

CONTRIBUTING FACTORS FOR OPIOID MISUSE AMONG U.S. ADOLESCENTS

Deidre N. Hurse

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Doctoral Committee

July 1, 2019

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Brent Arnold Ph.D., Chair

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Peter Altenburger Ph.D.

---

Elizabeth Goering Ph.D.

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Chandan Saha Ph.D.

---

Augustine Agho Ph.D.

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Deidre N. Hurse

## DEDICATION

I dedicate this document to the men in my life, my dad Rudolph Verdun, sons Devin and Dont'a Hampton, and husband Jessie Hurse for all their support and to all those close to me who I lost while pursuing this degree: Billie Verdun-Wright, Andre Baker, Jean Smith, Lula Hurse, Jessie Hurse Sr., Vernon Wilson, Chauncey Rogers, and to my mother who died when I was seven years old but lives in my heart always Ollie May Verdun. Lastly I dedicate this body of work to my granddaughter Ky'Aisa Bell and all the little girls from Flint that aspire to be the best versions of themselves.

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## CONTRIBUTING FACTORS FOR OPIOID MISUSE AMONG U.S. ADOLESCENTS

The United States is amidst an opioid overdose epidemic. Even with significant gaps in surveillance data on opioid-related deaths, the problem is undeniable and requires a systemic response. Despite the dangerous effects of opioid misuse, pathways that lead to opioid abuse for young people is understudied. This study sought to understand factors related to opioid misuse among youth. An exploratory approach used data from both quantitative and qualitative sources. The convergent parallel mixed method design used secondary data from a biannual school-based survey and three oral interviews. While opioid misuse is not limited to heroin, the 2013, 2015, and 2017 Youth Risk Behavior Surveillance Survey (YRBS) was used to determine associations between predictor variables and heroin use. Oral interviews added the perspective of adolescent users and were inclusive of persons that misused prescription and other forms of opioids. The synchronization of data analysis allowed observations to impact the study direction unilaterally.

Opioid misuse for youth was related to experiences, access, and divergent substance use. Traumatic stressors, such as physical dating violence and sexual dating violence, had the most substantial relationship with heroin misuse. Findings confirmed that ease of access had a relationship with misuse. It is unclear if opioid misuse was a result of polysubstance use. However, the study identified that divergent substance use was correlated with opioid misuse in this population. The study findings support the use of early intervention before high school. Prevention must be inclusive of primary, secondary, and tertiary approaches. Future prevention for youth can be enhanced by

addressing resilience from trauma, reducing access to opioids and addressing alcohol, and substance use among youth. Adopting a framework that acknowledges the root causes of misuse, can mitigate the impact of the opioid crisis and save lives.

Brent Arnold Ph.D., Chair

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## **Chapter 1: Introduction to the Research**

Far too many people in the United States (the U.S.) are currently fighting a battle with opioid addiction. Across the country, facts and figures are making headlines, showcasing the pervasiveness and sheer magnitude of the current opioid issue. A variety of data points articulate the diverse dimensions of the problem. There is undoubtedly a consensus that it poses a public health crisis. What also cannot be refuted is the fact that we need to learn more. There is a significant gap in surveillance data on opioid-related deaths; however, based on existing statistics, the Centers for Disease Control (CDC) has unequivocally declared that the U.S. is indeed suffering from an opioid overdose epidemic. By way of an online epidemiological research platform, the CDC reports that in 2014, in excess of 28,000 people died because of opioids, and at least 50% of the deaths involved a prescription opioid (CDC, 2018). That same year, approximately 19% of death certificates for drug-poisoning deaths lacked information on the specific drugs involved (National Center for Health Statistics, 2016).

In a complex healthcare system of evolving, reactive policies, strategies to prevent and appropriately address opioid misuse amongst young people in the U.S. is dependent on gaining a better understanding of the risks for abuse. Despite biological and emotional harm, there exists little knowledge about pathways that lead to opioid abuse for young people. Furthermore, there is limited information known regarding adolescent-specific opioid abuse prevention. This study aims to highlight how understanding the pathways to opioid use and determining the

factors specific to young people who have previously used heroin, can inform future prevention efforts.

### **Contributing Factors to Opioid Misuse**

The difficulty with opioids is that the first introduction can be based on a legitimate need, such as a chronic illness or an injury. The synthetic street drug heroin and access to non-medical opioids further complicate the problem, making it more challenging to understand how and why people start misusing. In the absence of a clear understanding of how and why people start (mis)using, prevention can be negatively impacted. Since prescription opioids are often introduced legitimately, the course of investigation for this study starts with the path of least resistance, street drugs.

Illicit drugs such as heroin and animal tranquilizers such as carfentanil are classified as opioids. Heroin is synthesized from morphine, and like prescription opioids, it binds to and activates mu-opioid receptors in the brain, resulting in the sense of pleasure (Johnson & North, 1992). Heroin can become the drug of choice for persons with opioid addiction because of its low cost and ease of acquisition. Nearly all (94%) respondents in a survey of individuals in treatment for opioid dependence reported heroin as their preferential opiate because prescription opioids were "far more expensive and harder to obtain" (Cicero, Ellis, Surratt, & Kurtz, 2014). Findings like these do not fully explain users' motivation for misusing opioids. While several articles substantiate the preference and ease of access for synthetic opioids, they only reveal that a preference for street drugs is most likely after a dependency has already occurred. The problem is that without

much in the literature to clarify the channels leading to misuse for youthful users, prevention efforts have become overly focused on targeting providers with the ability to prescribe. This medicalization of the problem is important to understanding pathways to misuse, but it fails to consider the social context in which young people may start using.

The connection between illegal and prescription opioids is well documented in the literature, both nationally and internationally. Researchers from Canada were amongst the first to record a causal relationship between a physician's willingness to prescribe opioids and increased opioid abuse and opioid-related deaths (Dhalla, Mamdani, Sivlotti, Kopp, Qureshi, & Juurlink, 2009). King et al. found similar findings in the U.S. by way of an extensive analysis of the literature expanding 67 years (King, Fraser, Boikos, Richardson, & Harper, 2014). Opioid analgesics are inclusive of oxycodone, hydrocodone, codeine, morphine, fentanyl and other FDA-regulated medications.

