saylor, Brian. (2009). Preventing youths' use of inhalants and other harmful legal products in frontier Alaskan communities: A randomized trial. *Prevention Science, 10*, 298–312.	Individual, School, Peer, Community/ Environment	(1) Peer use of HLPs; (2) peer normative beliefs about HLPs	(1) Refusal skills; (2) knowledge of drug-related consequence; (3) assertiveness skills; (4) cultural identity	*ThinkSmart,* designed to reduce use of harmful legal products (HLPs, such as inhalants and over-the-counter drugs), alcohol, tobacco, and other drugs among fifth- and sixth-grade students in frontier Alaska. The curriculum consisted of 12 core sessions and 3 booster sessions administered 2- 3 months later. *ThinkSmart* targets six risk and protective factors: (1) refusal skills, (2) peer use of HLPs, (3) peer normative beliefs about HLPs, (4) knowledge of drug-related consequences, (5) assertiveness skills, (6) cultural identity	(1) School characteristics; (2) community characteristics; (3) student characteristics; (4) school dynamics	Student survey administered in a classroom setting in14 communities; student participation: Wave 1=460, Wave 2= 401, Wave 3= 428	A two-group, randomized, matched-control trial with nested repeated measures of youth (fifth and sixth grades); three waves of data collection: (1) collected prior to *Think Smart* implementation, (2) survey post booster session, and (3) 6-month follow-up survey. October 2006- May 2007.	Past 30-day HLPs use of (a) inhalants, (b) prescription medicine, (c) over-the-counter medications, and (d) common household products, and/or other drug use (tobacco, alcohol, and marijuana or hashish).	*Think Smart* curriculum significantly reduced use of harmful legal products, including legal prescription, non-prescription and over-the-counter drugs as well as household products found at home, in schools, and from retail outlets, at six month assessment after completing the curriculum; inhalant use reduction was most prevalent. This curriculum, however, did not directly impact youths' use of tobacco, alcohol, and marijuana. The risk and protective factors measured did not mediate *Think Smart* effects on reduced substance use among youth.	(1) Unmeasured risk and protective factors may have mediated *Think Smart* curriculum effects on HLPs and other drug use among youth in the study communities; (limited generalizability—findings based on sample of Alaskan native fifth and sixth grade students)

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Johnson, Knowlton, Holder, Harold, Ogilvie, Kristen, Collins, David, Courser, Matthew, Miller, Brenda, Moore, Roland, Saltz, Bob. (2007). A community prevention intervention to reduce youth from inhaling and ingesting harmful legal products. *Journal of Drug Education, 37*(3), 227-247.	Community/ Environment and School- based	Availability of harmful but legal products including prescription drugs	(1) Rules and regulations in businesses, homes, and schools; (2) anti-drug norms in community, family, school; (3) social influence, life skills, and cultural identity	Comprehensive community-based prevention intervention including: (1) community mobilization (readiness assessment, building and expanding base, developing and implementing a plan of action and seeking feedback, dissemination and sustaining efforts; (2) environmental strategies including retail strategies, home strategies, and school environmental strategies; and (3) school-based prevention education, including the *Think Smart* curriculum, to address risk factors, social influences, intrapersonal factors, and cultural competence		Four Alaska communities with populations ranging from 3,500 to 9,000	Pre- and post-studies of each intervention strategy; mobilization was assessed through in-person interviews pre and post; retail strategies tested using pre- and post- youth purchase attempts at retail stores; home strategy assessed with post surveys of attendees at a family night; and pretest and posttest surveys of teachers/staff assessed the school environment. *Think Smart* curriculum was assessed through pre- and post-observer reports and student surveys of fifth and sixth grade students (number and demographics not presented)	Availability and attitudes of legal but harmful products and substances in four communities	Developing a community-wide community prevention is feasible in Alaskan communities	Study is primarily descriptive of intervention rather than an empirical test of the intervention

