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# Scientific Committee on Opioid Prevention and Education (SCOPE)

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## Prevention Techniques and Strategies Report

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## Executive Summary

The Scientific Committee on Opioid Prevention and Education (SCOPE) has met monthly since June 2019. SCOPE developed a model for examining associated links to opioid use disorder (OUD), substance use disorder (SUD), and reasons for abstinence from drug use. Committee members reviewed the current literature and created summary tables and journal clubs in the following areas associated with SUD/OUD: adverse childhood experiences (ACEs), mental health (Attention Deficit Hyperactivity Disorder (ADHD), depression, Post Traumatic Stress Disorder (PTSD), and anxiety), genetics, socioeconomic factors and reasons for abstinence. Following this review of the literature, SCOPE generated three target areas for consideration:

- Target area 1 focuses on professional education. SCOPE recommends that all academic healthcare programs involved in opioid prescribing and dispensing be surveyed in order to determine the level of SUD/OUD in the core curriculum. Because of the associated link between Adverse Childhood Experiences (ACEs) and the development of SUD/OUD, education in the detection of ACEs should be included in the survey. Once the Ohio academic healthcare programs complete the survey, the academic programs should meet to develop a common core curriculum. Continuing education requirements and human resource training would also be a component of target area 1. SCOPE suggests the development of an Ohio Attorney General’s Gold Medal Training Group for healthcare systems and companies obtaining threshold professional education in SUD/OUD.
- Target area 2 focuses on opioid storage and disposal methods. SCOPE recommends supporting ongoing efforts to decrease the number of opioids that are prescribed as well as working with state health systems to explore pre-set limits in Electronic Health Records (EHR) when prescribing opioids. In conjunction with the educational efforts, healthcare programs should ensure that counseling on safe storage and disposal is provided to patients who receive opioid prescriptions. We further encourage expansion and promotion of opioid disposal sites and exploration of options that allow for disposal of opioids at home.
- Target area 3 utilizes a behavioral economic approach to address the SUD/OUD crisis. For target area 3, SCOPE has two recommendations:
  - The first is to develop a knowledge-based program with built-in behavioral economics components. In contrast to a typical awareness-based program (such as Drug Abuse Resistance Education, or DARE), the program should be based on insights borrowed from behavioral economics. When educating participants, behavioral “nudges” including social norms, loss aversion, and hyperbolic discounting should be utilized.
  - The second recommendation is to develop a cognitive-behavioral training program that incorporates principles from the motivational and cognitive-behavioral literatures. The main components of the interventions include (1) psychoeducation, (2) behavioral coping skills training, and (3) cognitive coping skills training.

The target population for this behavioral economic intervention includes high school (grades 9-12) and young adults attending career centers and technical schools.

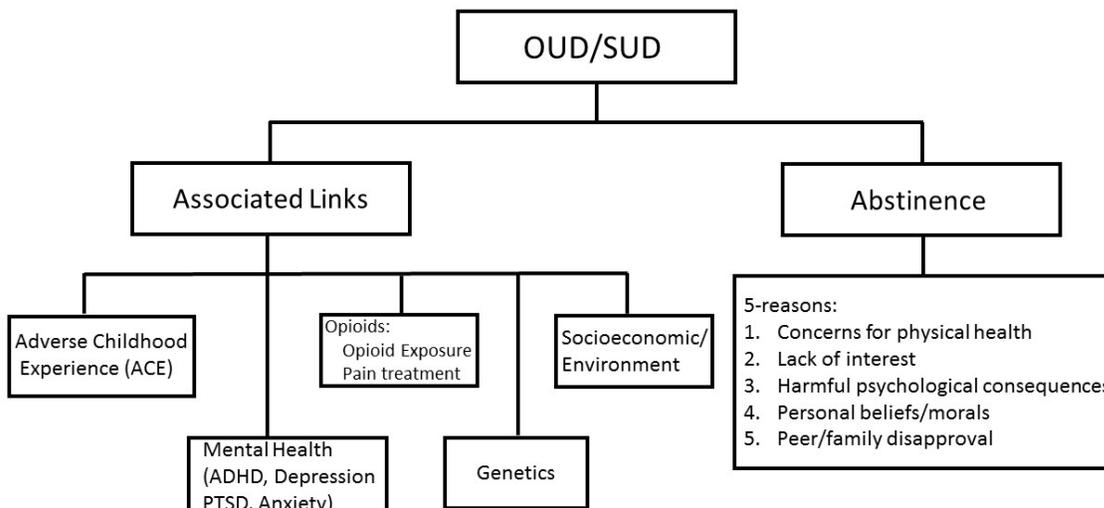
In this report, we review the literature and studies that were involved in generating these target areas. Following each recommendation, SCOPE provides the assessment measures to consider. The report concludes with a discussion of the pharmacogenomics study currently underway, which is aimed at gaining a more thorough understanding of the role of genetics in OUD.

## Committee Overview

In the United States, nearly 20 million people are addicted to alcohol or other drugs (McCance-Katz, 2018) with an associated cost burden of \$740 billion annually (NIDA, 2017). In Ohio, current strategies to combat the opioid epidemic include the following: screening and identification of OUD; abuse deterrent formulations; safe medication disposal programs; recommendations and education to providers on appropriate prescribing and monitoring; expansion for treatment, including Medicaid expansion for such; prescription drug monitoring programs; and naloxone distribution.

Last year, the Ohio Attorney General assembled the Scientific Committee on Opioid Prevention and Education (SCOPE), a group of scientists (SCOPE) with expertise in a variety of areas to apply the scientific method for developing novel prevention techniques and strategies grounded in scientific evidence. The primary focus and efforts of SCOPE are based on prevention, rather than treatment, and decreasing the number of new people with substance use disorder.

After the initial organizational meeting in June 2019, SCOPE developed a model (figure) for examining associated links to OUD and SUD and reasons for abstinence.



Committee members were then assigned the task of reviewing the scientific literature available in each of the topic areas. Committee members created review tables (for an example review table, see Appendix A) on the literature and then provided a journal club discussion to the committee on what they determined to be the relevant papers for SCOPE to consider. The journal club presentations not only focused on the study design but also included the reviewer's comments on limitations and weaknesses of the study and the study's potential utility to the mission of SCOPE. An example journal club is presented in Appendix B. In this report, we outline the three areas and strategies for targeting OUD/SUD prevention efforts.

## Introduction

From 1999 to 2011, the consumption of prescription opioids increased by nearly 500% and the opioid-related overdose death rate quadrupled (Kolodny et al., 2015). During the same time period, there has been a dramatic increase in the number of people seeking treatment for OUD. According to the United States Centers for Disease Control and Prevention (CDC), 130 Americans die every day from an opioid overdose. Although there has been a number of successful attempts at reducing nonmedical prescription opioid use, rates of heroin use and death are continuing to rise (Compton et al., 2016). Given the magnitude of the problem, in 2014, the CDC added opioid overdose as one of the top five public health challenges. In 2017, the opioid crisis was declared as a public health emergency by the President of the United States of America.

The opioid epidemic not only reduces the quality of life and decreases life expectancy, but it also places tremendous costs on the economy of the United States. Jiang et al. (2017) estimate that the cost of heroin use disorder was around \$51.2 billion U.S. dollars in 2015 (\$50,799 per heroin user). The projected costs could quadruple to \$200 billion dollars by 2020 (Haffajee and Frank, 2018).

The opioid epidemic differentially impacts various demographic groups. For example, it is generally recognized that men have a higher rate of prescription opioid misuse than women (Saha et al., 2016). Also, rates of opioid misuse are generally greater among whites, young adults, individuals with lower income, and individuals with lower education. Similar demographic trends are observed among heroin users. Jones et al. (2015) use data from the 2002-2013 National Survey on Drug Use and Health to analyze trends in heroin use among different demographic groups in the United States. Based on the multivariable logistic regression model, the study finds that heroin dependence is higher among white males, ages 18-25 years, residing in large urban areas, with less than \$20,000 annual household income, having no health insurance, and having history of abuse or dependence on alcohol, marijuana, cocaine, or opioid pain relievers. These results point out that policies and strategies targeting specific groups of people could be more effective than a uniform approach treating all people as potential victims of the opioid problem.

An extensive overview of the literature (King et al., 2014), published between January 1990 and September 2013, suggests that there are many determinants (causes) of the increased opioid-related mortality in the United States. The first set of determinants is related to prescribers'

behavior: an increased number of opioid prescriptions, increased dosage and volume, and increased prescriptions of oxycodone and methadone. The second set of determinants is related to users' behavior: sociodemographic differences, prior history of substance abuse, and drug substitution. The third set of determinants is related to environmental and legal conditions: changes in guidelines and policies, media coverage, geographical location, and area urbanization.

