CAPT Decision-Support Tools

PREVENTING PRESCRIPTION DRUG MISUSE:

Overview of Factors and Strategies

Using Prevention Research to Guide Prevention Practice

SAMHSA's Center for the Application of Prevention Technologies

Updated May 2016

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OVERVIEW

The nonmedical use of prescription drugs (NMUPD) has become an increasing public health concern in the United States, with abuse rates rising rapidly since the late 1990s. Yet preventing and reducing prescription drug misuse represents a major challenge for several reasons. First, we know less about the factors that contribute to NMUPD than about those that contribute to other drug use. Also, because of how prescription drugs are made available, these factors may differ from those that are associated with alcohol misuse and illicit drug use. Another major challenge is the fact that prescription drugs offer important health benefits, in addition to presenting risks. Prevention strategies, therefore, are often more restrained and less known than those targeting alcohol and illicit drug use; and involve key intermediaries different from those who supply alcohol and other drugs. Moreover, because NMUPD prevention is a relatively new field, few strategies have been subjected to evaluation.

Building on past and current work at the state and local level, SAMHSA's Center for the Application of Prevention Technologies (CAPT) has developed two decision-support tools that highlight factors and strategies associated NMUPD. These include:

- ***Preventing Prescription Drug Misuse: Understanding Who Is at Risk***, which summarizes information from cross-sectional and longitudinal studies on factors that have been shown to either increase risk of or protect against NMUPD.
- ***Preventing Prescription Drug Misuse: Programs and Strategies***, which provides brief summaries of substance abuse prevention strategies and associated programs that have been evaluated to determine their effects on NMUPD.

Each tool is based on a review of the literature; guidelines for the reviews are described in their respective tools.

HOW THE TOOLS ARE ORGANIZED

The two tools are organized differently. The first tool, *Preventing Prescription Drug Misuse: Understanding Who Is at Risk,* is organized according to the **socio-ecological model**, a multi-level framework that allows us to consider the different contexts in which risk and protective factors exist. This model considers the different contexts and settings with which a person interacts and is based on the premise that we are influenced not only by traits specific to us or what we think and believe, but by our relationships with others, the institutions and communities to which we belong, and the broader society in which those institutions are embedded.

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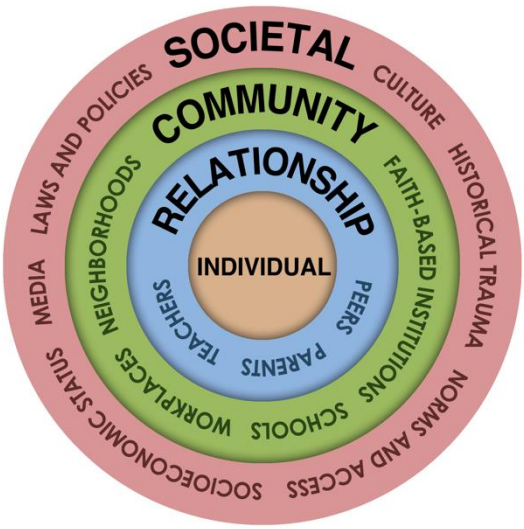
There are four levels to the socio-ecological model: [1, 2, 3]



- **Individual level**: Includes factors specific to the individual, such as age, education, income, health, and psychosocial problems, which may correspond with substance use and misuse.
- **Relationship level**: Includes an individual's closest social circle—family members, peers, teachers, and other close relationships—that contribute to his or her range of experiences and that may influence his or her behavior.
- **Community level**: Includes the settings in which social relationships occur, such as schools, workplaces, and neighborhoods. These factors can have both negative and positive associations with substance use and misuse.
- **Societal level**: Includes the broad societal factors, such as social and cultural norms. Other significant factors operating at this level include the health, economic, educational, and social policies that contribute to economic and/or social inequalities between populations.