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Looby, Alison, De Young, Kyle P., Earleywine, Mitch. (2013, in press). Challenging expectancies to prevent nonmedical prescription stimulant use: A randomized, controlled trial. *Drug Alcohol Dependence, 132,* 362-268.	Individual	College students with (a) involvement in a fraternity or sorority, (b) grade point average below 3.5, (c) binge drinking in the past two weeks, (d) past-month cannabis use	Perceived harmfulness of stimulant use	A mock study was used as a means of intervening with college students. Participants received a placebo that they were told was methylphenidate and asked to complete tasks and then assess their mood and cognitive abilities. During a second visit, the participants were told about the placebo and given a broad didactic lecture and discussion on expectancy effects and informed about the risks of drug use. The effect on drug use over six-months was assessed.	(1) Demographics, [(a) gender, (b) age, (c) years of education, (d) grade point average, (e) ethnicity, (f) Greek (fraternity/ sorority) involvement]; (2) expectancies [(a) cognitive enhancement, (b) anxiety and arousal, (c) social enhancement, (d) guilt and dependence]; substance use: [(a) binge drinking, (b) alcohol abuse and dependence, (c) marijuana abuse and dependence]	96 at-risk, stimulant-naïve college students [Eligibility: between 18-25 years, current enrollment in college, lifetime nonuse of any prescription stimulant medication and at least two relevant risk factors: (a) involvement in a fraternity or sorority, (b) grade point average below 3.5, (c) binge drinking in the past 2 weeks, (d) past-month cannabis use. The average years of education was 13.49, race/ ethnicity was Caucasian (71%), African American (8%), Hispanic (8%), Asian (4%), mixed race (4%), and Native American (1%).	Study examined the efficacy of a randomized controlled expectancy challenge intervention to prevent nonmedical prescription stimulant use; randomized control trial [intervention (n=47)]; three sessions (2 laboratory visits and 1 online follow-up); all participants completed the Prescription Stimulant Expectancy Questionnaire-II (PSEQ-II, 45-item measure that assesses prescription stimulant expectancy effects) at baseline; participants randomized to an expectancy challenge (EC) or a control condition; all participants were contacted by email 6 months after their second visit and asked to complete an online survey regarding NPS over the past 6 months; linear mixed-effects modeling	(1) Past 6-month nonmedical prescription stimulant use including: (a) incidence, (b) frequency, (c) specific drug used, (d) motivations for use; and (2) prescription stimulant-related expectancy effects	The expectancy challenge successfully modified expectancies related to prescription stimulant effects. Nevertheless, this intervention group and a control group showed comparable rates of nonmedical prescription use at 6-month follow-up. However, negative expectancies were significant predictors of reduced odds of future use.	(1) Use of homogeneous sample (at-risk college students); (2) short study timeframe (6 months)

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Ogilvie, Kristen A., Moore, Roland S., Ogilvie, Diane C., Johnson, Knowlton W., Collins, David A., Shamblen, Stephen R. (2008) Changing community readiness to prevent the abuse of Inhalants And other harmful legal products In Alaska. *Journal of Community Health, 33*(4), 248–258.	Community/ Environment	None discussed	None discussed	Assessing community mobilization using the Community Readiness Model (CRM) as part of a multi-stage community mobilization strategy to engage community leaders, retailers, parents, and school personnel in preventing youth use of inhalants and other harmful legal products in rural Alaska	Not applicable	Four participating communities typical of regional centers in rural Alaska; populations range from about 3,000 to 9,000p two communities have a majority Alaska Native population, the other communities' populations are over 20% Alaska Native	Used a modified CRM assessment tool; 32 baseline (February and March 2005) and 34 post intervention (October 2006); community readiness assessment interviews with key informants in four rural Alaskan communities 20 months after a community mobilization strategy had been implemented; interviews were coded and analyzed using CRM methods to yield readiness scores; aggregate results were analyzed using hierarchical linear modeling and individual community scores were analyzed in the context of the overall study	(1) Community readiness; (2) dimension readiness	The Community Readiness Model proved a useful tool in the Alaska Harmful Legal Products (HLP) prevention study. This short-term feasibility study demonstrated the potential value of CRM as an integral part of a community mobilization strategy for prevention, as a guide for the intervention in a multi-community research study, and as a mode of feedback for the participating communities.	(1) No control group(s) were used; (2) only four rural Alaskan communities were assessed; (3) outcomes for substance use were not assessed