## Previous Solutions Attempted

Given the different causes of the opioid epidemic, various solutions and strategies have been proposed to solve this problem (Hawk et al., 2015; Kolodny et al., 2015; Skolnick, 2018).

### Price controls

Given that prescription opioids and heroin are expensive, it is important to consider various economic strategies that could be used to reduce the opioid epidemic. Unick et al. (2014) construct a unique data set based on 27 Metropolitan Statistical Areas (MSAs) and use this data to examine the question of how price, purity and source region of heroin affect yearly hospital counts of heroin overdoses. They find that the purity of heroin does not increase the number of overdoses. However, lower price and higher market share of Colombian-sourced heroin significantly increase the number of overdoses. These findings are robust when controlling for poverty, unemployment, crime, MSA socio-demographic characteristics and population size. Similar results (that higher prices of drugs reduce consumption) were documented by Dobkin and Nicosia (2009) and Dobkin et al. (2014). An important application of these results is that by increasing the price of heroin, the number of heroin overdoses could be reduced.

### Monitoring programs

An example of a successful prevention program is the *Prescription Drug Monitoring Program* (PDMP). The PDMP allows healthcare providers to view a patient's prescribing history in order to identify those who are misusing opioids. Although almost all states have implemented the PDMP, they differ substantially along several dimensions. Notably, some states that implemented the PDMP do not require providers to access a patient's prescribing history, while other states enacted stricter laws requiring providers to access prior history before prescribing opioids. Using this difference across the states, Buchmueller and Carey (2018) show empirically that implementing a "must access" PDMP reduces many of the measures associated with misuse (e.g, days supply, daily morphine-equivalent dosage, opioid poisonings) of prescription opioids. Their results suggest that the strategy of requiring healthcare providers to access the PDMP can be very effective at preventing prescription opioid misuse. Other researchers have also arrived at similar conclusions (Patrick et al., 2016; Dave et al., 2017; Meinhofer, 2018). In Ohio, the use of the Ohio Automated RX Reporting System (OARRS) by healthcare providers has increased dramatically since 2011 when just over a million patient queries were performed to over 142 million queries in 2018 (OARRS 2018 Annual Report).

## Abuse-deterrent opioids (reformulation of OxyContin)

Several policies and programs have been successful at reducing nonmedical use of prescription opioids. However, while nonmedical prescription opioid use has plateaued between 2010 and 2014, the use of heroin substantially increased and the number of deaths from heroin overdose more than tripled during the same time period (Compton et al., 2016). Given the pharmacological similarity of heroin to prescription opioids, a natural question arises of whether “the very policies and programs that have been designed to address inappropriate prescribing are now fueling the increases in rates of heroin use and death” (Compton et al., 2016, p. 155). This same concern extends to fentanyl and the synthetic fentanyls.

Evans et al. (2019) argue that since Purdue Pharma pulled the existing OxyContin from the market in 2010 and replaced it with an abuse-deterrent formulation, it made it less appealing to opioid abusers and led many to shift to a cheaper alternative, heroin. Using structural break techniques, they show that indeed the reformulation of OxyContin caused the increase in heroin deaths. Furthermore, they show that the total number of heroin and opioid deaths did not change after the reformulation, suggesting that there was a one-for-one substitution of heroin deaths for opioid deaths.

Alpert et al. (2018), exploiting cross-state variation in OxyContin exposure, find that states with the highest initial rates of OxyContin misuse experienced the largest increases in heroin deaths. They conclude that “the recent heroin epidemic is largely due to the reformulation of OxyContin.”

## Harm reduction treatments (Naloxone)

Skolnick (2018) point out that in addition to using prevention strategies, it is important that individuals with opioid addiction have access to effective and affordable medication-assisted treatments. An example of a medication-assisted treatment is the introduction of buprenorphine/naloxone (originally branded as Suboxone). Naloxone is used as one of the harm reduction strategies for opioid overdose, capable of reversing the effects of opioids and reviving overdose victims. Indeed, Rees et al. (2017) find that Naloxone Access Laws and Good Samaritan Laws lowered opioid overdose mortality by about 10%.

However, these laws do not necessarily reduce consumption of opioids. On the contrary, it has been recently pointed out that naloxone may have a potentially negative impact on the use of nonmedical opioids (Greene, 2018). Since naloxone access makes opioid overdose reversible, it may give the impression that opioid use is less dangerous, creating a potential “moral hazard” – a situation in which people tend to take more risky actions because such actions became less harmful. In other words, by making opioid overdose less dangerous, people are more likely to abuse opioids. Indeed, there is evidence that in states where naloxone kit distribution was enforced by law, the number of people misusing prescription opioids has increased (Doleac and Mukherjee, 2018; Erfanian et al., 2019). This brings into question the efficacy of naloxone as a harm reduction strategy.

# Potential Target Areas for Prevention Efforts

## Target Area 1: Professional Education

*There are significant differences in SUD and OUD professional healthcare education.* A recent study found that physicians trained in “top-tier” medical school programs were less likely to prescribe opioids, suggesting a potential educational difference (Schnell & Currie, 2018). In this study, comprehensive data on all opioid prescriptions written by doctors in the United States between 2006 and 2014 were examined for the relationship between opioid prescribing and training. Schnell & Currie (2018) found that Doctors of Osteopathic (DO) medicine prescribed more opioids than Doctors of Medicine (MD). Additionally, almost 50% of opioid prescriptions were written by general practitioners. From an educational perspective, Kolodny et al. (2015) highlight the importance of prevention strategies, such as adopting the Center for Disease Control (CDC) prescribing guidelines and cautioning healthcare providers about prescribing opioids for both acute and chronic pain. Unfortunately, many healthcare providers lack understanding regarding opioid risks, particularly the risk of addiction, and have an overestimation of opioid benefits (Kolodny et al., 2015). Kolodny et al. (2015) conclude that “this pattern highlights the need for prescriber education explicitly correcting misperceptions about opioid pain relievers (OPR) safety and efficacy.” Additionally, according to the 2019 Health Care’s Hidden Epidemic report, healthcare executives and providers cite a variety of tools that could help healthcare providers, including a more robust SUD education (BD Institute for Medication Management Excellence, 2019).

In October 2019, the All-Ohio Medical School Opioid Use Disorder Collaborative provided SCOPE a copy of its final report. The “All-Ohio” collaborative was funded by the Ohio Department of Mental Health & Addiction Services. The overall goal of the collaborative was to develop a common medical school curriculum on pain management and OUD. Of the seven medical schools in Ohio, following the meeting, two medical schools planned to add 11 topic areas to their curriculum and three schools plan to add three topic areas to their curriculum. Two schools did not state any plans to adjust their curriculum. The collaborative report noted the lack of participation by other practicing healthcare providers, other specialties, and non-clinical professionals. The report further stated that, in order to promote integration into the medical school curriculum, suggestions made by the collaborative could be offered as electives and better engagement by medical school deans would be required.

*There is a lack of healthcare provider knowledge on safe drug disposal.* In October 2019 at the Ohio Dental Association Annual meeting, a survey was provided to participants. The Ohio’s Strategic Prevention Framework for prescription drug misuse survey found that of 147 dentists

who completed the survey, two (1.4%) told their patients to dispose of unwanted medications by using Drug Enforcement Administration (DEA) take back days or permanent prescription disposal locations, one (<1%) knew where the closest disposal location to their practice was and NONE knew about safe medication storage or discussed safe medication storage with patients.

*Adverse Childhood Experiences (ACEs) contribute to the development of SUD/ODU.* During the SCOPE evaluation of literature on the associated links to the development of SUD/ODU, ACEs were developed as an area of focus. ACEs has been associated with developing SUD (Rhee et al., 2019) later in a person's life. In the study by Rhee et al., (2019), 5,806 subjects ages 65 or older were surveyed using the 2012-2013 National Epidemiological Survey on Alcohol and Related Conditions Wave III (NESARC-III). They found that 35.9% of older adults had reported some form of ACEs. Those having experienced any ACEs had higher odds of SUD. Current healthcare organizations and providers do not typically screen for ACEs and SUD. Additionally, there is evidence to support that the higher the number of ACEs one experiences, the greater the propensity to develop SUD and have challenges with relapse (Derefinko et al., 2019; Felitt et al., 2019). Many health professionals have indicated their unmet needs about ACEs knowledge in their education and clinical practices (Al-Yateem, Banni Issa, & Rossiter, 2015; Szilagyi et al., 2016).