Factors that influence future behavior are often categorized as either risk or protective factors. Here, a *protective factor* is a characteristic operating at the individual, relationship, community, or societal level that is associated with a lower likelihood of NMUPD or that reduces the negative impact of a risk factor on NMUPD. Conversely, a *risk factor* is a characteristic at each level of the socio-ecological model that precedes and is associated with a higher likelihood of NMUPD.[4]

The second tool, *Preventing Prescription Drug Misuse: Programs and Strategies,* is organized according to five categories similar to those listed in the national *Prescription Drug Abuse Prevention Plan*,[5] which calls for education, monitoring, proper disposal, and enforcement. We added an additional category—harm reduction—to highlight programs and strategies that reduce the likelihood of overdose and overdose consequences. Because our search yielded no evaluation studies of enforcement strategies, we eliminated that category. It is important to note, however, that enforcement stakeholders are involved with implementing many programs that are not explicitly designated as "enforcement," such as prescription drug take-back programs and prescription drug monitoring programs. We also added a

[1] Centers for Disease Control and Prevention, 2015
[2] World Health Organization, 2016
[3] Domains and sub-domains of the socio-ecological model often overlap or are nested within each other. For example, bullying is an individual-level risk factor that falls under the interpersonal behavior sub-domain; however, bullying in a school setting could also be considered a community-level risk factor that falls under the school sub-domain.
[4] O'Connell, Boat, & Warner, 2009
[5] US Executive Office of the President, 2011

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multi-component category because some strategies were combined and evaluated together, and the outcomes of those studies cannot necessarily be attributed to one specific strategy.

Specifically, strategies are organized into the following categories:

- **Education** is implemented to increase awareness of prescription drug misuse dangers for the public and health care providers. It also provides opportunities to teach individuals how to properly dispense, store, and dispose of controlled substances.
- **Tracking and monitoring** helps detect "doctor shoppers" and identify prescribers who have aberrant prescribing practices. The objective of tracking and monitoring is to reduce access and availability of prescription drugs to those who would misuse them.
- **Proper medication disposal** provides ways for people to safely and responsibly get rid of controlled substances that they have in their household. The objective of proper medication disposal is to limit access and availability, as well as raise awareness of prescription drug misuse.
- **Harm reduction** mitigates risks associated with prescription drug misuse and overdose. These strategies are not necessarily focused on preventing drug misuse, rather they are designed to reduce death, disability, and other negative consequences associated with prescription drug misuse and overdose.
- **Multi-component** programs combine more than one type of strategy in order to address multiple risk factors (e.g., lack of awareness, perceptions of harm, access and availability, overdose antidote use) associated with prescription drug misuse and overdose.

UNDERSTANDING WHO IS AT RISK

Our search of the literature yielded many more risk than protective factors. In addition, the majority of factors are situated at the individual level of the socio-ecological model, which focuses on an individual's personal experience rather than contextual factors. We also found studies that included populations across the whole lifespan, ranging in age from 12 years old to over 70, and focused on special population groups or groups at increased risk for NMUPD and other types of substance abuse (such as homeless young adults, veterans, active duty service members, lesbian and gay youth, cancer patients, and Medicaid recipients). In addition, while our literature search included search terms that encompass various types of prescription drugs, the class of drug that was represented most frequently in the identified studies was opioids.[6] Here is what we found at the specific socio-ecological levels:

[6] For more information on search terms and inclusion criteria, see *Preventing Prescription Drug Misuse: Understanding Who Is at Risk*.

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INDIVIDUAL-LEVEL FACTORS

At the individual level, individuals most at risk of NMUPD include those with a history of **mental illness** (i.e., history of depression,[7] posttraumatic stress disorder,[8] anxiety[9]), **acute and chronic pain** (i.e., having a current painful physical disorder,[10] chronic pain,[11] past-year back pain[12]), **physical health problems** (i.e., fatigue,[13] headaches[14]), and **heightened physiological reactions** to certain types of drugs (i.e., having a greater subjective euphoric reaction[15]). The link between pain, physical health problems, and opioid use seems likely because these drugs (e.g., opioids) are often prescribed to lessen pain.[16] It may be that people start by using opioids as prescribed, develop dependence, have a difficult time tapering off and, ultimately, find a way to access and use against original doctor's orders.[17] Having prescription drugs on hand may perpetuate NMUPD because evidence suggests that individuals who have access to prescriptions drugs[18] and who are prescribed opioids at a large dosage[19] or have multiple prescriptions[20] are at greater risk of NMUPD.