This apparent connection may explain why an increase in heroin consumption parallels the rise in availability of prescription opioids, but it does not explain why people start using them. Alleviating pain is a logical presumption to why people use opioids, but it doesn't fully explain the rationale for misuse. Suppression of pain both physical and emotional, coupled with social pressure, and the perceived safety of prescription medication makes it difficult to isolate the behaviors that should be targeted in prevention efforts. Furthermore, biological addiction has a role in abuse and there are other elements at play. Contextualizing pain and considering the social context for why people misuse opioids raises

questions about what leads to opioid abuse. Directing efforts to those who need it the most is a practical approach to reducing opioid abuse and preventing related complications associated with abuse such as overdose deaths and the spread of communicable diseases like HIV and HCV. Currently, prevention in adolescents is understudied and often coupled with alcohol and other drugs.

### **The Rationale for the Population of Interest**

Substance abuse has been long recognized as a problem amongst young people, but historically it focused on alcohol, marijuana, and nicotine. The misuse of prescription opioid drugs has reached epidemic proportions in American society and while the population of individuals who misuse is diverse, as much as 3.6% of adolescents aged 12 to 17 have recently been identified for their misuse of opioids annually" ("Opioids and adolescents," 2018). The outcomes of misuse are serious and, in many cases, lead to overdose deaths, with over 4,230 adolescent deaths resulting from opioid misuse in 2015 ("Opioids and adolescents," 2018). The population of interest for this study is the youth because prevention at this stage in life may help to avert addiction throughout the lifespan. Brain development during adolescence influences both the likelihood that persons will misuse opioids and experience cognitive deficits and neurological transformation because of abuse. Substance use during this critical period of development has the potential to negatively impact academic, occupational, and social functioning extending into adulthood. Therefore, identifying prevention efforts that can avert misuse is a societal obligation (Squeglia, Jacobus, & Tapert, 2009).

## **Theoretical Frameworks for Understanding the Problem**

The goal of this investigation is two-fold. The first component of inquiry is to evaluate factors about adolescent opioid use since 2013. Data are from a biennial, school-based survey the national Youth Risk Behavior Surveillance Survey (YRBS). The YRBS produces nationally representative estimates about health and risk behaviors, including substance use, amongst high school students (Kann et al., 2014). Data from 2015 is used as a sample representation of the comparison population of self-reported heroin users. Variables thought to have a relationship with heroin, based on presumptions from the researcher's professional experience and data from the oral interviews, were examined. This exploratory analysis examines adolescent heroin use in the context of social factors and situational stressors, such as physical altercations, intimate partner violence, and suicidal ideation. The qualitative assumptions regarding adolescent opioid misuse are ontological in nature. While the study aims to gather understanding related to the experience of young people who misuse opioids, insight about heroin use in relationship to social factors and situational stressors provides useful information that can be used to tailor future prevention efforts. Data from the YRBS was selected because it is nationally representative and methodologically rigorous.

Additionally, due to YRBS surveys being administered in a school setting, young people are less likely to underreport substance use (Administration, 2012). Furthermore, 9th to 12th graders are surveyed, and the resulting estimates represent U.S. high school students as a whole, versus specific grades. Thus, the

results can be used to summarize the prevalence of heroin use in U.S. high schools. YRBS sampling is inclusive of both public and private schools with respondents receiving their education in the 50 states and the District of Columbia. The sampling frame for YRBS historically has been based on the Market Data Retrieval (MDR) database and data collected by the National Center for Education Statistics (U.S. Department of Education National Center for Education Statistics, 2016).

The second aspect of inquiry relies on reflective interviews with adults who self-report misusing opioids during adolescents. This qualitative exercise is not intended to make broad generalizations about the population but rather ensure that assumptions gathered from the literature and quantitative investigation are inclusive of the experiences of persons who misused opioids during their youth. Because of the subject matter, ethical concerns around confidentiality and parental consent are a barrier to recruiting youth who report use persons under 18 years old were not included in the interviews. Subjects were involved in a privately directed dialogue with the researcher. The objectives were exploratory and aim to understanding factors surrounding the nature of opioid misuse among youth better. Additionally, the perspective of what is needed in terms of prevention was explored with the subjects. This is an important element of inquiry. The way past users perceive prevention can affect the future development of interventions.

While the quantitative aspects of the study use deductive reasoning, the research questions and the nature of the study elements utilize inductive

reasoning. Grounded theory is an appropriate approach for this type of study because of its exploratory nature. Grounded theory serves as the primary theoretical approach. When using a grounded theory research design, data analysis begins with data collection unlike other analytical approaches that are predicated on the completion of data collection before the commencement of analysis (Urquhart, 2013).

### **The Importance of Designing Prevention Efforts With a Population in Mind**

Tailoring prevention to groups at the highest risk for disease has shown to be effective in many health-related disciplines. Theoretical approaches to changing behavior, such as the health belief model, are widely accepted in disease prevention and behavior change programming. Findings from a study on harm reduction amongst intravenous drug users found that both susceptibility and self-efficacy, elements of the health belief model, were contributing to harm reduction behaviors (Bonar & Rosenberg, 2011). Documented as effective in harm reduction and disease prevention, successful interventions using the health belief model are centered on the participant's ability to succeed at avoiding risky or triggering behaviors. This supports the need to know more about the risks for opioid abuse. Another commonly used model for prevention is the trans theoretical model. This theoretical framework requires a person to have a clear understanding of behaviors to change or avoid in order to achieve the desired health outcome. Once unhealthy behaviors found to contribute to abuse are better understood, introducing behavior change models could be critical in preventing opioid misuse for persons at risk. Better understanding about contributing factors

to opioid misuse would improve prevention efforts using behavior change theories. The investigation of stressors and social factors can be used to illuminate the gaps in existing preventative interventions as well offer insight into what subpopulations of youth may most benefit from them.

### **Purpose of the Study**

Prevention of substance use in the U.S. is both personal and political. The impact of well-executed prevention can be lifesaving, yet the strategies, funding, and support for prevention are interdependent on the political and social will of the people with the power to carry out such prevention activities. Comprehensive approaches to health promotion require altering the practices of social systems that have far-reaching adverse effects on health instead of solely changing the habits of individuals. Without exploratory studies such as this one, historical models of prevention take precedence. With such catastrophic effects on our society outside-the-box innovative strategies are needed. Vigorous and constant attention on the problem may slowly lead to systemic change that will ultimately reduce opioid misuse.