*There is a lack of continuing education and human resource requirements on SUD/ODU.* SCOPE further examined the continuing education requirements for state licensed professionals. Our findings (Appendix C) indicate that none of the professional organizations in the state require Substance Use Disorder (SUD) education for healthcare professionals or other professionals in general. We also found that there are currently no uniform standards for SUD education requirements by human resource (HR) departments. According to the Bureau of Labor Statistics, unintentional overdoses from drugs or alcohol increased 25% from 2016 to 2017 (Department of Labor, 2018). A survey by Hartford Business found that 76% of employees and 64% of HR workers are not trained to assist their colleagues with addiction issues. Ompad et al. (2019) analyzed 10 years of data from 293,492 adults in the National Survey on Drug Use and Health comparing construction trade/extraction workers (CTEW) with non-CTEW. Those authors found that CTEW are a high-risk population for SUD and concluded that prevention and harm reduction programming is needed in the CTEW population.

## Target Area 1: Recommendations

- 1) Survey healthcare academic program directors in Ohio universities (Table 1) utilizing the 10 core competencies (List 1) outlined in the Massachusetts study of medical schools (Antman et al., 2016) with an additional focus on SUD and ACEs training for all healthcare programs in Ohio. Survey questions that were sent to the deans of healthcare programs on Nov. 11, 2019, are attached in Appendix D.

Table 1: Healthcare Academic Programs to be surveyed in Ohio

Health Care Programs					
Medical	Dental	Nursing (MSN)	Pharmacy	Physician Assistant	Optometry
Case Western Reserve University	Case Western Reserve University	Case Western Reserve University	University of Cincinnati	Baldwin Wallace University	The Ohio State University
Northeast Ohio Medical University	The Ohio State University	Cleveland State University	The Ohio State University	Cleveland State University	
The Ohio State University		Kent State University	Toledo University	Cuyahoga Community College	
University of Cincinnati		The Ohio State University	Ohio Northern University	Kettering College	
Ohio University		Ohio University	NEUCOP	Marietta College	
Toledo University		Toledo University	Findlay University	Ohio Dominican University	
Wright State University		Wright State University	Cedarville University	Findlay University	
Ohio University		Capital University Cedarville University		Mount Union University	
		Mount St. Joseph		Toledo University	
		Franciscan University			
		Lourdes University			
		Malone University			
		Mount Carmel			
		Otterbein University			
		University of Akron			
		Urbana University			
		Ursuline University			
		Xavier University			
		Youngstown State			

- 2) Once the study of academic programs is complete, meet with deans to establish cross-institutional and cross-discipline core competencies in academic programs consistent with literature and national standards.
- 3) Establish SUD/ODU continuing education requirement for all state regulated licensure programs which could be implemented with licensure renewal. Develop a one-page need summary to share with appropriate licensing boards in order to implement a targeted educational campaign.

Additionally, standardization and critical need of healthcare provider education could include:

- a. Development of mandatory education materials. The creation of these educational materials would reduce the work burden and increase the opportunities for evidence-based education. Online learning with embedded quizzing as well as opportunities for face-to-face education would be optimal.
- b. Should the mandatory education option be selected due to the critical nature of the education, it could be limited to one or two times per licensure renewal cycle.
- c. Provide individual incentive or recognition to healthcare providers. This could be as simple as providing additional free educational opportunities for completing SCOPE education requirements to providing a certification from the Attorney General which could be displayed in an organizational setting to having random names selected for some type of reward to those completing the training.
- d. Another alternative healthcare provider education strategy would be to create levels of recognition in the media for healthcare organizations to be a part of the Attorney General's Gold Medal Training Group on SUD. If a healthcare organization trained 50% of its staff, with the SCOPE training, a news article regarding their positive efforts can be created for their local/social media. Should they achieve 75%, the AGO would work with the local news/social media outlets to carry information on local news and social media programs. Should an organization achieve 90%, AG comes to the organization with televised proclamations and maybe something more. The main precept would be that the recognition of education efforts with positive reinforcement, more than negative, can be an effective evidence-based strategy for success.

4) Establish an HR OUD/SUD training program for employees. We could begin with a pilot program and implement the same recognition strategies as listed in the previous recommendation. We would suggest that we start with the construction trade/extraction workers (CTEW) population.

5) Affirm the ACEs section of the report with the recommendation to endorse proper evidence-based ACEs screening and trauma informed follow up.

## LIST 1\*

### Core Competencies for the Prevention and Management of Prescription Drug Misuse

#### Primary prevention domain:

##### Preventing prescription drug misuse (screening, evaluation, & prevention)

1. Evaluate a patient's pain using age, gender, and culturally appropriate evidence-based methodologies.
2. Evaluate a patient's risk for substance use disorders by using age, gender, and culturally appropriate evidence-based communication skills and assessment methodologies, supplemented by relevant available patient information, including but not limited to health records, prescription dispensing records (e.g., the Prescription Drug Monitoring Program), drug urine screenings, and screenings for commonly co-occurring psychiatric disorders (especially depression, anxiety disorders, and posttraumatic stress disorder).
3. Identify and describe potential pharmacological and nonpharmacological treatment options, including opioid and nonopioid pharmacological treatments for acute and chronic pain management, along with patient communication and education regarding the risks and benefits associated with each of these available treatment options.

#### Secondary prevention domain:

##### Treating patients at risk for substance use disorders

##### (engaging patients in safe, informed, and patient-centered treatment planning)

4. Describe substance use disorder treatment options, including medication-assisted treatment, as well as demonstrate the ability to appropriately refer patients to addiction medicine specialists and treatment programs for both relapse prevention and co-occurring psychiatric disorders.
5. Prepare evidence-based and patient-centered pain management and substance use disorder treatment plans for patients with acute and chronic pain with special attention to safe prescribing and recognizing patients displaying signs of aberrant prescription use behaviors.
6. Demonstrate the foundational skills in patient-centered counseling and behavior change in the context of a patient encounter, consistent with evidence-based techniques.

#### Tertiary prevention domain:

##### Managing substance use disorders as chronic diseases

##### (eliminating stigma and building awareness of social determinants)

7. Recognize the risk factors for, and signs of, opioid overdose and demonstrate the correct use of naloxone rescue.
8. Recognize substance use disorders as a chronic disease by effectively applying a chronic disease model in the ongoing assessment and management of the patient.
9. Recognize their own and societal stigmatization and biases against individuals with substance use disorders and associated evidence-based medication-assisted treatment.
10. Identify and incorporate relevant data regarding social determinants of health into treatment planning for substance use disorders.

\*List 1 as it appears in the Antman et al 2016

## Target Area 1: Assessment of Outcomes

### Logic Model for Target Area 1

	<b>Logic Model</b>	<b>Evaluation Questions</b>	<b>Designs and Methods</b>
A. Goals	Improve SUD/ODU core competence across discipline.	What areas improved in the target population?	Pre-post survey of students and practitioners
B. Strategies	<ul style="list-style-type: none"> <li>– Complete educational survey</li> <li>– Develop core competencies</li> <li>– Develop educational programming</li> </ul>	<p>How many healthcare programs participate?</p> <p>How many healthcare students and providers?</p>	Program records from schools and CE events
C. Target group	<ul style="list-style-type: none"> <li>– Ohio student healthcare providers</li> <li>– Ohio healthcare providers</li> </ul>	How many from each discipline and providers participate?	Program records from schools and CE events
D. If-then statement	If core competency training is offered to healthcare providers, THEN, healthcare providers can provide better overall care and reduce the number of new SUD/ODU	How did practice change for the participants? Did pain management change? Did the provider's perspective on the SUD/ODU change?	<ul style="list-style-type: none"> <li>– Prescribing records</li> <li>– Pre-post survey findings</li> </ul>
E. Long-term outcomes	Decrease in the pattern of new SUD patients.	How did the overall number of new SUD/ODU patients change within five years of the program?	Measure emergency department visits due to OD or SUD.

## Target Area 2: Opioid Storage and Disposal

*There are significant numbers of unsecured opioids in homes.* Multiple studies, mostly in the surgical literature, have found that patients often have opioid pills that go unused after they receive a prescription (Bartels et al., 2016; Bicket et al., 2017; Feinberg et al., 2018). Many patients report storing these unused medications in unsecured locations within their home (Bartels et al., 2016; Bicket et al., 2017). Few patients who reported leftover opioids intended to dispose of them, and those who did were unable to identify appropriate means of disposal (Bicket et al., 2017; Feinberg et al., 2018). Khan et al (2019) found that opioid prescriptions to family members were associated with overdose among individuals who do not receive opioid prescriptions. In this study, healthcare utilization data from 2004 to 2015 from a large U.S. commercial company were evaluated for the odds of overdose among individuals whose family members had been dispensed an opioid. There were 2,303 opioid overdoses identified. The odds ratio for an opioid overdose as a result of prior opioid being dispensed to a family member was 2.89. Khan et al (2019) also found that the amount and dose of the opioid dispensed increased the odds of overdose.