Having a past **history of other substance use or misuse** is also linked to NMUPD. People who have a history of substance use disorder, who use alcohol heavily, or who use illicit drugs are more likely to engage in NMUPD. These individuals have already engaged in risky behaviors; they have initiated substance use and some are abusing other substances. This finding also suggests that those who misuse prescription drugs are more likely to also be polydrug users.[21] It may also suggest that these individuals may benefit from prevention messages and interventions other than those that specifically target NMUPD. A broader, more comprehensive approach to preventing substance misuse in general may be appropriate to those in this category exhibiting risk for NMUPD.

Regarding protective factors, individuals who **commit to doing well**[22] and **finishing school**[23] are less likely to misuse prescription drugs. These include individuals who are current students,[24] have a high school diploma,[25] or have attended a prevention class.[26] Students who are committed to school and

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[7] Boscarino et al., 2010; Ford & Rigg, 2015; Grattan, Sullivan, Saunders, Campbell, & Von Korff, 2012; Koyyalagunta et al., 2013; Park & Lavin, 2010
[8] Mackesy-Amiti, Donenberg, & Ouellet, 2015
[9] Koyyalagunta et al., 2013; Mowbray & Quinn, 2015
[10] Edlund, Steffick, Hudson, Harris, & Sullivan, 2007; Sullivan et al., 2010
[11] Rosenblum et al., 2007
[12] Cepeda, Fife, Kihm, Mastrogiovanni, & Yuan, 2014; Edlund et al., 2010; Sullivan et al., 2010
[13] Koyyalagunta et al., 2013
[14] Edlund et al., 2010
[15] Bieber et al., 2008
[16] Haddox et al., 1997; Joranson, Ryan, Gilson, & Dahl, 2000
[17] Lankenau et al., 2012
[18] Edlund et al., 2014; Jeffery, Babeu, Nelson, Kloc, & Klette, 2013; Silva, Schrager, Kecojevic, & Lankenau, 2013
[19] Bohnert et al., 2011; Edlund, Steffick, Hudson, Harris, & Sullivan, 2007; Koyyalagunta et al., 2013; Sullivan et al., 2010
[20] Peirce, Smith, Abate, & Halverson, 2012
[21] McCabe & Teter, 2007; Sung, Richter, Vaughan, Johnson, & Thom, 2005
[22] Collins, Abadi, Johnson, Shamblen, & Thompson, 2011
[23] Arkes & Iguchi, 2008
[24] Arkes & Iguchi, 2008
[25] Arkes & Iguchi, 2008
[26] Ford & Rigg, 2015

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have a strong school bond are less likely to engage in risky behaviors. The Social Development Model[27] suggests that this occurs because once a student has strong school bonds, they conform to the norms and values of the school; if the school norms discourage substance use or misuse, then a strongly bonded student will more likely remain faithful to the norms and not engage in substance use. It is worth noting, however, that one study found that having a college degree was associated with higher likelihood of unintentional fatal opioid overdose at home for New York City residents.[28] This study differs from the other studies examining associations between academic achievement and NMUPD in that the sample studied included individuals who unintentionally overdosed on opioids at home or outside the home. It's possible that there is something about having a college education that propels opioid misuse at home rather than outside the home and requires further exploration.

Another common protective factor includes **perceptions about prescription drug misuse**. For example, if individuals don't think they are doing anything wrong when they take prescription drugs without a doctor's orders, then they are more likely to misuse them.[29] Conversely, those who are concerned about the dangers of prescription drugs are less likely to misuse them.[30] These findings mirror those from studies linking perception of harm and other kinds of substance abuse (e.g., alcohol).[31]

RELATIONSHIP-LEVEL FACTORS

At the relationship level, our inner circle of family and friends, with whom we are in direct contact and communicate most frequently, influence our attitudes and behaviors. Family, especially parents, can influence NMUPD among children both positively and negatively. For example, adolescent children whose **parents express disapproval** of substance use[32] or who have a **strong bond with their parents**[33] are less likely to misuse prescription drugs; adolescent children whose parents express favorable attitudes toward substance use, however, are more likely to misuse prescription drugs.[34]