The purpose of this study is to examine pathways to opioid misuse for adolescents with the intention of offering insight that can inform future prevention efforts. The potential for opioid misuse in adolescents is a significant concern given the risk of death and the lifetime effects of addiction. The study uses the experiences of people who used opioids during adolescence to better understand the population at risk of misuse. This is accomplished by both interviews and analyses of 15 various factors thought to be correlated with misuse. The 15 factors

chosen are not comprehensive but rather a starting point for an examination of the contributing factors that lead to misuse. The biological difference between adults and youth should also be explored in future studies.

Considering the manner in which opioids impact the brain and the addictive principals, the motivation for use can be different from other drugs. There is also a difference in the social perception of opioids. Even in street form, opioids currently do not carry the social stigma of drugs such as crack or meth. There is somewhat of a social acceptance to opioids, likely attributable to the medicalization of the problem. This study does make note of some demographical attributes of the youth who report using heroin in the YRBS survey but did not take in consideration other social factors such as region. The focus was on dynamics that are common among youth and did not address disparities that exist among sub populations. The study attempts to avoid stigmatization of any particular group while achieving a better understanding of youth who misuse because such insights may have implications for economic decisions related to prevention based on the theory of bounded rationality. The 15 factors selected for inquiry are inclusive of situations that weigh heavily on human capital externalities. Factors like suicide, trauma, and abuse of alcohol and other drugs impact the productivity and economics of communities.

If more is known about the population prevention and policy can be impacted. The theory of bounded rationality suggests that more informed decision makers are more likely to allocate funding for prevention and social support. Developing appropriate messages that influence determinations is predicated on

understanding the cognitive processes and social influences of the decision makers. Bounded rationality is profoundly concerned with how the actual decision-making process influences the decisions that are reached. Findings from the study could be used for institutional and governmental justification and rationalization for opioid misuse prevention programming by directly aiding in their ability to conceptualize the problem. The firsthand accounts of opioid misusers' experiences should not be overlooked. The prevalence of stressors experienced by youth who misuse such as suicidal ideation and intimate partner violence are pertinent to conversations about prevention. Studies such as this give credence to the inherent connection between those factors and opioid misuse. In the 2015 HIV outbreak in Indiana, HIV infections were linked to opioid misuse. As a policy response, needle exchange protocols were adopted and implemented as a preventative measure.

However, it is not enough to simply recognize that opioid misuse is a problem. Information that indicates where resources should be targeted has the most impact on the decision-making process. Tailored messages based on study findings can increase the appeal for targeted interventions among stakeholders. The inclusion of needs unique to those at the highest risk can shift the social and political decisions and aid in preventing vulnerable populations from ever misusing opioids.

### **Limitations**

The study is small and not comprehensive of the entire youth population using heroin. Additionally, data are limited to heroin and are not entirely inclusive

of all opioid misuse, possibly limiting the generalizability of the results to all persons at risk of opioid misuse. Despite the noted limitations, the findings are likely to add to the body of knowledge meeting the standards for scientific inquiry.

The limitations associated with grounded theory arise from the methodology. While the data can be rich and meaningful, the data collection process may also be challenging. When using grounded theory, research is immersed in the data, unlike other methods that allow a more objective perspective. There is also probable cause to be concerned about methodological errors. Often the data interpretation using grounded theory can be subjective. Generalizability can also be a limitation of grounded theory studies. The limitations of only applying grounded theory are addressed by including descriptive and statistical analyses of youth who self-reported heroin use. The interviews serve as a narrative to help ensure attributes are represented that were not available for comparison due to the utilization of a secondary data source. There are factors related to the social and physical environment that are not captured in the YRBS survey that could be related to opioid misuse.

### **Ethical Considerations**

One of ethical considerations is the implication of the study findings. While there is no identifying information revealed in the data analysis, the population of interest is vulnerable in nature. Every effort to reduce stigma attributed to substance-using youth will be considered. It is the intention of this study to understand better behaviors and demographical characteristics of youth

using heroin to support prevention efforts. While results may be informative in nature, they are not intended to infer or attribute social generalizations stigmatizing youth or persons using substances. The need to improve prevention efforts is of the utmost importance when considering the trends in overdose and opioid misuse within the population. Interpretation of the findings from this exploratory study can aid in the development of targeted prevention efforts, mitigating the risk of any adverse social generalizations that the findings may unintentionally generate.

## **Chapter 2: Literature Review**

Prescription and street drugs both lend themselves to abuse. A widely understudied type of drug abuse is the non-medical use of opioid prescriptions (NMUOP). Increasingly, adolescents and young adults are becoming victims of addiction to these powerful drugs. This literature review focuses on the young adult/adolescent abuse and misuse of opioids.

Access to pain medication is an area of concern for young Americans. NMUOP among youth has surpassed all illicit drugs except marijuana (Fiellin, Tetrault, Becker, Fiellin, & Desai, 2013). The Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality conducted a national survey in 2014. The findings from the survey were startling. Nearly 36% of the 467,000 adolescents identified as non-medical users of pain relievers reported having an addiction to prescription pain medication. Based on the national survey, they estimated that in 2014 28,000 adolescents had used heroin of which 18,000 had developed a heroin use disorder (Rockville, 2014). Strategies to prevent opioid misuse are complicated by the increased access indicating a need for more information about people at risk.

### **Trends in Opioid Use**

Documented as a social problem for a long time, the misuse of opioids is not a new phenomenon. In 1527 Paracelsus, considered the founder of toxicology, introduced an opium-based pain reducer called laudanum, derived from the Latin verb *laudare*, meaning “to praise.” After experimenting with various opium concoctions, Paracelsus came across a specific extract of opium that was

considerably effective and useful in pain reduction. Until the early 20th century laudanum sold without a prescription and remains available by prescription in the United States today (Drago, 2013). This newfound ability to block pain was a significant contribution to medicine and other areas of the social economy, setting the stage for opioid misuse that has ebbed and flowed culturally since its discovery.