*Opioids in homes increase risk of harm to co-habitants.* From 2002 to 2016, the Wisconsin Poison Control Center received 3,320 unintended opioid exposure related calls (Creswell et al., 2019). Of those, 61% were 0-5 years old and 29% were 13-19 years old. The most common exposure for ages 6-12 was the result of therapeutic errors. The authors concluded that children and adolescents continue to have access to opioids in their homes and stressed the importance of safe storage for these medications and the dangers of unintended exposures to others in the home. A separate national study found that there has been a threefold increase in the number of pediatric deaths attributed to opioids in the past 18 years. There were 604 deaths in children ages 0-4 due to unintentional opioid exposure (Gaither et al., 2016).

*There is a lack of education regarding safe storage and disposal.* Most patients report not receiving information about safe storage and disposal of opioids (Bicket et al., 2018). Additionally, there is little information regarding safe storage and disposal included in the actual package inserts for these medications (Douchette et al., 2018). Increasing awareness of medication safety practices could include healthcare providers, but few studies currently examine counseling practices for opioids. The majority of studies focus on Prescription Drug Monitoring Program (PDMP) use, prescribing practices, and prescribing guideline usage. Patient adherence to physician recommendations about medications has been positively associated to clinical areas where patient education has been systematically optimized with one-on-one counseling, suggesting a comprehensive approach including written and spoken interventions may benefit patient care more significantly (Roter et al., 1998). Additionally, pharmacy based medication guides alone may be inadequate as patients self-report minimal use of these resources (Wolf, et

al., 2012). Healthcare providers represent a unique educational opportunity for reinforcement of medication storage and disposal messaging, but a multimodal, comprehensive approach could improve patient health (Gregory and Gregory, 2019)

*Experience of committee members has shown that there are barriers to disposal of opioids.* Patients report keeping opioids because they feel that they may need them in the future. Many disposal locations are associated with law enforcement locations, which some patients avoid. Locations have had difficulty in the past getting their drop boxes picked up and emptied, leading them to stop this service. Apparently, Ohio has only one incendiary site in the state able to destroy medications. Patients express frustration when they wish to dispose of medications and yet physician offices and pharmacies refuse to accept them.

## Target Area 2: Recommendations

- 1) Support ongoing efforts to decrease the number of opioids that are prescribed. We must not blindly push to restrict all opioids to all persons, as this may result in unintended consequences such as increased use of illicit opioids and lack of appropriate pain management.
- 2) Work with state health systems to explore pre-set limits in Electronic Health Records (EHR) when prescribing opioids.
- 3) Support research to help determine typical need for opioids after surgery/specific injuries.
- 4) Promote safe storage and disposal of opioids:
  - a. Encourage healthcare providers (physicians, dentists, pharmacists, nurses, PAs) to educate patients on proper storage and disposal.
  - b. Run a media campaign to raise awareness about the dangers of unsecured opioids in the home and explain proper storage and disposal methods.
  - c. Partner with hospice organizations, funeral homes and elder care groups to promote safe storage and disposal methods.
  - d. Partner with poison control center to provide counseling on safe storage and disposal after an accidental opioid exposure in the home.
  - e. Work with state medical organizations to encourage physicians to ask about opioid storage and disposal at:
    - Follow-up surgical appointments
    - Annual exams
    - Pediatric well-child checks
  - f. Promote availability of opioid disposal options:
    - Increase drop box locations throughout the state
  - g. Explore options for providing products that allow for safe disposal at home
    - Mailings
    - Dispense from physician offices
    - Stock at pharmacies
  - h. Encourage insurance companies to cover costs of home disposal options and possibly incentives to return unused opioids.
  - i. Explore ability to allow healthcare organizations/pharmacies/hospice to accept any unused opioids that patients or their family members wish to dispose of.

## Target Area 2: Assessment of Outcomes

### Logic Model for Target Area 2

	<b>Logic Model</b>	<b>Evaluation Questions</b>	<b>Designs and Methods</b>
A. Goals	<ul style="list-style-type: none"> <li>– Decrease number of opioid prescriptions</li> <li>– Promote safe storage and disposal</li> </ul>	<p>How have the number of opioid prescriptions changed?</p> <p>Have the ED visits due to unintentional opioid exposure changed?</p>	<ul style="list-style-type: none"> <li>– Follow OARRS prescribing data</li> <li>– Monitor ED visits</li> </ul>
B. Strategies	<ul style="list-style-type: none"> <li>– Promote patient education programs (patient counseling)</li> <li>– Media campaign</li> <li>– Increase number of disposal sites</li> </ul>	<p>How many education pamphlets provided to patients?</p> <p>What is the increase in disposal sites?</p> <p>What home disposal methods are appropriate?</p>	<ul style="list-style-type: none"> <li>– Monitor patient counseling</li> <li>– Track number of new disposal locations.</li> <li>– Track number of calls to poison control for unintentional opioid exposure.</li> <li>– Youth use rates from OHYES!</li> </ul>
C. Target group	<ul style="list-style-type: none"> <li>– All patients receiving opioid prescriptions</li> <li>– All ED or poison control patients resulting from unintentional opioid exposure</li> </ul>	<p>How did the number of patients receiving patient education information change?</p>	<ul style="list-style-type: none"> <li>– Monitor the number of patients receiving information.</li> <li>– Monitor number of opioids received at collection locations.</li> </ul>
D. If-Then statement	<p>If opioid prescription numbers decrease and proper storage increases, THEN, ED and poison control calls will decrease.</p>	<p>Did the number of opioid prescription continue to decrease?</p> <p>Did the number of ED visits and poison control calls from unintentional opioids decrease?</p>	<p>Monitor chart records</p>
E. Long-term outcomes	<p>Decrease in the pattern of new SUD patients.</p>	<p>How did the overall number of new SUD/OD patients change within five years of the program?</p>	<p>Measure emergency department visits due to OD or SUD.</p>

## Target Area 3: Behavioral Economic Approach

Behavioral economics studies how people make decisions by allocating scarce resources (e.g., money, effort, time) to competing goals and how various economic incentives and physiological factors impact these decisions (Hursh, 1993). Opioid addiction affects this decision-making process in several important ways (Bickel et al., 2010, 2014). For example, those with OUD may not be sensitive to the price of a drug. Indeed, while it has been shown that people respond to higher drug prices by reducing drug consumption (Dobkin and Nicosia, 2009; Dobkin et al., 2014; Unick et al., 2014), such response is fairly inelastic (Olmstead et al., 2015). Also, SUD may reduce the value of alternative goals (Volkow et al., 2003; Koob, 2006), such as a desire for social interaction (Inagaki et al., 2016) or other nondrug rewards (Lubman et al., 2009), further increasing the demand for drugs. Other potential behavioral economics-based interventions include the following:

### Incentives

Perhaps the most common intervention used by behavioral economists is in terms of incentives and rewards. Evidence shows that financial and non-financial incentives and disincentives (e.g., increasing price) can be effective in altering addictive behaviors (Lussier et al., 2006). For example, financial incentives in the form of vouchers exchangeable for retail items have been shown to significantly reduce cocaine use (Higgins et al., 1994; Silverman et al., 1996). Offering immediate rewards as well as providing a high-return savings opportunity has been shown to be effective (Volpp et al., 2009; Schilbach, 2019).

### Available alternatives

The standard economic model assumes that people make intentional decisions to consume drugs based on their expected value and the value of available alternatives (Bickel et al., 1995; Correia et al., 2010). For example, a person may choose to spend more quality time with their family rather than to consume drugs. Similarly, getting a new job might provide an alternative source of reinforcement to drug use, lowering the drug's relative value. Indeed, it has been shown that the availability of alternative reinforcers reduces the rate of drug use (Bickel et al., 1995). Therefore, a successful intervention could involve enhancing the value of alternative reinforcers, or developing more sources of alternative reinforcement (Rogers et al., 2008; Murphy et al., 2012).

### Commitment devices

Commitment is a powerful tool that can impact a decision-making process. Commitment devices consist of arrangements that people make to formalize and facilitate their goals (Bryan et al.,

2010). Such commitments are most effective when people commit to very specific rules, rather than make general plans (Gollwitzer, 1999). It has been shown that commitment devices are effective in reducing overconfidence, boosting self-control and achieving self-regulation. Studies also show that encouraging individuals to make a plan increases the frequency of healthy eating (Gollwitzer and Sheeran, 2006) and quitting smoking (Giné et al., 2014). Such pre-commitments are relatively low costs, and yet they have been shown to be very effective (Thaler and Sunstein, 2009).