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Paulozzi, Leonard J., Kilbourne, Edwin M., Desai, Hema A. (2011), Prescription drug monitoring programs and death rates from drug overdose. *Pain Medicine, 12,* 747–754.	Community/ Environment	None discussed; reviewers infer over and/or inappropriate prescribing and doctor-shopping	None discussed	State prescription drug monitoring programs (PDMPs)	(1) Median age of the population; (2) proportions of racial groups in population; (3) median household income; (4) percentages of high school and college graduates by state and year; (5) proportions of state populations living in counties; (6) state- and year-specific retail distributions of prescription opioids; (7) state- and year-specific quantities of seven of the most commonly prescribed opioid drugs; (8) morphine milligram equivalents; (9) presence or absence of an operational PDMP and "proactive" PDMPs	51 jurisdictions (50 states and DC)	U.S. mortality data by state and by year for 1999–2005 were obtained from multiple cause of death mortality files produced by the National Center for Health Statistics; additional data included: (1) Wide-ranging Online Data for Epidemiologic Research (WONDER) system, (2) Automation of Reports and Consolidated Orders System (ARCOS) of the U.S. Drug Enforcement Administration.	The effects of PDMPs over time on: (1) drug overdose mortality; (2) opioid overdose-related mortality; (3) morphine milligram equivalents (MME)	For all states (with and without PDMPs) mean drug overdose and opioid-related overdose mortality rates rose substantially and consistently 1999–2005. PDMPs were not significantly associated with lower rates of drug overdose, opioid overdose mortality, or lower rates of consumption of opioid drugs. PDMP states consumed significantly greater amounts of hydrocodone and lower amounts of all other Schedule II opioids (i.e., oxycodone, fentanyl, etc.). Increases in overdose mortality rates and use of prescription opioid drugs between 1999-2005 were significantly less in PDMP states that required use of special prescription forms.	(1) Studies at the population level are unable to identify associations at the individual level; (2) adjustment for other factors that were more difficult to quantify. For example, patterns of treatment, preventive measures such as changes in state regulations, or the availability of street drugs, was not possible. Therefore, this study cannot rule out residual confounding that may have obscured a protective effect of PDMPs; (3) lack of pre/post design; (4) study could not evaluate the potential benefits other than prevention of overdose fatalities that might have resulted from PDMPs.

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Schinke, Steven P., Fang, Lin, Cole, Kristin C. (2009). Computer-delivered, parent-involvement Intervention to prevent substance use among adolescent girls. *Prevention Medicine, 49*(5), 429–435.	Individual, Family	None discussed	(1) Positive outcomes on communication with their mothers; (2) closeness to their mothers; (3) knowledge of family rules about substance use; (4) awareness of parental monitoring of their extracurricular activities; (5) ability to cope with stress; (7) recognition that adolescent substance use is not normative behavior; (8) drug refusal self-efficacy	Computer-delivered program for mother/daughter dyads to prevent substance use among adolescent girls	None discussed	Adolescent girls (ages 11-13) and their mothers from greater New York City area [mother-daughter dyads (n=916) enrolled]	Randomized clinical trial conducted in 2006, 2007, 2008, and 2009; baseline and two annual follow-up surveys; intervention participants received annual booster sessions after each follow-up measurement; nine 45-minute sessions; sessions were delivered through voice-over narration; skills demonstrations by animated characters; interactive exercises for mothers and daughters to complete jointly.	(1) Substance use; (2) risk and protective factors	At 2-year follow-up, girls who participated in computer-delivered prevention program reported higher protective factors as well as less past 30-day use of alcohol, marijuana, illicit prescription drugs, and inhalants. Mothers of participating girls showed more positive 2-year outcomes than mothers of girls who did not participate on variables linked with reduced risks of substance use among their daughters, and mothers reported lower rates of weekly alcohol consumption.	(1) Follow-up did not include highest risk years for substance abuse; (2) delivering program content by computer restricts the reach of the material to households equipped with personal computers; (3) sample was from a large urbanized region of the Northeastern U.S. limiting generalization; (4) mothers in sample were well-educated and may not typify parents in need of programs to prevent adolescent substance use

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Spoth, Richard, Trudeau, Linda, Shin, Chungyeol, Ralston, Ekaterina, Redmond, Cleve, Greenberg, Mark, Feinberg, Mark. (April 2013) Longitudinal effects of universal preventive intervention on prescription drug misuse: Three randomized controlled trials with late adolescents and young adults. *American Journal of Public Health, 103*(4), 665-672.	Family, School	For **Studies 1 and 3,** risk factors were initiated use of gateway drugs (alcohol, cigarettes or marijuana) at baseline; for **Study 2,** participants reported higher levels of baseline use so "high risk" was participants reported having initiated 2 out of 3 of these gateway drugs	Family and school environments, youth competencies	Brief universal (not targeted toward prescription drug prevention) interventions. **Study 1** looked at family-based interventions and assigned participating schools to either (a) *Preparing for the Drug Free Years (PDFY)* which emphasizes adolescent refusal skills or (b) *the Iowa Strengthening Families Program (ISFP)* which strengthens family protective factors or (c) a control group. **Study 2** assigned participating schools to either (a) a multi-component family- and school-based intervention, which combined the ISFP with *Life Skills Training* (LST) in school; (b) a school-only LST intervention group or (c) a control group. **Study 3** assigned participating schools to either (a) *PROmoting School-community-university Partnerships to Enhance Resilience* (PROSPER) model which links community teams, public schools, and	None discussed.	Middle school students from rural communities in Iowa and Pennsylvania in three studies. **Study 1:** 446 families of sixth graders from communities with fewer than 8500 residents and more than 15% school free or reduced lunch. **Study 2:** seventh graders (n=226 families) from 24 schools in districts with enrollments of fewer than 1200 students of whom 20% or more were free or reduced lunch. **Study 3:** Two consecutive cohorts of sixth graders and families (n=1064 families) from 28 school districts ranging in size from 1300 to 5200 students with at least 15% free and reduced lunch.	Three randomized controlled trials with adolescents are presented. **Study 1** (1993-2008) data collected by written questionnaires during home visits until twelfth grade and telephone interviews after twelfth grade. **Study 2** (1998-2011) data collected via 45-minute machine-scored questionnaires administered during school class periods, grade 7-12, and follow-up via telephone surveys. **Study 3** (2002-2009), machine-scored questionnaires during school class periods.	Prescription drug misuse assessed using questions about lifetime use of barbiturates, tranquilizers, amphetamines, narcotics. Prescription drug misuse overall was identified by an index if any of the above four drug categories had been used without a doctor's orders. Prescription opioid misuse was analyzed separately.	These brief universal interventions had potential impact of reducing prescription drug misuse among adolescents and young adults in comparison to control sample in all three studies. Significant differences between groups were found for both high-risk and low-risk populations for studies one and three, though for study 2 the high-risk sample showed stronger effects.	Difficult to generalize to non-rural populations in other parts of country