The recent epidemic in the U.S. has a history tied to both street versions of opioids and prescription pharmaceutical opioids. A study of almost 2800 people admitted to a drug rehabilitation program found that subjects who began in the 1960s were younger than those of later decades. The earliest users started at approximately the age of 16. This age increased, peaking at a mean age of 22.9 years of age during the last decade (Cicero et al., 2014). This study is relevant due to the results indicating an aging opioid abusing population, indicating that efforts for prevention should start earlier in users' lifetimes. It is also notable that this study found that recent abusers are primarily introduced to opioids through prescription drugs.

Guarino, Marsch, Deren, Straussner, and Teper (2015) discovered in their study of former Soviet immigrants in New York City that over half of the subjects began opioid use before the age of 18. Even more starkly, 85% of them became acquainted with opioids through NMUOP. The abuse of NMUOP transitioned into heroin use an average of 1.5 years after exposure, either due to availability or tolerance. Users transitioning from NMUOP to heroin made up 69% of the group of people who used opioids regularly (Guarino et al., 2015). This study

demonstrates how opioid abuse begins before the age of 18 but quickly escalates to heroin use after just 1.5 years.

In 2014, Vaughn, Nelson, Salas-Wright, Qian, and Schootman conducted a quantitative study on the racial trends that help correlate NMUOP in adolescents using data from the National Survey on Drug Use and Health between the years 2004-2013. One finding of note was that non-Hispanic White youth consistently reported higher levels of NMUOP. Other notable findings were that older adolescents, aged 15 through 17, as well as females, were more likely to be users of NMUOP. Vaughn and his team also found, however, that there was a declining trend of NMUOP overall, mostly due to the decline of non-Hispanic White users. The reduction was so dramatic that there was no racial correlation by 2013. This decline is hopeful but should be reproduced in other studies and continued before any conclusions are drawn (Vaughn et al., 2016).

Research has identified that the increased prescribing of controlled medications to adolescents and young adults, and prescribing rates is correlated with the misuse of medications (Fortuna, Robbins, Caiola, Joynt, & Halterman, 2010). As access to medical providers has increased, and fears related to sports injuries have overwhelmed social and scientific media it is plausible to assume that more young people are seeking care. The Fortuna et al. study also found increasing rates of prescribing across multiple settings for both injury- and non-injury-related visits. They found that prescriptions for controlled medication for both adolescents and young adults increased between 2005 and 2007 for both injury- and non-injury-related visits. The types of complaints that would lead to

an adolescent being prescribed a prescription opioid varied from musculoskeletal complaints to those of back pain, injuries, and headaches. While the rate of prescriptions increased for the preceding complaints, the rate of prescribing for visits for a diagnosis related to sickle cell disease, tumors, masses, or malignancy did not. Another key finding from this study was that controlled medications were consistently prescribed at higher rates to patients without insurance as compared with those with private insurance (Fortuna et al., 2010). These findings suggest a more in-depth look at factors that may lead to why and how young people are introduced to opioids.

### **Cultural Characteristics and Risks of Opioid Misuse**

One reason that adolescents may be increasing their use of opioids is due to an increase in their availability. Tormoehlen, Mowry, Bodle, and Rusyniak (2000) produced a study correlating the JCAHO pain initiative, an initiative that allows the more liberal use of opioids to reduce pain in hospital settings to an increase in poison control calls for adolescents overdosing on opioids. Comparing cases from between 1994 and 2000 to cases between 2001 and 2007, they found that there was a 69% increase in cases from the two studies and that they are 2.84 times more likely to develop medical complications. Also, of note is that there were 15 deaths from 2001 through 2007 while there were none for the six preceding years (Tormoehlen et al., 2000). This shows the dangers of opioid use for adolescents and how the trend has been changing over time. Matue-Gelabert, Guarino, et al. confirm this finding with their study of 451 New Yorkers, showing

the mean starting age of 16 and that 47% of the regular prescription opioid users reported overdose experiences (Mateu-Gelabert et al., 2017).

Another source of data regarding the health costs of opioid misuse today is social media. Chary, Genes, Giraud-Carrier, Hanson, Nelson, and Manini (2017) scanned through over 4 million tweets from the period 2012-2014 that contained at least one keyword from a list curated by toxicologists and emergency physicians. These keyword hits were then pushed through a semantic distance to quantify the similarity of meaning between the tweets and identity tweets (Chary et al., 2017). The results demonstrated that tweets mentioning NMUOP as a distinct cluster were far from semantically unrelated to medical data on overdoses, deaths, and abuse. Chary et al. showed a very close correlation between Twitter and NSDUH's estimates of misuse from state to state.

Social context has also been shown to be of importance in analyzing opioid abuse. A study found that young adults with an opioid addiction initially received their prescriptions from family and friends. They also described the teens as living in environments where poly-substance use and pill use were common (Yedinak et al., 2016). Subramaniam, Ives, Stitzer, and Dennis (2010) came to similar conclusions regarding the social aspects of opioid abuse. They found that those who abused opioid prescriptions and marijuana were more likely to be between ages 15 and 17 and Caucasian. These adolescents also reported weekly drug use at home and with their peers (Subramaniam et al., 2010). These results solidify the dangerousness of peer influence and the severity of poly-substance abuse, as well as speak to the social and situational influences of opioid use.

## **Physical Altercations and Aggression**

A search of the literature designed to identify research on the relationship between opioid misuse and physical altercations was significantly improved when the search included the keyword “aggression.” However, the outcomes nevertheless manifested a dearth of research in this area. The research that does exist suggests typically addresses physical altercation/aggression among other characteristics of adolescents who misuse opioid drugs. For example, Young, McCabe, Cranford, Ross-Durow, and Boyd (2012) sought to identify the distinguishing characteristics of two sub-types of adolescents who misuse opioid drugs. The study was predicated on previous research establishing that adolescents who misuse opioids fall under one of two groups based on the motivation for their use, including (a) those who are intent on treating a “perceived medical symptom” and (b) those who are intent on “engaging in sensation-seeking or recreational drug use” (Young et al., 2012, p. 20).