Youth exposure to prescription drug use in the household environment can also influence their future drug use. For example, youth who have **witnessed a family member overdose** are more likely to overdose on prescription drugs themselves,[35] and youth who have accessed stimulants for the first time in their homes initiated NMUPD at a relatively early age.[36] Peer attitudes and behaviors also may be strongly associated with individuals' NMUPD. Young people who associate with a large number of friends that misuse prescription drugs are more likely to do the same compared to their counterparts.[37] Certain social networks and situations also trigger misuse. For example, compared to their counterparts, college students involved with fraternities and sororities were more likely to misuse

[27] Catalano & Hawkins, 1996
[28] Siegler, Tuazon, O'Brien, & Paone, 2014
[29] Collins, Abadi, Johnson, Shamblen, & Thompson, 2011
[30] Ford & Rigg, 2015
[31] Henry, Slater, & Oetting, 2005
[32] Collins, Abadi, Johnson, Shamblen, & Thompson, 2011
[33] Schroeder & Ford, 2012
[34] Ford & Rigg, 2015
[35] Silva, Schrager, Kecojevic, & Lankenau, 2013
[36] Kecojevic et al., 2012
[37] Collins, Abadi, Johnson, Shamblen, & Thompson, 2011; Ford & Rigg, 2015; Schroeder & Ford, 2012

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stimulants,[38] and Filipino-American respondents who experienced discrimination in their routine interactions were more likely to misuse prescription drugs.[39]

COMMUNITY-LEVEL FACTORS

At the community level, the settings where we live and work can influence the decisions we make and our subsequent behaviors. Research demonstrates that aspects of our neighborhoods where we live can influence misuse of prescription drugs. For youth ages 12 to 17, **moving three or more times in the past year** and/or living in an **urban environment** can increase the likelihood of misusing opioids.[40] In general, residential mobility or instability is associated with adverse childhood experiences[41] and can put a child at risk for developmental and social problems. Frequent mobility often disrupts routines and breaks social ties. When youth move, social capital shifts—they can lose social support and access to resources that can help them navigate developmental challenges.[42] In addition, research suggests that having a **Gay-Straight Alliance** in schools is protective for sexual and gender minority students in high school, and helps protect against prescription opioid and ADHD medication misuse.[43] **Community norms** that disapprove of NMUPD also protect against NMUPD: if the community as a whole disapproves of use (or if young people think that their community frowns upon NMUPD), young people in that community will be less likely to misuse prescription drugs.[44]

SOCIETAL-LEVEL FACTORS

Societal-level factors, at the outermost level of the socio-ecological model, encompass elements of the broader culture and policy context. Out of all the socio-ecological levels, we were able to find the fewest societal-level factors related to NMUPD, primarily because the research in this area is limited. The few factors we did find, however, reveal that some individuals may turn to substances to cope with environmental stressors. One stressor associated with increased likelihood of NMUPD is **discriminatory practices** directed toward individuals who are traditionally underrepresented or marginalized. Discriminatory events (i.e., "treated unfairly or badly" because of racial or ethnic status, speaking a different language, or speaking with an accent) and unfair treatment based on social status (i.e., being treated with less courtesy or respect than others; experiencing worse service at restaurants or stores; people acting "afraid of you," like "you are dishonest," or they are "better than you"; being called names or insulted; and being threatened or harassed) permeate society and can place individuals, relationships, social networks, and communities on the receiving end at risk for prescription drug misuse.[45]

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[38] Gallucci, Martin, Beaujean, & Usdan, 2015
[39] Gee, Delva, & Takeuchi, 2007
[40] Ford & Rigg, 2015
[41] Dong et al., 2005
[42] Anderson, Leventhal, Newman, & Dupéré, 2014
[43] Heck et al., 2014
[44] Collins, Abadi, Johnson, Shamblen, & Thompson, 2011
[45] Gee, Delva, & Takeuchi, 2007

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PREVENTION PROGRAMS AND STRATEGIES