## Feedback and reminders

Another important lesson from behavioral economics is that individuals respond to feedback and reminders. It has been shown, for example, that both brief and extended personalized feedback on the use, motives and harms of cannabis consumption reduces cannabis use (Copeland et al., 2017). Reminders to follow through on a desired course of action are a low-cost interventions (such as automated text messaging) and yet they can be very effective at increasing adherence to the desired plan of action (Pop-Eleches et al., 2011).

## Providing information and aids

Related to feedback and reminders, simple information about the negative impact of drugs presented in a clever way could be very effective. For example, it has been shown that an easy-to use and informative e-health psychoeducational tools are effective at reducing the risk of overdose (Baldacchino et al., 2016). Also, it is well-documented that providing warnings, such as labels and graphic images on cigarette packages, is very effective. In a meta-analysis, Noar et al. (2016) show that pictorial warnings are more effective than text-only warnings because they (1) attract attention better, (2) garner stronger cognitive and emotional reactions, (3) elicit more negative smoking attitudes, and (4) more effectively increase intentions to not start smoking and to quit smoking. The basic idea of these interventions is that when decision-making is complex, providing information and decision aids can guide individuals into making choices that have better outcomes.

## Social norms

People follow social norms. Such norms suggest the acceptable group conduct. Social norms could be communicated in a positive or negative way about what the majority thinks and does (Perkins, 2003). Such interventions have been shown to reduce alcohol and drug use among adolescents (Stock et al., 2016) and increase the use of HIV prevention strategies among injecting drug users (Latkin et al., 2013). One successful tactic for reducing drug use is correcting young people's misperceptions about how common drug use is (Strang et al., 2012).

## Loss aversion and framing

One of the fundamental elements of Kahneman and Tversky's (1979) prospect theory is the idea that people are loss-averse, i.e., they weigh losses more than gains. One study with cocaine-dependent individuals has shown that future drug losses are weighted more heavily than gains (Johnson et al., 2015). Specifically, individuals prefer receiving a smaller amount of cocaine now rather than a larger amount after a delay, but they also prefer losing a smaller amount now rather than a larger amount after a delay. This overweighting of drug losses by people with an addiction could play a role in decisions to quit, seek treatment or remain abstinent.

## Encouraging long-term thinking

Most people are “present biased” – they have a tendency to seek immediate gratification, such that they overvalue present rewards relative to future ones. Additionally, people further discount the value of future rewards with distance in time. Behavioral economists call it “time discounting” (Frederick et al., 2002). It has been shown that people who are more “present biased” (discount future at a higher rate) are more likely to develop addictive behaviors (Perry et al., 2005; Anker et al., 2009; Marusich and Bardo, 2009; Sheffer et al., 2014). Also, experimental evidence shows that chronic exposure to addictive drugs significantly increases delay-discounting rates (Dallery and Locey, 2005; Roesch et al., 2007; Simon et al., 2007; Mendez et al., 2010). Therefore, one way to reduce the likelihood of opioid addiction is to reduce “present bias.” Several interventions show promise. One intervention to change delay discounting is the use of episodic future thinking, requiring individuals to pre-experience future events by imagining realistic events that may happen in the future (Peters and Büchel, 2010). Episodic future thinking interventions have been shown to reduce impulsivity (Daniel et al., 2013), cigarette smoking (Stein et al., 2016) and alcohol consumption (Snider et al., 2016). Another promising intervention is working memory training, where participants are exposed to sequential working memory sessions with tasks increasing in difficulty from session to session. Working memory training has been shown to decrease delay discounting with a subsequent decrease in alcohol consumption (Houben et al., 2011).

## Designing Behavioral Interventions: Practical guidelines

Designing effective behavioral interventions aimed at decreasing harmful behaviors is challenging (Conrod et al., 2015). Nevertheless, there are some practical guidelines that may help overcome these challenges.

First, it is important to emphasize that behavioral interventions should be used with a specific group in mind. **One of the lessons from behavioral economics is that one-size-fits-all solutions do not work.** Potential division into target groups could be: (1) non-drug users and drug users;

(2) general public and minorities; (3) adults, teenagers, and children. This group-based approach is especially important for groups that are vulnerable. For example, if a person has financial difficulties, it may negatively affect their attention (Shah et al., 2012). Therefore, for this vulnerable group, interventions that reduce opportunity costs and simplify procedures can be especially effective (Bertrand et al., 2006; Bettinger et al., 2012).

Second, a successful intervention should be built on the existing scientific evidence. In the context of drug prevention programs in schools, Newton et al. (2011) summarized the main components of an effective program:

- Be evidence-based and theory driven;
- Target risk factors for substance use and psychopathology;
- Be developmentally appropriate;
- Be implemented prior to the onset of harmful patterns of use;
- Be part of a comprehensive health education curriculum;
- Utilize social influence and incorporate normative education;
- Be relevant to students;
- Use peer leadership, but keep teacher as the central role;
- Address values, attitudes and behaviors of the individual and community;
- Be sensitive to cultural and local attitudes;
- Provide adequate initial coverage and continued follow-up in booster sessions;
- Deliver using interactive teaching approaches;
- Deliver within a framework of harm minimization.

Third, when designing behavioral interventions, it is important to follow some basic principles:

- 1) The intervention should be “easy.” Making decisions takes time and requires effort. A behavioral intervention should simplify this process by reducing the number of choices (e.g., from 12 to four) or by eliminating hassle (e.g., helping decision-makers to make a choice).
- 2) The intervention should be “salient.” The decision-makers should clearly see the potential consequences of their decisions (e.g., clear visual representation of costs and benefits).
- 3) The intervention should involve some sort of a social pressure. It is well-documented that people are guided by social norms (e.g., following the signs) and are sensitive to peer pressure (e.g., following the example of others).
- 4) The intervention should be done within the correct timing. It has been shown that time is a very important factor predicting buying behavior, doctors’ prescriptions and even the behavior of judges.

## Existing school prevention programs

One way to reduce drug abuse is to start with one of the most vulnerable groups – children. While some school-based prevention programs have shown promise, others have not (Foxcroft and Tsertsvadze, 2012; Strang et al., 2012).

Simple knowledge and awareness-based programs are not effective at preventing the use of illicit drugs (Strang et al., 2012). The ineffectiveness of didactic educational tactics is a serious challenge for mass media approaches and also many traditional programs. For example, Drug Abuse Resistance Education (DARE), a school-based preventive intervention widely adopted in the USA in which police officers provide classroom advice on the dangers of drug use, has been shown to be ineffective at preventing or delaying drug use (Ennett et al., 1994).

Prevention programs that have been successful are the programs that use psychosocial developmental interventions. These include life skills training programs (Botvin et al. 2001, 2003; Faggiano et al., 2008), the Climate Schools programs (Newton et al., 2009a, 2009b, 2010), and the Good Behavior Game programs (van Lier et al., 2004, 2009). For example, the PAX Good Behavior Game, a classroom behavior management program used in some primary and elementary schools in the USA and Europe, has reported positive outcomes 15 years after intervention (Kellam et al., 2008). Another prevention program that has shown promise in the field of prevention of adolescent drug and alcohol use is the Preventure Program (Conrod et al., 2015). This program is based on a cognitive behavioral and motivational approach and it targets four personality risk factors: hopelessness, anxiety-sensitivity, impulsivity, and sensation-seeking. The program has been successfully tested in three separate trials across Canada (Conrod et al., 2006) and the UK (Conrod et al., 2008, 2010, 2011), reducing drinking rates by 50-60% over a six-month period (O’Leary-Barrett et al., 2010) and other associated behaviors, including the use of illicit drugs (Conrod et al., 2010, 2011). Beneficial effects are found after only two 90-minute group-based sessions, making this a cost-effective and practical program to implement (Conrod et al., 2015). A follow-up study also showed that personality-targeted interventions had a positive effect on young people’s mental health outcomes, such as depression, anxiety, and conduct problems over a two-year period (O’Leary-Barrett et al., 2013).

## Target Area 3: Recommendations

Based on behavioral economics approaches, we recommend the following actions:

### Recommendation No. 1

**A knowledge-based program with built-in behavioral economics components:** In contrast to a typical knowledge and awareness-based program (such as DARE), the program should be based on insights borrowed from behavioral economics. When educating participants, behavioral nudges such as social norms, loss aversion, and hyperbolic discounting should be utilized. For example, participants should receive accurate information about how many of their peers use drugs (a social norm nudge), as individual beliefs are often highly exaggerated.