The results of the study revealed that those adolescents who misused opioid drugs for sensation-seeking or recreational use were also more like to exhibit “aggressive behavior” (Young et al., 2012). The researchers suggest that this sub-type of opioid misuser is more likely to be challenged when it comes to self-regulating as well as compelled to engage in opioid misuse for the perceivably liberating behavioral dis-inhibition to which it contributes. The research has already established the appeal of opioid drugs in precipitating “excitation through dis-inhibition.” However, this neurological outcome had, as its original purpose, the goal of reducing pain and not facilitating aggressive

behavior in some individuals, and therefore presents important implications for research explicitly in terms of how opioid misuse contributes to aggression and physical altercation in adolescents (Fields & Margolis, 2015).

Understanding the role of opioid drug misuse in physical altercation and aggression can also be supported by pointed research that looks at the influence of family histories of substance use disorders on adolescents who are predisposed to aggressive behavior. Although the research already exists to show that the early exposure to and use of drugs predisposes adolescents to substance use disorders, one study submits that adolescents who exhibit aggressive behavior toward others are similarly predisposed (Mathias et al., 2015).

**Intimate partner violence.** Fields and Margolis (2015) pointed to the misuse of opioid drugs as the consequence of an individual's propensity for aggression, where the excitation through dis-inhibition that it fosters perpetuates aggressive behavior and contributes to physical altercations with others. This finding presents important implications for understanding the relationship between opioid misuse and intimate partner violence (IPV). Intimate partner violence has been a public health problem for decades and the research suggests that addiction intensifies aggression, or worse, violent behavior toward others, especially domestic or intimate partners. Although this problem is critical regardless of the age of the victim or the perpetrator, there is an identifiable lack of research on the issue with regard to adolescents. This might be explained by the fact that many pre-teen and teenaged adolescents have never had an intimate partner; however, there is no clear evidence to suggest that this is the only

explanation of the gap in the literature. Clayton, Lowry, Basile, Demissie, and Bohm (2017) took a more developmentally appropriate approach to this issue by addressing physical and sexual dating violence amongst adolescents who misuse opioid drugs. Clayton et al. contended that IPV is regularly identified as teen dating violence when it involves adolescents.

The researchers used data from the 2015 National Youth Risk Behavior Survey to investigate the incidence of distinct situations—no dating violence victimization (DVV), physical DVV only, sexual DVV only and both physical and sexual DV—amongst a sample of more than 1,000 teenaged girls and boys (Clayton et al., 2017). Although they did not evaluate the outcome of their study from the perspective of opioid misuse alone or in particular but rather from non-medical prescription drugs in general, including opioids, the researchers were able to establish that the misuse of prescriptions drugs was associated with experiences of DVV among both adolescent girls and boys (Clayton et al., 2017, p. 4). Findings such as this one presents significant implications for the implementation of research that looks explicitly at the relationship between opioid drug misuse and the propensity of adolescents to be victims or victimizers of dating violence. It should be noted that Clayton et al. (2017) also found that physical DVV was associated with prescription drug misuse; specifically among female students, at all levels of frequency, which suggests that the issue of intimate partner violence is not confined to one gender and that teens who misuse opioid drugs are likely to find themselves becoming the initiators of dating violence, the victims of dating violence or both (Clayton et al., 2017). These findings echo an earlier study by

Epstein-Ngo et al. (2014), which found that both males and females were more likely to misuse opioid drugs before an event of dating violence (Epstein-Ngo et al., 2014).

In the broader literature that exists on opioid misuse and violence in general, researchers like Catalano, White, Fleming, and Haggerty (2011) were able to establish that opioid drug misuse is often correlated with violent actions. However, they also conceded that it was difficult to explain why. The use of opioids and such a pharmacological response—the increase of an individual’s propensity for violence—is not typically expected because of its more common sedative effect (Catalano et al., 2011). Catalano et al. (2011) also suggested that individuals who are known to misuse opioid drugs may also be more likely to find themselves in environments that elicit a violent response. Unfortunately, findings like these present only half of the equation on intimate partner violence. They present important implications for identifying the direction of this correlation: is it the individual who is innately violent and therefore a victimizer of his or her intimate partner who happens to also misuse opioid drugs or is it the misuse of the opioid drug itself that fosters the violence directed at the intimate partner (Catalano et al., 2011).

**Suicidal ideation.** Existing research points to an inherent relationship between opioid drug use and suicidal ideation among adolescents and young adults, a connection that is not only precipitated by deteriorating life circumstances but is also often the cause of the deteriorating life circumstances that prompt the user to think about, plan, and ultimately attempt suicide (Sharma,

Bruner, Barnett, & Fishman, 2016). Although it might be expected that illicit use of the illegal street drug heroin could affect this type of devastating outcome for adolescents, the non-medical misuse of opioid prescription drugs has been proven to be just as disastrous in this respect. In fact, opioids have been identified as one of the most common drugs used to commit suicide (Sharma et al., 2016).

The work by Sharma et al. suggests that the misuse of opioid drugs, therefore, plays a dual role in adolescent suicide ideation: first, by precipitating the real or perceived psychosocial decline of the adolescent's life circumstances, resulting in thoughts about and planning to commit suicide, followed by the use of the drug in the attempted or effective suicide. Unfortunately, a study conducted in the same year established that it was the individual's suicide ideation that increased the risk of his or her use of illicit and other misused drugs but not the misuse of the drug that increased the risk of suicidal ideation (Zhang & Wu, 2014).

A recent international study of Chinese adolescents demonstrated similar outcomes on the relationship between the misuse of opioid drugs and suicidal behavior and suicidal ideation in particular. Suicidal ideation constitutes the thinking about and potential planning of a suicide attempt and therefore is a critical aspect of suicidal behavior that needs to be identified for its relationship with opioid misuse among adolescents. Guo et al. (2016) established that baseline opioid misuse among the Chinese adolescents examined was significantly associated with not only suicidal ideation but also with suicide attempts. Guo et al. also found that depressive symptoms had a partial but significant mediating

influence on the relationship between opioid misuse and suicidal ideation. Thus it is fair to suggest that it may be the case in most circumstances where opioid drugs are used in an attempt to assuage a depressive state of mind, ultimately contribute to not only the consequent suicidal ideation but also to the mechanics of the suicide attempt, whether successful or otherwise. This assertion is supported by the fact that as much as half of all opioid prescriptions written in the United States are for the treatment of individuals who suffer from anxiety, depression, and other mood disorders (Caruso, 2017).