Our literature search revealed 17 strategies that produced prescription drug-related outcomes. Most of the strategies (n=7) were categorized as "education" strategies; only one was categorized as an example of "proper medication disposal" (Prescription Drug Take-Back Programs). The remaining three categories—tracking and monitoring, harm reduction, and multi-component—contain three strategies each. Overall, the strategies span from a universal[46] to an indicated[47] focus. For example, many of the education strategies are universally focused with attention given to educating the general population on the dangers of prescription drug misuse, and teaching prescribers safer prescribing practices and guidelines. On the other hand, there are strategies designed for a more indicated population, such as those regarding naloxone distribution and education. These are designed not to prevent initiation, but to reduce negative consequences (e.g. overdose) for those who are already using. Below is additional detail on what we found.

EDUCATION

Given that opioids are one of the most commonly researched misused prescription drug,[48] many of the educational strategies our search yielded specifically focused on opioid misuse. Because most misused opioids derive from social sources (e.g., receiving controlled substances through family and friends for free[49]), educational strategies have focused—with some success—on reducing this kind of access. For example, parents who were taught the dangers of prescription drug misuse through interactive "family night" sessions were more likely to restrict access to prescription drugs in their household,[50] thus reducing opportunities for their children or other individuals to obtain the drugs for misuse. This program may also cultivate greater parental disapproval toward prescription drug misuse—an identified protective factor for youth.[51] In addition, a widespread media campaign implemented in Utah demonstrated that those who saw the media messages were less likely to share their prescription drugs and less likely to use prescription drugs that were not prescribed to them.[52] Although these educational strategies are not directly associated with misuse, they are linked to factors (e.g., lack of knowledge about the potential dangers of prescription opioid misuse, ease of access) that place people at potentially higher risk of NMUPD.

We also found several educational strategies that aimed to reduce access to and availability of prescription drugs for those who are likely to misuse them. These types of strategies typically targeted drug prescribers. In fact, evidence suggests that prescribers taught best practices for opioid prescribing and provided information regarding opioid dosing guidelines were more likely to safeguard against

[46] Interventions that target the general public and/or a whole population that has not been identified on the basis of individual risk.
[47] Interventions that target individuals at high risk who have minimal but detectable signs or symptoms of mental illness or substance use/misuse problems (prior to the diagnosis of a disorder).
[48] Zosel, Bartelson, Bailey, Lowenstein, & Dart, 2013
[49] Substance Abuse and Mental Health Services Administration, 2014
[50] Collins, Johnson, & Shamblen, 2012
[51] Collins, Abadi, Johnson, Shamblen, & Thompson, 2011
[52] Johnson, Porucznik, Anderson, & Rolfs, 2011

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potential patient misuse. For example, prescribers were less likely to prescribe opioids at high dosages when they were provided opioid dosing guidelines.[53] Physicians participating in educational presentations describing recommended prescribing practices also were less likely to prescribe long-acting opioids for acute pain and more likely to adopt other recommended practices.[54] Having a prescription for a controlled substance,[55] obtaining multiple prescriptions,[56] and having a large dosage prescribed[57] are all risk factors related to elements of prescription misuse.

TRACKING AND MONITORING

Tracking and monitoring strategies help law enforcement and regulatory agencies detect "doctor shoppers"[58] and identify prescribers who have unusual prescribing practices. The best-known example of tracking and monitoring interventions are prescription drug monitoring programs (PDMPs): electronic databases, which track prescribing and dispensing of opioid analgesics and other controlled substances. PDMPs allow prescribers to obtain information on individuals' prescription drug use, and allow pharmacists and law enforcement to follow the prescribing behavior of health professionals. For example, if a prescriber finds, after examining PDMP data, that a patient has many prescriptions for commonly misused prescription drugs (i.e., opioids, tranquilizers, sedatives, and stimulants), then s/he can make an informed decision about whether or not to provide that patient with another prescription and/or to screen for a potential substance abuse disorder. Pharmacists and law enforcement agents may use PDMP data to determine which health care professionals in their community are prescribing commonly misused prescription drugs often and in large dosages. This kind of prescribing behavior may signal the presence of "pill mills[59]" where health care professionals are overprescribing potentially addictive medication.