The research (Rosansky and Rosenberg, 2019) identifies that the top two reasons for why adolescents and young adults abstain from using drugs are “fear/concern for physical harms/damages” and “fear/concern for psychological harms/damages.” Also, the long-term negative consequences of drug use (e.g., brain damage) should be emphasized (a loss aversion nudge). Similarly, participants should learn information about the likelihood of staying addicted once they try certain drugs (a hyperbolic discounting nudge). These and other nudges should be used to build an effective knowledge-based program.

### Recommendation No. 2

**A cognitive-behavioral training program similar to the one implemented by Conrod et al. (2006, 2008):** This intervention incorporates principles from the motivational and cognitive-behavioral literatures. The main components of the interventions include (1) psychoeducation, (2) behavioral coping skills training, and (3) cognitive coping skills training. During the psychoeducational stage, participants are educated about personality styles and a variety of problematic coping strategies (including drug use). During the behavioral coping skills training stage, participants discuss the short- and long-term positive and negative consequences of a particular behavior. Finally, during the cognitive coping skills training stage, participants learn how to identify and challenge personality specific cognitive distortions. During this stage, participants complete exercises and engage in discussions based on real life scenarios.

### Suggested Procedures for Implementation for Target Area 3

1. High school students (grades 9-12) in white, lower income school districts
2. Young adults attending career centers and technical schools

## Methods

1. Randomly assign a pre-selected group of, say 30, schools into three conditions: (1) no intervention, (2) intervention No. 1, (3) intervention No. 2.
2. Participants will be surveyed before the intervention. The survey should include questions about demographics, various behaviors, risk factors, and substance/drug use.
3. Each intervention will involve two 90-minute sessions spread across two weeks.
4. If participants are minors, then parents should be informed about their children participating in a study. If they do not wish their child to participate in the study, they should contact the experimenters by phone or email.
5. All interventions should be delivered by master's-level therapists and a co-facilitators (a bachelor's-level research assistant or an undergraduate student).
6. Principal investigators will supervise group training sessions involving all the study therapists and co-facilitators using a common training protocol.

## Target Area 3: Assessment of Outcomes

The outcome measures include short-term and long-term:

1. The short-term outcome assessment will be based on pre-intervention (before the first 90-minute session begins) and post-intervention surveys (after the second 90-min session ends).
2. The long-term outcome assessment will be based on 6-month follow-up survey. Also, we will obtain local records about the frequency of illegal drug use, number of police visits to the school, number of drug-related crimes, etc.

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## Pharmacogenomic Risk Assessment Study

Although not under the direct purview of SCOPE, the Attorney General's Office also has initiated a pharmacogenomics (PGx) study with two members of SCOPE (Caroline Freiermuth and Jon Sprague).

In 2017, over 70,000 people died from a drug overdose in the United States, with 47,600 attributed to opioids. Ohio ranked second in number of deaths, at 46.3 per 100,000.<sup>1</sup> Over 17,000 overdose deaths were related to prescription pain relievers.<sup>2</sup> Efforts have been made to curtail the number of opioid prescriptions generated. Although these efforts have successfully reduced the number of opioid prescriptions, there were still 58.7 prescriptions for every 100 people in 2017.<sup>3</sup> In addition, despite the decrease in the number of opioid prescriptions, opioid related overdoses have continued to rise.<sup>2</sup>

Opioid use disorder carries a large economic burden as well, estimated at upwards of \$504 billion in 2015.<sup>4</sup> Much of this is due to high healthcare costs, with criminal justice costs and lost productivity contributing less. A significant amount of funding has been dedicated to treating complications of opioid use disorder and reintegrating affected persons into society. Only recently has attention been turned to prevention of opioid use disorder.

There is a general lack of understanding about the underlying cause of the disease, with only retrospective studies to date identifying individual risk factors.<sup>5</sup>

Genetic factors have been speculated to account for 40-70% of the risk for alcohol addiction.<sup>6</sup> A review by Mistry et al. found that multiple studies attributed 30-40% of opioid dependence to genetic effects.<sup>7</sup> The review also outlines proposed mechanisms by which genetics affect development of addiction. Only a few specific gene variants have been linked to addiction and are speculated to be associated with the neurobiology of substance use disorder. For decades, the regulation of dopamine release in the nucleus accumbens (NAc) has been demonstrated to be central to the euphoria associated with drugs abuse.<sup>8</sup> The cell bodies for the dopaminergic projections into the NAc originate in the ventral tegmental area. Within the VTA, gamma-aminobutyric acid (GABA), the most abundant inhibitory neurotransmitter in the brain, regulates dopaminergic activity in the NAc.  $\mu$ -opioid receptors in the VTA produce a tonic inhibition of GABA release through the activation of GABA<sub>A</sub> receptors (GABA<sub>A</sub>R). The inhibition of GABA release by  $\mu_1$ -opioid receptor activation results in a subsequent increase in dopamine in the NAc.<sup>9,10</sup> Through the co-localization of the GABA<sub>A</sub>R and  $\mu_1$ -opioid receptors, a disinhibitory response is mediated. Genetic variations in the  $\mu$ -opioid receptor gene (OPRM1) can mediate individual differences in response to pain and opiate addiction. For example, a common OPRM1 single nucleotide polymorphism (SNP) that has been shown to have functional consequences is

the A118G SNP (rs1799971). This missense SNP changes the N-terminal region amino acid asparagine to aspartic acid, which decreases the function of the  $\mu$ -opioid receptor. The A118G SNP is present in 5-30% of the general population with some racial variation.<sup>11</sup> Manini et al. found that the 118G allele conferred 5.3-fold increased odds of cardiac arrest/respiratory arrest<sup>12</sup>. These findings suggest that the 118G variant allele in the OPRM1 gene is associated with the severity of the clinical outcomes in patients with acute opioid overdose.

Opioids are primarily metabolized by the cytochrome P450 (CYP) enzyme system. This system is susceptible to SNPs that alter the function of these enzymes. The metabolism of the opioids has been shown to be mediated by a number of CYP enzymes, including CYP2B6, CYP2C9, CYP2C19, and CYP2D6. When considering metabolizer phenotypes of the various CYPs, the exposure to a given opioid parent compound can be anticipated. Normal metabolizers (NM) would expect an average exposure to a given opioid as expressed by the maximum concentration (C<sub>max</sub>) and the area under the concentration versus time curve to infinity (AUC). An intermediate metabolizer (IM) would be expected to have an increased exposure to a given opioid, as compared to a NM, as drug metabolism is decreased. This would result in an increased C<sub>max</sub>, AUC, and a longer half-life ( $t_{1/2}$ ) and potential toxicity. A poor metabolizer (PM) would be expected to have the greatest exposure to a given opioid as their metabolism is decreased further, being less than the IM. In some cases, the metabolism may be increased above that seen for a NM; this is termed rapid metabolism (RM). An ultrarapid metabolizer (UM) has increased enzyme activity beyond that of a RM. For example, the CYP2B6\*6 allele has been associated with the regulation of plasma concentrations of methadone<sup>13</sup>. Hence, genes that regulate the metabolism and pharmacokinetic characterization of the opioids will also be screened.

Based upon these observations, we propose that a genetic mutation profile is associated with OUD and opioid related overdose. In this model, we propose to classify the genes of interest into three groups: 1) dopamine reward pathways, 2) opioid pharmacodynamics responses and 3) opioid metabolism.

Our contribution here is expected to be the identification of addiction risk genes for OUD. Identification of these key gene variations associated with OUD will help to facilitate the development of G-OARS guidelines for managing pain with opioids while reducing the risk for OUD and overdose. G-OARS assisted treatment guidelines have the potential to reduce morbidity, mortality, and healthcare costs associated with OUD and opioid overdose. Additionally, this knowledge will inform the refinement pain management. Finally, the G-OARS would provide critical information to children and family members of addicts to understand their addiction risk and reduce the onset of new addiction.