### **Existing Adolescent Prevention Efforts**

Although there are evidence-based prevention and treatment strategies when it comes to opioid use amongst youthful users, they are highly underutilized. Improving opioid prescribing practices and increasing diversion programs may address the complex problem of opioid misuse. However, a better understanding of the causes of opioid use can prevent misuse before it develops into a health concern. Mateu-Gelabert et al. (2017) performed a qualitative and a quantitative analysis of NMUOP in New York City and found a variety of reasons that the participants used drugs: an increase in the effectiveness of other drugs, to lessen withdrawal symptoms, or to bring about calming effects after the using intense “uppers.” They also discovered that poly-substance use, drug bingeing, and heroin injecting, and overdose are strongly associated with the regular use of benzodiazepines. Another study reported that NMUOP usage amongst high school students in the U.S. and Canada is as high as 20% of the student population. It is also indicated that the use of these drugs has more than doubled

in North America, citing higher mobility and mortality harm due to the drug (Fischer, Nakamura, Urbanoski, Rush, & Rehm, 2001). This is significant to the current study because it provides evidence underlying the reasons for rising usage in the general population.

### **The Theoretical Framework for Targeted Opioid Misuse Prevention**

Developing a prevention science paradigm recognizes risk and protective factors as targets for preventive intervention. Characteristics and social determinants that increase the likelihood of given problem phenomena for a group or individual are risk factors. Protective factors are the characteristics and social factors that reduce the probability of problematic behavior. These factors can either directly minimize the likelihood or indirectly minimize the likelihood of misuse by mediating or reducing the effect of exposure to risk factors (Arthur, Hawkins, Pollard, Catalano, & Baglioni, 2002).

Studies have used risk and protective factors contributing to examine social problems like adolescent drug use, delinquency, violence, and school dropout for over 30 years. The relationship between exposure and the number of risk factors are correlated with the probability of the observed problem and used to identify prevention strategies. Some studies suggest that the number of risk factors is a more powerful predictor of problematic behavior than the specific risk factors that are present (Sameroff, Bartko, Baldwin, & Mahwah, 1998). These findings suggest that understanding risk and protective factors is necessary to build adequate prevention programming for problem behaviors of adolescents, including substance use.

Arthur et al. (2002) used regionally based data from over 10,000 middle and high school students who completed a self-administered survey. They found a wide range of risk and protective factors in multiple ecological domains to influence problematic behaviors (Arthur et al., 2002). This indicates that learning more about risk factors for adolescent opioid misuse can be useful in the future development of prevention interventions.

### **Critique of the Existing Literature**

As a final thought, it seems that one of the greatest dangers is that people that typically abuse opioid medications begin before the age of 18. Further studies may reveal that their use of drugs is related to incomplete development. Incomplete frontal lobe development lowers one's cognitive state and ability to anticipate the consequences of one's actions. Compounding peer acceptance or peer pressure to use opioids can contribute to lifelong abuse and addiction and even death.

There are not enough studies that examine factors related to adolescents that have misused prescription medication. Researchers do know that rates of prescription misuse seem to be greatest for opioid medications, followed by tranquilizers, stimulants, and sedatives. Additional suggestions from the literature indicate that adolescents are at a higher risk for prescription medication misuse than adults over 25 years of age, with a comparable risk to young adults between the ages of 18 and 25 (Schepis & Krishnan-Sarin, 2008).

The limited number of studies that investigate risk and protective factors related to prescription medication misuse supports the need for future

investigation on opioids. The number of studies focusing on the misuse of stimulant prescriptions outnumbers those focusing on opioid prescription misuse among adolescents. A 2015 study found that recognizing the need for professional intervention for alcohol, nicotine, and marijuana use were the strongest predictors of adolescent NMPO use. They also found that young people who gambled frequently, experienced weekly bullying, were exposed to gangs and peers who glorified substance use, and who recently suffered from suicidal ideation were also at an increased risk of misusing prescription pain medication.

### **Literature Gaps to be Addressed by this Study**

Culturally and linguistically appropriate interventions are well-documented in the literature as successful ways to address health behaviors. Cooper et al. highlight that a vital aspect of designing an intervention is defining the target group (Cooper, Hill, & Powe, 2002). The nature of this study is to learn more about young people who misuse opioids, with the intention of developing evidence-based interventions that are culturally and linguistically appropriate for youths at risk of misusing opioids. There is limited information available specific to young opioid misusers, especially information that captures their lived experience and associated health behaviors. Ford and Rigg (2015) found that there was a prevalence of Black and Hispanic youth opioid misusers as compared to White youth. An earlier 2008 study found that rates of misuse were higher amongst White adolescents (Wu, Pilowsky, & Patkar, 2008). While ethnicity is not a focal point of this study because of the contradictory findings in the

literature, the rates of self-reported heroin use amongst the four major racial/ethnic groups will nonetheless be examined.

Existing literature suggests that there are some general areas to examine regarding the targeted prevention of opioid misuse among youth. In 2016, Monnat and Rigg identified risks and protective factors related to opioid misuse. They pointed to personal and demographic factors such as age, race, and socioeconomic status as well as examined clinical, social, and regional factors, such as residing in a rural or urban environment. Factors such as gender, sex, and previous substance use will also be examined in this study as well. The findings will confirm or challenge the relationship between said factors and opioid misuse risks. Monnat and Rigg (2016) found that in rural areas youth who misuse are two times as likely to get their opioids from a dealer as compared with urban areas. They also highlighted that little is known about how young users encounter a dealer. A *Journal for the American Medical Association* (JAMA) article from a University of Iowa study found that the majority of young people that misuse prescription pain medications get them from their parents, both with and without parental consent; while others acquire pain meds from their friends (Abbasi, 2017). The qualitative aspects of this study aimed to understand more about how youths obtain opioids by specifically asking persons with lived experience exactly how young people obtain prescription opioids.