"Pill mills" and "doctor shopping" behavior contributes to the possibility of diversion—that is, using prescription drugs, without doctors' orders, to get high. Research suggests that prescription drug abusers and traffickers use pain clinics to obtain controlled substances in large doses, and engage in "doctor shopping" behavior in order to obtain drugs for themselves to abuse or to sell to others for profit.[60] Individuals who have a history of doctor shopping are at an increased risk of a drug-related death.[61] Tracking and monitoring strategies, such as PDMPs, have been somewhat successful in reducing NMUPD and its precursors (e.g., limiting access). In those states with a functioning PDMP, there were

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[53] Garg et al., 2013
[54] Cochella & Bateman, 2011
[55] Edlund et al., 2010; Jeffery, Babeu, Nelson, Kloc, & Klette, 2013; Silva, Schrager, Kecojevic, & Lankenau, 2013
[56] Ehrentraut et al., 2014; Peirce, Smith, Abate, & Halverson, 2012
[57] Bohnert et al., 2011; Edlund et al., 2014; Edlund, Steffick, Hudson, Harris, & Sullivan, 2007; Koyyalagunta et al., 2013; Sullivan et al., 2010
[58] "Doctor Shoppers" is a term used to describe individuals who simultaneously visit multiple health care providers to obtain multiple prescriptions for medications during a single illness episode or for treating a continuous illness (Sansone & Sansone, 2012).
[59] "Pill Mill" is a term used to describe a doctor, pain clinic, or pharmacy that indiscriminately prescribes or dispenses controlled prescription drugs (Rigg, March, & Inciardi, 2010).
[60] Inciardi, Surratt, Kurtz, & Cicero, 2007
[61] Peirce, Smith, Abate, & Halverson, 2012

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significantly lower increases in the number of Oxycodone shipments,[62] intentional exposures to NMUPDs,[63] and treatment admissions associated with NMUPD compared to states without a PDMP.[64]

Another tracking and monitoring strategy is Triplicate Prescription Programs (TPPs), which require physicians to issue prescriptions for certain controlled substances using multiple copy forms, with the extra copies either retained for record-keeping purposes or submitted to monitoring agencies. Some states have implemented TPPs as precursors to PDMPs. The New York TPP demonstrated significant reductions in problematic benzodiazepine use, pharmacy-hopping, and non-problematic benzodiazepine use with non-problematic and potentially problematic use decreasing the most among African-American individuals.[65]

PROPER MEDICATION DISPOSAL

Proper medication disposal provides safe and responsible ways for people to dispose of prescription drugs kept in their homes. Take-back programs, a popular proper medication disposal strategy, provide avenues to reduce the supply of drugs available for diversion. The logic behind take-back programs goes something like this: If people dispose of their drugs, then they may be less likely to offer them to friends or family, have drugs ingested by and poison young children or unknowing guests, or have drugs taken from their homes for illicit purposes. Prescription Drug Take-Back Programs collect individuals' unwanted or expired prescription drugs voluntarily through the use of drop boxes or take-back events. Evidence does not support the logic provided above in terms of how take-back programs influence individuals' misuse; however, we do know that these programs collect thousands of pounds of drugs with only 10% of the drugs being commonly abused prescription drugs.[66] Practice-based evidence indicates that take-back programs also may be implemented to increase awareness of NMUPD and enhance community readiness to implement a more comprehensive prevention strategy.[67]

HARM REDUCTION

Harm reduction strategies mitigate risks associated with prescription drug misuse and overdose. These strategies do not focus solely on preventing prescription drug use and initiation, rather they are designed to reduce death, disability, and other negative consequences associated with NMUPD and overdose. Two of the three harm reduction strategies we identified combine overdose education with naloxone distribution. Naloxone is an overdose antidote that sometimes goes by the brand name Narcan™. This combination has been associated with increased overdose reversals[68] and knowledge of overdose symptoms.[69] The third harm reduction strategy our search yielded is the alteration of the drug's chemical or physical formulation to inhibit its abusive properties. Prescription drug abuse