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## Appendix A: Sample Summary table of literature review

Authors	Source	Title	Sample Size	Design	Findings	Conclusion
Bicket et al.	JAMA Surg. 2017 152(11): 1066-71	Prescription opioids commonly unused after surgery: a systematic review	810 6 studies	Comprehensive search through Oct 2016	67-92% of patients reported unused opioids (higher for outpatient surgeries). Most patients stopped taking opioids due to pain controlled. 73-77% of opioids were not locked up. 4-30% disposed of or planned to dispose of opioids.	Patients commonly have opioids that are unused after surgical procedures. Most opioids are not securely stored. Most patients do not dispose of unused opioids.
Feinberg et al.	Ann Surg 2018; 267:1056-62	Opioid use after discharge in postoperative patients: a systematic review	3,562 11 studies	Comprehensive search through Dec 2016 Peds and adults	42-89% opioids were unused (only 10% unused for peds spinal fusion study). 70% of patients kept unused opioids. 4-59% planned to dispose of unused opioids.	Patients commonly have opioids that are unused after surgery. Most patients do not dispose of unused opioids.
Douchette et al.	Ann Int Med 2018; 169(3): 198-99	Storing and disposing of opioid analgesics: What does our medicine tell us?	6 meds: hydrocodone, hydromorphone, oxycodone, ramadol, fentanyl, morphine  98 package inserts	Read package inserts to determine presence of instructions regarding safe storage and/or disposal.	No tramadol inserts have any instructions for safe storage or disposal. Only 1/33 for hydrocodone had such.	Messages about safe storage and disposal are often lacking on prescription inserts. Those that are present vary.

## Appendix B: Sample Journal Club

“The Effect of Adverse Childhood Experience on Clinical Diagnosis of a Substance Use Disorder:  
Results of a Nationally Representative Study”

McKenzie Lynn LeTendre & Mark Reed

Center for Alcohol and Drug Studies and Services, School of Social Work  
San Diego State University May (2017)

**Background:** Impact of SUD and associated ACEs.

- 2006 CDC reported 88K deaths and 223.5 billion dollars spent related to excessive alcohol use
- 2007 over 40K drug abuse deaths with 193 billion spent on healthcare costs and additional social impacts of the issue (crime, lost productivity & premature death)
- 1994-2008 UNC Chapel Hill-National Longitudinal Study of Adolescent to Adult Health-ADD Health study-adolescents grades 7-12 approx. 20K students-looked at every aspect of their life related to health. Over 4 waves of research, years in between, researchers (Harris & Udry) conducted in home interviews of similar information with student and significant other to obtain longitudinal health data. Study was supported by many U.S. governmental agencies
- 1998 first ACE study per CDC and Kaiser Hospital-San Diego. Study reported those individuals who reported 4 or more adverse childhood experiences had 4 to 12 fold risk of developing alcohol or drug abuse problems
- National Epidemiologic Survey on Alcohol & Related Conditions (Keys & Hasin, 2009 NIH/NIAAA) reported from N=36K between 1991-2005 2 or more ACEs significantly increased risk for developing alcohol dependence after controlling for binge drinking.
- Begin exploring resilience/protective factors

**Objectives of LeTendre & Reed study:** to demonstrate a relationship between ACEs and a substance use disorder using nationally representative data, as well as test whether religion moderates this relationship.

**Methods:** Secondary analysis of National Longitudinal Study of Adolescent to Adult Health. N=11279. A logistic regression was performed to consider if multiple types of ACEs (physical, emotional, and sexual abuse) increased SUD (alcohol, cannabis and drug). Researchers controlled for prior SUD and other demographics previously shown to increase SUD. AND was religiosity a moderator between SUD and ACEs. Multistage stratified cluster sampling design. Results were obtained by comparing Wave 3 and 4 to Wave 1. Question related to alcohol, “In the past year, how many times have you consumed 5 drinks in a row? And supported by USPSTF, single item screening-(McNeely et al 2015).” Also descriptions of how obtained info

regarding SUD, ACEs and Religiosity which could be useful to SCOPE. Used DSM IV criteria in these areas as well. SPSS ver 22 used in data analysis with  $p < 0.05$ .

### **Key Findings:**

1. "Likelihood of developing SUD later in life increased as the score on the ACE index increased, even after adjusting for previous SUD. Religiosity significantly reduced the likelihood of developing SUD no moderating effects were observed." Religiosity has been shown to be a protective factor in other studies.
2. Identification of Key words for SCOPE-ACEs, Religiosity, Resilience, Abuse, ADD Health (National Longitudinal Study of Adolescent to Adult Health)
3. Demographic associations related to results were available (bivariate analysis and multivariate regression). In all categories men at greater risk than women. Overall, ethnicity not related or white greater than others. Increase in education level less SUD.
4. Increase ACEs, increase SUD
5. Early exposure to substances more likely to develop SUD.
6. Every ACEs unit increase, increase SUD by 41%

### **Discussion relevant to SCOPE:**

1. Role of religiosity-modest effect of 8 to 11% reduction for developing SUD and could be considered a resilience factor. Protective or Preventive factor?
2. Authors support a "trauma informed" approach to all strategies

### **Strengths:**

1. Sample size
2. U.S. national sample
3. Data collection was concurrent instead of retrospective and longitudinal corresponding in the typical ages for substance use development-16.6 Wave 1 and 28.9 Wave 4.

### **Limitations/Weaknesses:**

1. May be lacking some data because some with a history of cannabis use dropped out of the study after Wave 1.
2. Is it possible that religiosity is a moderating factor but this study did not ask the right questions to capture the information about religious integration within a person?
3. Recall bias in Wave IV
4. Data is still old when comparing to 2019
5. Wave 1 data had data gaps between 36-65%
6. Predominantly white sample-6862, then AA 2215, then the rest of the ethnic group numbers range from 115-823. Does this sound like a correct U.S. distribution-looks similar to U.S. Census data.  
<https://www.census.gov/quickfacts/fact/table/US/PST045218>

## Appendix C: Continuing Education in Ohio without Substance Use Disorder Requirements

<b>SCOPE – Occupational Drug Education Mandates</b>	
<b>Occupation</b>	<b>Licensing Body/ORC</b>
Accountants	Accountancy Board. R.C. 4701.06; R.C. 4701.061; R.C. 4701.10; R.C. 4701.14
Acupuncturists	State Medical Board. R.C. 4762.04
Anesthesiologist Assistants	State Medical Board. R.C. 4760.03
Architects	Architects Board. R.C. 4703.06
Athlete Agents	Ohio Athletic Commission. R.C. 4771.05
Attorneys	Supreme Court of Ohio. R.C. 4705.01
Certified Behavior Analysts	State Board of Psychology. R.C. 4783.04
Chemical Dependency Professionals	Chemical Dependency Professionals Board. R.C. 4758.24
Chiropractors	State Chiropractic Board. R.C. 4734.20; R.C. 4734.27
Construction Industry Contractors	Construction Industry Licensing Board (divided into an administrative section and three specialty sections. The license application goes through the applicable specialty section and is approved by said section, while the administrative section administers the examination and issues the license.). R.C. 4740.02; R.C. 4740.04(C)(1); R.C. 4740.05(A)(2) and (4); R.C. 4740.06
Cosmetologists & Barbers	State Cosmetology and Barber Board. R.C. 4709.09 (barbers); R.C. 4713.35 (cosmetologists)
Counselors, Social Workers, Marriage and Family Therapists	Counselor, Social Worker, and Marriage and Family Therapist Board. R.C. 4757.16 (each filing with an appropriately labeled committee).
Dentists; Dental Hygienists	State Dental Board. R.C. 4715.10 (dentists); R.C. 4715.20 (dental hygienists); R.C. 4715.53 (dental x-ray machine operators); R.C. 4715.62 (expanded function dental auxiliaries)
Dietetics	State Medical Board. R.C. 4759.06
Embalmers, Funeral Directors, Crematories	Board of Embalmers and Funeral Directors. R.C. 4717.05 (embalmers and funeral directors); R.C. 4717.051 (crematory operators)

## SCOPE – Occupational Drug Education Mandates

Emergency Service Telecommunicators	State Board of Education / 4742.02
EMTs	State Board of Emergency Medical, Fire, and Transportation Services. R.C. 4765.11; R.C. 4765.17
Engineers & Surveyors	State Board of Registration for Professional Engineers and Surveyors. R.C. 4733.14
Genetic counselors	State Medical Board. R.C. 4778.03
Hearing Aid dealers	State Speech and Hearing Professionals Board. R.C. 4747.05
Home inspectors	The Ohio Home Inspector Board establishes the licensing rules, R.C. 4764.05, and the superintendent of real estate and professional licensing administers them. R.C. 4764.07.
Home Medical Equipment Providers	State Board of Pharmacy. R.C. 4752.05
Landscape Architects	Ohio landscape architects board. R.C. 4703.33
Manufactured Homes Commission	Varies between the Division of Industrial Compliance and Division of Real Estate (divisions of the Department of Commerce). Division of Industrial Compliance: R.C. 4781.08 (manufactured housing installer). Division of Real Estate: R.C. 4781.17 (manufactured housing dealers, manufactured housing brokers, and manufactured housing salespersons).
Motor Vehicle Collision Repair Operators	Motor Vehicle Repair Board. R.C. 4775.04
Nurses	Board of Nursing. R.C. 4723.09 (registered nurses); R.C. 4723.41 (nurse-midwifery and other specialties); R.C. 4723.65 (medication aide); R.C. 4723.75 (dialysis technician); R.C. 4723.76 (dialysis technician intern).
Nursing Home Administrators	The Board of Executives of Long-Term Services and Support (or an entity under contract with the board). R.C. 4751.06
Occupational Therapists; Physical Therapists; Athletic Trainers	Ohio Occupational Therapy, Physical Therapy, and Athletic Trainers Board. R.C. 4755.08 (Occupational therapists; the licenses being issued by the occupational therapy section of the Board); R.C. 4755.44 (Physical therapists; likewise with the physical therapy section); R.C. 4755.62 (Athletic trainers; likewise with the athletic trainers section).
Optometrists; Dispensing Opticians	State Vision Professionals Board. R.C. 4725.02 (optometrists); R.C. 4725.41 (dispensing opticians and ocularists); R.C. 4725.50 (ocularists)
Orthotists, Prosthetists, Pedorthists	Ohio Occupational Therapy, Physical Therapy, and Athletic Trainers Board. R.C. 4779.09.