Many of the prevention efforts for opioid misuse are centered on medical providers. This practice is important and works in tandem with the objectives of this study. A study focusing on opioid prescription practices recommends that

ambulatory care providers should introduce a risk stratification analysis before providing an opioid prescription to a young person. They also state that pediatricians lack the competencies related to assessing patients' risk for opioid misuse (Thienprayoon, Porter, Tate, Ashby, & Meyer, 2017). There are not many studies that address risk stratification for youth opioid misuse; most studies look at adult populations. This suggests that more information about why and how youth come to misuse opioids is needed. Also, if screening tools can be developed to successfully support clinical risk stratification, it seems plausible that screening tools can be used in other settings. This study aims to identify key factors that contribute to the risk of misuse by considering some of the health behaviors of young people who self-report using heroin in order to gain insight into perceived strategies for prevention from persons with relevant lived experience.

Study after study suggests that there is a relationship between the increase in opioid prescriptions written by medical providers and opioid misuse. In Ontario, Pulver, Davison, Parpia, Purkey, and Pickett (2016) examined the non-medical use of prescription opioids and injury risk among youth. There are few articles that examine the phenomenon of increased risk for injury for youth because of non-medical use of prescription drugs. This results in the question: what risks are associated with opioid misuse for young people? Many of the prevention efforts for substance use illuminate the actual and perceived risk of misuse. The qualitative aspect of the study examines this by asking persons with lived experience about their perception of the dangers associated with opioid misuse. One of the most interesting findings from the Pulver study was that young

people reporting recreational use of prescription opioids also reported a higher incidence of injuries related to altercations (Pulver et al., 2016). This was also a finding in a 2004 study on adolescent girls (Resnick, Ireland, & Borowsky, 2004). To explore this concept in more depth, the frequency of physical fighting and the relationship between youths that self-report heroin use were examined.

### **Implications for the Future**

The research is unequivocal: adolescents between the ages of 12 and 18 are especially vulnerable to the impact of opioid use and misuse, and the statistical outcomes are daunting. According to the most recent data, there were as many as 214,000 adolescents aged 12 to 17 identified as opioid drug misusers in 2017 (Ramos & L., 2018). Children living in the U.S. comprise as much as 25% of the opioid drug misusing population and they are often defenseless to the rampant practice by many physicians of misprescribing or overprescribing opioids to young patients for pain (Schechter & Walco, 2016). While some experts see this as the consequence of slow research on better options adolescent pain management, others see it as an opportunity to exploit the effectiveness of opioid drugs in reducing pain.

What cannot be ignored is the fact that adolescents as young as age 15 are part of this daunting statistic: 2.6 out of every 100,000 people who die each year as a result of opioid use are age 15 and younger (Schechter & Walco, 2016). Statistics such as this confirm that deeper research on pain management alternatives is necessary. Furthermore, a review of the literature also indicates that more focused research is necessary to not only confirm the interrelationship

between drug misuse and physical altercations, IVP, and suicidal ideation, and more importantly, to determine if a bi-directional relationship exists between these behaviors. Opioid use in the U.S. has been an alarming and increasingly pervasive trend since the 1990s, its use more than doubling amongst adults, creating a crisis due to the rates of addiction in adolescents skyrocketing (Martins et al., 2017).

One of the major concerns regarding opioid addiction is the increased risk of heroin use that accompanies prescription addiction and abuse since many often resort to heroin as a cheaper option when they are no longer able to obtain a prescription from a physician (Martins et al., 2017). In 2013, it was acknowledged that roughly 1.9 million Americans met the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) requirements for dependence on or abuse of opioid prescriptions (Compton et al., 2015). Since drug use amongst adolescents has been a common theme since the 1960s, it is not incredibly shocking to witness this increase in use by young people who commonly experiment with drugs, alcohol, nicotine, and other substances during their teenage years (Schrager et al., 2014). However, the increase in opioid use in adolescents is alarming due to the dangerous risks involved such as death from overdose. Additionally, the reasoning for substance abuse, particularly of opioids, in adolescents has a variety of underlying causes and risk factors that, upon thorough examination, may assist in providing targeted future prevention efforts.

## **Conclusions from the Literature**

The research confirms that there are unknown factors associated with adolescent opioid misuse. It also affirms that areas of inquiry should focus on the associations that exist between opioid misuse and behaviors like physical altercations, intimate partner violence, and suicidal ideation. The importance of, and need for, effective prevention interventions focused on opioid misuse and abuse in youth populations has been noted in the literature (Spoth et al., 2013). By using both a qualitative approach to solicit information from persons with relevant lived experience as well as a quantitative approach in order to investigate correlates and congruent health behaviors, this study adds to the existing body of scholarly knowledge regarding opioid use and misuse in the adolescent population.

## **Chapter 3: Methodology**

This chapter describes the mixed method methodology used to identify relevant factors that contribute to opioid use among adolescents. The following subsections describe the rationales for using mixed method methodology as well as the methodological approaches for both the quantitative and qualitative research design.

### **Research Questions and Hypotheses**

This study sought to answer the following research questions:

1. What elevates the risk for youth opioid misuse?
2. What factors contributing to youth opioid misuse can be targeted for prevention efforts?

### **Research Objectives**

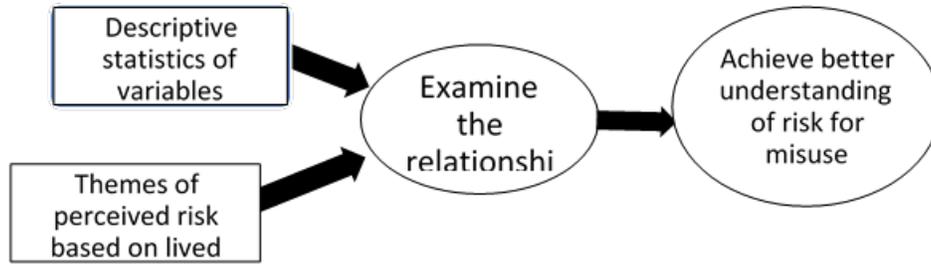
The overarching objective of this study was to better understand the population of young people who need opioid prevention the most. This study aimed to identify contributing factors for opioid misuse among adolescents and discuss the implications for prevention. Research objectives included the following:

- To determine the factors related to sub-groups of the U.S. adolescent population who are at the highest risk for misusing opioids, thereby aiding the future development of prevention interventions targeted to those at greatest risk.