[62] Reisman, Shenoy, Atherly, & Flowers, 2009
[63] Reifler et al., 2012
[64] Reifler et al., 2012
[65] Pearson et al., 2006
[66] Ma, Batz, Juarez, & Ladao, 2014
[67] G. Rots, personal communication, July 30, 2015
[68] Walley et al., 2013
[69] Green, Heimer, & Grau, 2008

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deterrent formulation packaging has been associated with a decrease in participants reporting OxyContin as their primary drug of abuse and a decrease in past 30-day OxyContin misuse; however, a substantial percent (24%) of participants were able to overcome the new formulation and a majority (66%) of participants moved on to other opioids.[70] While the reformulations diverted users from OxyContin misuse, the majority turned to other opioids and continued to misuse.

MULTI-COMPONENT

Multi-component programs combine multiple strategies in order to address the various factors that influence NMUPD. One program that we found, Project Lazarus, has five major components: (1) community activation and coalition building to raise community awareness and actively engage the community in intervention design; (2) monitoring data on overdose, prescribing behavior, and other relevant data; (3) prevention program implementation at multiple levels throughout the community; (4) education on overdose antidote use for prescribers and the general community in order to change attitudes toward opioid misuse and abuse; and (5) evaluation to assess program impact and identify areas needing improvement. Project Lazarus activities have been linked to decreases in overdose death rates.[71]

Another multi-component program we found in our search, Communities that Care (CTC), requires communities to create and implement a data-informed community action plan for preventing NMUPD. While communities implementing the CTC approach have demonstrated reductions in risk behaviors associated with NMUPD, they have not affected prescription drug use rates.[72]

A third multi-component strategy, Iowa Strengthening Families Program (ISFP): For Parents and Youth 10-14, includes intensive youth and parent skill-building components paired with family and classroom curricula. Compared to non-participants, ISFP participants demonstrated lower rates of lifetime prescription drug misuse, which persisted over time.[73]

DISCUSSION

Overall, preventing and reducing prescription drug misuse may be a challenge. We know less about the risk and protective factors that contribute to NMUPD than about the factors that contribute to other drug use; we also know less about the strategies that are effective for prevention.

RISK AND PROTECTIVE FACTORS

Our search yielded many more risk than protective factors. This suggests a better understanding of what places people at increased risk for NMUPD than what protects them from harm. In addition, the majority of factors that we found are situated at the individual level of the socio-ecological model which

[70] Cicero, Ellis, & Surratt, 2012
[71] Albert et al., 2011
[72] Hawkins et al., 2009; Hawkins et al., 2012
[73] Spoth et al., 2013

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focuses on an individual's personal experience rather than contextual factors. These findings do not mean that individual-level influences are more pronounced than contextual influences. Rather, they indicate that more research has been conducted to examine associations between individual- (and, even relationship-) level factors and NMUPD than between contextual factors and NMUPD. One reason for this discrepancy may be that it is more difficult to measure contextual factors, such as community disorganization, than an individual-level factor, such as perception of harm. Furthermore, the theoretical mechanisms through which contextual factors might influence NMUPD are not well understood, thereby limiting exploration of those relationships.

Interestingly, many of the studies we looked at focused on special population groups or groups at increased risk for NMUPD and other types of substance abuse. These populations included, for example, homeless young adults, veterans, active duty service members, lesbian and gay youth, cancer patients, and Medicaid recipients. Given this trend to focus on specific rather than general population groups, readers are encouraged to pay close attention to characteristics of the populations studied and how some risk factors influence NMUPD among those populations, but not necessarily other groups.

Moreover, opioid misuse was studied more frequently than other classes of prescription drugs. One reason for this could be the growing availability of opioids compared to other drugs. Over the years, there has been marked increases in prescriptions written for opioids.[74] In the late 1990's and early 2000's, pharmaceutical companies started expanding sales and campaigns to encourage physicians (including primary care specialists not necessarily trained in pain management) to prescribe OxyContin not just for cancer pain, but for moderate-to-severe non-cancer pain—leading to a commensurate rise in prescriptions. In addition, the original formulations of these drugs provided a rapid release of opiates and a quick reinforcement of a high. The combination of increased access and rapid release drug formulations has been associated with an increase in opioid misuse and overdoses.[75]