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				Cooperative Education System of land-grant universities to implement the ISFP curriculum or (b) a control group.						

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Spoth, Richard, Trudeau, Linda, Shin, Chungyeol, Redmond, Cleve. (2008). Long-term effects of universal preventive interventions on prescription drug misuse. *Addiction, 103,* 1160–1168.	Individual, Family, School	None discussed	Family and school preventive interventions; combination of the family-focused and school-based universal interventions (stronger)	**Study 1: Family-focused interventions:** Schools assigned to the *Iowa Strengthening Families Program (ISFP), Preparing for the Drug Free Years (PDFY),* or a control condition. **ISFP**: 7x sessions focused on family risk and protective factors, **PDFY:** 5x 2-hour sessions, focused on risk and protective factors for substance use; **Study 2: Multi-component family-focused and school-based Intervention:** schools were assigned to the school-based *Life Skills Training (LST)* plus a revised ISFP (SFP 10–14), or a control condition. **LST:** 15 sessions taught by trained teachers during 40–45-minute regular classroom periods and 5x boosters 1 year later, focused on self-improvement, decision-making, coping with anxiety, cognitive and social skills training components.	(1) Substance use measures: (a) tobacco (cigarettes), (b) alcohol (c) marijuana; (2) family demographics: (a) average number of children, (b) dual-parent family, (c) average family income, (d) race; (3) school/ community characteristics: (a) enrollment, (b) number of classrooms, (c) student achievement ranks, (d) attendance, (e) school lunch program eligibility rates, (f) population	Randomized controlled trials of universal preventive interventions implemented in rural Iowa communities with mostly White middle-income middle school students. **Study 1:** Study began in 1993, with 667 sixth graders; follow-ups with twelfth graders and 21 year-olds, included 457 and 483 participants **Study 2**: Study began in 1998 with seventh graders (total sample across waves 2127); follow-ups with eleventh- and twelfth graders included 1443 and 1212 participants.	Two randomized controlled prevention trials; **Study 1**: 60- to 80- minute home interviews with adolescent and parents, follow-up (twelfth grader), completed computer-assisted telephone interviews	Self-reports of lifetime and past-year prescription drug misuse	Universal interventions have potential for public health impact by reducing some types of prescription drug misuse among adolescents and young adults: **Study 1**: *ISFP* twelfth graders' past year narcotic misuse was significantly less than controls, as were ISFP 21-year-olds' life-time narcotic and barbiturate misuse rates. **Study 2:** *LST* plus *SFP* 10-14 showed significant effects on lifetime prescription drug misuse at the eleventh grade follow-up, while effects at the twelfth grade follow-up were marginally significant.	(1) Generalizability to other populations unknown; (2) small numbers of participants reported prescription drug misuse, so use rates are sensitive to small changes in numbers of users