## SCOPE – Occupational Drug Education Mandates

Pawnbrokers	Superintendent of Financial Institutions (the Division of Financial Institutions is within the Department of Commerce). R.C. 4727.02
Pharmacists	State Board of Pharmacy. R.C. 4729.07; R.C. 4729.08
Physician Assistants	State Medical Board. R.C. 4730.10
Physicians	State Medical Board. R.C. 4731.14; R.C. 4731.56
Private Investigators	Director of Public Safety. R.C. 4749.02; R.C. 4749.03
Psychologists	State Board of Psychology. R.C. 4732.09; R.C. 4732.13. For School Psychologists, either the State Board of Psychology or the State Board of Education. R.C. 4732.21.
Radiation Technicians	Department of Health. R.C. 4773.03
Radiologist Assistants	State Medical Board. R.C. 4774.04
Real Estate Appraisers	Superintendent of Real Estate, in accordance with the rules of the Real Estate Appraiser Board. R.C. 4763.03
Real Estate Brokers	Superintendent of Real Estate (the executive officer of the Ohio Real Estate Commission, which is a part of the Department of Commerce). R.C. 4735.08 (real estate broker's license); R.C. 4735.09 (salesperson's license)
Respiratory Care	State Medical Board. R.C. 4761.05
Sanitarian	Director of Health. R.C. 4736.11
Security Services	Director of Public Safety. R.C. 4749.02; R.C. 4749.03
Speech-Language Pathologists and Audiologists	State Speech and Hearing Professionals Board. R.C. 4753.07 (Speech-language pathologists and audiologists); R.C. 4753.072 (speech-language pathology aides and audiology aides).
Veterinarians	State Veterinary Medical Licensing Board. R.C. 4741.03; R.C. 4741.11

## Appendix D: Healthcare Academic Program Survey

# Opioid and Substance Abuse Disorders Education Survey

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Start of Block: Introduction

Q0 What academic discipline does your program represent?

- Medicine (MD, DO, Podiatry) (1)
- Nursing (MSN, APRNs, NPs) (2)
- Physicians Assistant (3)
- Pharmacy (4)
- Dentistry (5)

End of Block: Introduction

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Start of Block: Substance Use Disorder

Q1.1 Are students educated on the DSM-5 criteria for Substance Use Disorder (SUD) as part of the core curriculum?

Yes (1)

No (2)

Q1.2 Are students taught about the neurobiology of SUD as part of the core curriculum?

Yes (1)

No (2)

Q1.3 Are students taught about the addiction cycle as outlined by Health and Human Services as part of the core curriculum?

Yes (1)

No (2)

Q1.4 Are students taught about the ethical issues in pain management?

Yes (1)

No (2)

Q1.5 Are students taught about the ethical issues in SUD?

Yes (1)

No (2)

Q1.6 Are students educated on medication assisted treatment (MAT) for SUD?

Yes (1)

No (2)

Q1.7 Are students taught about non-opioid prescription medication therapy for SUD?

Yes (1)

No (2)

Q1.8 Are students taught about over the counter medication therapy for SUD?

Yes (1)

No (2)

Q1.9 Are students taught about physical therapy options for SUD?

Yes (1)

No (2)

Q1.10 Are students taught about relaxation therapy options for SUD?

Yes (1)

No (2)

Q1.11 Are students taught about massage therapy options for SUD?

Yes (1)

No (2)

Q1.12 Are students taught about community program options to assist in the treatment of SUD?

Yes (1)

No (2)

Q1.13 Are students educated on the support infrastructure available to patients suffering with SUD? (recovery housing, counseling centers)

Yes (1)

No (2)

End of Block: Substance Use Disorder

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Start of Block: Triage and Initial Screening

Q2.1 Are students taught about the mechanism of pain in the human body (nociceptive pain, neuropathic pain, other pain)?

- Yes (1)
- No (2)

Q2.2 Are students taught how to properly use patient pain assessment scales and tools? (including pediatric pain scales)

- Yes (1)
- No (2)

Q2.3 Are students taught about additional factors affecting pain? (Check all that apply)

- Age (1)
- Cultural beliefs (2)
- Gender (3)

Q2.4 Does the curriculum include training in non-pharmacological methods for pain management? (including psychology, physical therapy)

- Yes (1)
- No (2)

Q2.5 What is the extent of education students receive on the use of pharmacological therapy combinations for pain management?

- Not at all (1)
- To a small extent (2)
- To a moderate extent (3)
- To a great extent (4)

Q2.6 What is the extent of education students receive on the use of non-pharmacological therapy combinations for pain management?

- Not at all (1)
- To a small extent (2)
- To a moderate extent (3)
- To a great extent (4)

Q2.7 Are students trained to evaluate a patient using interviewing techniques such as motivational interviewing?

- Yes (1)
- No (2)

Q2.8 Are students trained to evaluate a patient's risk of medication abuse based on: (Check all that apply)

- Age (1)
- Culture (2)
- Gender (3)
- Disease history (4)

End of Block: Triage and Initial Screening

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Start of Block: High Risk Patients

Q3.1 Are students taught how to search for a patient history of pain medication usage using Prescription Drug Monitoring Programs such as OARRS?

- Yes (1)
- No (2)

Q3.2 Are students educated on the best practice methods to initiate and manage substance use disorder treatment?

- Yes (1)
- No (2)

Q3.3 How much of the curriculum covers evidence-based plans for safe pain management in patients more susceptible to medication abuse?

- Not at all (1)
- Somewhat (2)
- Moderate (3)
- To a great extent (4)

Q3.4 Are students trained in encounters involving high risk patients? (*High risk patients, according to the CDC, are those who exhibit some or all of the following: a past history of overdose, a history of substance use disorder, high opioid dosages (>50 MME/day), and concurrent benzodiazepine use.*)

- Yes (1)
- No (2)

Q3.5 Are students trained in methods to safely taper pain medications?

- Yes (1)
- No (2)

Q3.6 Are students taught how to support patients to avoid drug abuse?

Yes (1)

No (2)

Q3.7 Are students taught how to support patients to avoid drug relapses?

Yes (1)

No (2)

Q3.8 Are students educated on the steps to take when a patient has overdosed?

Yes (1)

No (2)

Q3.9 Are students taught how to restart therapy after a relapse?

Yes (1)

No (2)

Q3.10 Are students taught to restart therapy after an overdose?

Yes (1)

No (2)

End of Block: High Risk Patients

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Start of Block: Chronic Pain Management

Q4.1 Are students educated about the signs of substance abuse in chronic pain patient populations?

- Yes (1)
- No (2)

Q4.2 What is the extent of education students receive in managing chronic pain?

- Not at all (1)
- To a small extent (2)
- To a moderate extent (3)
- To a great extent (4)

End of Block: Chronic Pain Management

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Start of Block: Adverse Childhood Events

Q5.1 Are students taught to assess for the following in patients treated for pain? (Check all that apply)

- Childhood neglect (1)
- Childhood physical/psychological abuse (2)
- Sexual abuse as a minor (3)
- Childhood exposure to domestic violence (4)
- Parental psychopathology (5)
- Other traumatic childhood events (6)

Q5.2 Are students educated on evaluating patients based on a combination of the following factors? (Check all that apply)

- Sex (1)
- Race (2)
- Ethnicity (3)
- Marital status (4)
- Employment (5)
- Education (6)
- Insurance coverage (7)
- Disability income support (8)
- Geographical region (9)

Q5.3 Does the curriculum include steps to adapt a pain management plan based on adverse childhood events?

- Yes (1)
- No (2)

End of Block: Adverse Childhood Events

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