PROGRAMS AND STRATEGIES

In general, we found relatively few prevention strategies and programs that demonstrated evidence of effectiveness in preventing or reducing NMUPD and its consequences. The most commonly evaluated (and, arguably, implemented) program type is education. Carefully crafted educational strategies may be vital to community prioritization of and action to alleviate NMUPD because they promote understanding of the problem and demonstrate how communities can address the problem. On the other hand, educational programs that simply disseminate information often do not facilitate wide-spread behavior change. They may, however, influence attitudes and beliefs that place individuals at greater risk of NMUPD—beliefs such as perceptions of harm and intentions to control the supply of prescription drugs in the home. Educational strategies coupled with other strategy types may be more likely to affect NMUPD. A more comprehensive approach to prevention, combining strategies that target multiple risk and protective factors, may show promise in reducing NMUPD—perhaps one that spans

[74] Zacny et al., 2003
[75] United States General Accounting Office, 2003

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multiple socio-ecological levels and comprises more than one strategy may be most effective and achieve the greatest impact.[76]

To select relevant strategies to implement, practitioners should prioritize strategies that target risk and protective factors supported by local data. This requires conducting an assessment to determine what influences NMUPD in your community. You may discover factors that differ from those in our review of the literature that are presented in these tools. To be effective, however, prevention strategies or interventions must be linked to the risk and protective factors that drive the problem in your community. Therefore, do not feel bound by what you read here. Instead consider it one of many information sources.

After determining local factors, use the tool *Preventing Prescription Drug Misuse: Programs and Strategies* to determine whether any programs exist that address those factors and have demonstrated positive results—namely reductions in NMUPD. You may need to learn more about those strategies and programs that seem most relevant. This tool provides basic information about each study to better inform your prevention planning decisions; however, more information on the programs highlighted is included in the studies themselves, and each table contains a complete study citation so you can locate the original article.

LIMITATIONS AND CAVEATS

As noted in each of the tools, please be aware of their limitations. These include the following:

- The literature summaries are limited to the time frame, databases, and search parameters used.
- The quality of research methods and evaluation methods were not rated.
- NMUPD is an emerging and fast-growing public health problem; therefore, our understanding of what factors predict NMUPD and the types of strategies likely to alleviate this problem are rapidly evolving. As we go to press, however, our understanding or risk and protective factors and what works to prevent NMUPD and its consequences is relatively limited.
- The methodological rigor of the studies in this tool varies widely. Most studies use non-experimental designs that cannot categorically determine whether a given strategy has affected NMUPD.

Despite these limitations, practitioners interested in reducing NMUPD may find these tools helpful in increasing their understanding of the risk and protective factors, as well as the strategies, for NMUPD prevention.

[76] Frankford, 2007

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NEXT STEPS

While understanding the factors and programs summarized in these documents is an important first step, there is more that can be done to prevent NMUPD. Some possible next steps include the following:

- Encourage researchers to focus on identifying more risk and protective influences at the community and societal levels. This would provide a more holistic perspective of NMUPD and place less emphasis on the individual and relationships levels.
- Support innovative programming that addresses NMUPD, with an emphasis on program evaluation, to expand the compendium of evidence-based strategies. There is limited knowledge on what is effective. In order to use resources wisely, practitioners need to feel confident that the strategies they select are effective.
- Evaluate programs that have demonstrated effectiveness in reducing alcohol and other drug use to assess their impact on NMUPD. For example, Iowa Strengthening Families Program: For Parents and Youth 10-14 was originally designed to reduce alcohol use, but has demonstrated evidence of effectiveness with reducing lifetime NMUPD.[77]
- Consider implementing prevention programming across the lifespan (i.e., beyond youth), because the risk and protective factors highlighted in these documents span from youth to older adults.
- Consider additional strategies that go beyond reversing opioid overdoses (with the use of naloxone or other antidotes) to prevent additional negative consequences. Surviving an opioid overdose may itself be a risk factor for additional overdoses,[78] so strategies that follow the use of antidotes should be included as part of a broader comprehensive plan.

[77] Spoth et al., 2013
[78] Coffin et al., 2007

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