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Twombly, Eric C., Holtz, Kristen D., Agnew, Christine B. (2011). Resonant messages to prevent prescription drug misuse by teens. *Journal of Alcohol and Drug Education, 55*(1), 38-52.	Community/ Environment	None discussed.	None discussed	Prescription drug misuse prevention message strategies		Two focus groups with eight seventh graders and eight eighth graders in Atlanta metropolitan area in March 2009; no racial, gender or other demographic information about the participants or their school is provided nor do authors indicate how this sample was recruited	Focus group with seventh and eighth grade students based on twenty drug prevention messages within nine categories	A three-fold categorization (highly resonant, moderately resonant, or not resonant) which define the extent to which a student reports a message may influence him or her and peers to refrain from misusing prescription drugs	Students reported that messages with positive alternatives and refusal skills had little resonance, but scare tactic messages resonated strongly.	Not generalizable

REFERENCES

Baehren, D.F., Marco, C.A., Droz, D.E., Sinha, S., Callan, M., & Akpunonu, P. (2009). A Statewide Prescription Monitoring Program Affects Emergency Department Prescribing Behaviors. *Annals of Emergency Medicine*, *51*(1), 19-23.

Center for Substance Abuse Prevention. *Identifying and Selecting Evidence-Based Interventions Revised Guidance Document for the Strategic Prevention Framework State Incentive Grant Program*. HHS Pub. No. (SMA)09-4205. Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2009.

Clark, H.K., Ringwalt, C.L., Hanley, S., Shamblen, S.R., Flewelling, R.L., & Hano, M.C. (2010). Project SUCCESS' effects on the substance use of alternative high school students. *Addictive Behaviors*, *35*, 209–217.

Cochella, S. & Bateman, K. (2011). Provider Detailing: An Intervention to Decrease Prescription Opioid Deaths in Utah. *Pain Medicine, 12*, S73–S76.

Fang, L., Schinke, S.P., & Cole, K.C.A. (2010). Preventing Substance Use Among Early Asian–American Adolescent Girls: Initial Evaluation of a Web-based, Mother–Daughter Program. *Journal of Adolescent Health, 47*, 529–532.

Gruenewald, P.J., Johnson, K., Shamblen, S.R., Ogilvie, K.A., & Collins, D. (2009). Reducing Adolescent Use of Harmful Legal Products: Intermediate Effects of a Community Prevention Intervention. *Substance Use & Misuse, 44*(14), 2080–2098.

Johnson, E.M., Porucznik, C.A., Anderson, J.W., & Rolfs, R.T. (2011). State-Level Strategies for Reducing Prescription Drug Overdose Deaths: Utah's Prescription Safety Program. *Pain Medicine, 12*, S66–S72.

Johnson, K.W., Shamblen, S.R., Ogilvi, K.A., Collins, D., & Saylor, B. (2009). Preventing Youths' Use of Inhalants and Other Harmful Legal Products in Frontier Alaskan Communities: A Randomized Trial. *Prevention Science, 10*, 298–312.

Johnson, K., Holder, H., Ogilvie, K., Collins, D., Courser, M., Miller, B., Moore, R., & Saltz, B. (2007). A Community Prevention Intervention to Reduce Youth from Inhaling and Ingesting Harmful Legal Products. *Journal of Drug Education, 37*(3), 227-247.

Looby, A., De Young, K.P., & Earleywine, M. (2013, in press). Challenging expectancies to

prevent nonmedical prescription stimulant use: A randomized, controlled trial. *Drug and Alcohol Dependence, 132*, 362-268.

Ogilvie, K.A., Moore, R.S., Ogilvie, D.C., Johnson, K.W., Collins, D.A., & Shamblen, S.R. (2008). Changing Community Readiness to Prevent the Abuse of Inhalants and Other Harmful Legal Products in Alaska. *Journal of Community Health, 33*(4), 248–258.

Paulozzi, L.J., Kilbourne, E.M., & Desai, H.A. (2011). Prescription Drug Monitoring Programs and Death Rates from Drug Overdose. *Pain Medicine, 12*, 747–754.

Schinke, S.P., Fang, L., & Cole, K.C. (2009). Computer-Delivered, Parent-Involvement Intervention to Prevent Substance Use among Adolescent Girls. *Preventive Medicine, 49*(5), 429–435.

Spoth, R., Trudeau, L., Shin, C., Ralston, E., Redmond, C., Greenberg, M., & Feinberg, M. (2013) Longitudinal Effects of Universal Preventive Intervention on Prescription Drug Misuse: Three Randomized Controlled Trials With Late Adolescents and Young Adults. *American Journal of Public Health, 103*(4), 665-672.

Spoth, R., Trudeau, L., Shin, C., & Redmond, C. (2008). Long-term effects of universal preventive interventions on prescription drug misuse. *Addiction, 103*, 1160–1168.

Twombly, E.C., Holtz, K.D., Agnew, C.B. (2011). Resonant Messages to Prevent Prescription Drug Misuse by Teens*. Journal of Alcohol & Drug Education, 55*(1), 38-52.