- To determine the specific attributes of adolescents with reported opioid misuse that reveal prevention opportunities for adolescents with similar attributes and no reports of opioid misuse.
- To document the pathways to opioid misuse that facilitate the current opioid epidemic adding insight to prevention efforts.

### **Research Design**

This study used a mixed methods approach to address its research questions. The specific design followed was a convergent parallel design the convergent parallel design is used by a researcher with both qualitative and quantitative methods elements being used concurrently. All qualitative and quantitative data is weighed the same and equally, with the analysis of its components independent of the other but the interpretations of the results are combined (Demir & Pismek, 2018). By using a convergent parallel design, a complete understanding of opioid misuse among the population of interest can better be achieved. The convergent parallel design allowed for all the elements of understanding to affect the study direction until a complete understanding is reached. It is important to note that data were examined in unison. Observations unilaterally impacted the study direction. The convergent parallel design allowed for a side-by-side display of results to embed qualitative findings that help to illuminate the problem. Figure 1 shows the analytic process followed for this approach.



*Figure 1.* Analytic approach used to analyze data to address the research objectives.

### **Description of the Population Sample**

Since 1990 the Center for Disease Control (CDC) has been conducting the YRBS. The bi-annual survey monitors the incidence and prevalence of key health risk behaviors among U.S. youth (Kwan, Bobko, Faulkner, Donnelly, & Cairney, 2014). This study uses a three-stage, cluster random sampling design in order to obtain the YRBS samples. The sample was inclusive of high school students in all 50 states and the District of Columbia. The primary sampling unit (PSU) consisted of counties or analogous geographic units and the secondary sampling unit (SSU) consisted of schools. Both PSUs and SSUs had a probability of selection that was proportional to their population size. The third sampling unit consisted of classrooms (1-2 for each grade level), and all students within the selected classrooms were invited to participate. Additional selection strategies were used to oversample Black and Hispanic students (Kwan et al., 2014). The survey was self-administered during a regularly scheduled class. Participation in the YRBS was confidential, optional, and participants were required to provide parental approval.

**Eligibility and recruitment strategies.** Teachers typically recruit a student to participate in the YRBS. The neutrality of the school setting and the being recruited by a trusting adult may ease any discomfort students may have around participating and reduced researcher bias. The findings are self-reported, but they are collected anonymously to encourage the students to answer honestly. The YRBS was chosen as a data source for this study as it provides access to information that would otherwise be difficult to obtain due to the need for parental consent and the vulnerability of the sample.

**Reliability.** Reliability of the YRBS data is well-established and has been ongoing biennially since 1990. In addition to the internal CDC process to measure reliability and validity, independent researchers have conducted studies that support the instrument as a reliable representation of health risk for youth in the U.S. One study did find a response bias among some participants that may impact the validity of the YRBS data specifically regarding violent behaviors (Furlong, Sharkey, Bates, & Smith, 2004). It should be considered that for questions such as heroin use, self-reported behavior may be exaggerated. All things considered, the reliability of an instrument that relies on only self-reported data can be expected to have some measure of questionability with regards to reliability.

### **Analysis Approach Using Secondary Data**

The relationship between self-reported heroin use and 15 demographic and behavioral factors asked about in the survey was the primary focus of this research. The abbreviations used in the study are in Appendix A, and the hypotheses and null hypotheses for each area of interest are listed in Appendix B.

The YRBS measures used for examination are sex, race/ethnicity, and heroin use; and the following painful stressors: physical altercations, intimate partner violence, and suicidal ideation.

On the survey, students were asked about their sex. Options to choose from are male or female. Students were also asked about their race and ethnicity. Race/ethnicity was ascertained from two questions: 1) “Are you Hispanic or Latino?” (response options were “yes” or “no”), and 2) “What is your race?” Response options were “American Indian or Alaska Native,” “Asian,” “Black or African American,” “Native Hawaiian or other Pacific Islander,” or “White.” The second question allowed students to select more than one response option. Students were classified as “Hispanic/ Latino” and referred to as “Hispanic” if they answered “yes” to the first question, regardless of how they answered the second question. Students who answered “no” to the first question and selected only “Black or African American” to the second question were classified as “Black or African American” and are referred to as “Black.” Students who answered “no” to the first question and selected only “White” to the second question were classified and are referred to as “White.” Race/ethnicity was classified as missing for students who did not answer the first question and for students who answered “no” to the first question but did not answer the second question (Gao, Howe, Zullo, & Marshall, 2017).

The national YRBS weighs the variables of sex, race/ethnicity, and grade. The variables are weighted to adjust for non-responses and oversampling for of students identifying as Black and Hispanic. The weights were scaled to reflect a

weighted count of students that equals the total sample size, and the weighted proportions of students in each grade match the national population proportions. This process aims to ensure that, weighted estimates represent all students in grades 9 through 12 in U.S. schools (Gao et al., 2017). This secondary data analysis is complementary to the qualitative research design because the descriptive methodology establishes the associations between variables. Understanding the relationship between health risk indicators and factors indicative of opioid misuse—such as self-reported heroin use during adolescence—supports a scientific inquiry of this nature.

**Validity.** The validity of a study is dependent on how well the characteristics of the sample mirror the characteristics of the population of interest. The sampling frame for YRBS historically has been based on the Market Data Retrieval (MDR) database and data collected by the National Center for Education Statistics (U.S. Department of Education National Center for Education Statistics, 2016). Based on the publicly available information on sampling for the data a cluster sample design was used. Multiple sampling stages were used, and all students in sampled classes were eligible to participate in the study (Brener et al., 2013). A purposive sampling procedure was implemented. This approach was used because the study participants had specific knowledge related to opioid misuse among young people that was necessary to answer the research questions (Urquhart, 2013). Theoretical sampling was used because of its appropriateness for grounded theory research. The use of general purposive sampling based on the inclusion criteria of the study generates initial data for this sampling approach.

The data provided some guidance concerning the general themes raised by the subject. Subsequent subjects were selected based on the assumption that they would be able to add information about a specific theme. Theoretical sampling is based on the assumption that the researcher is simultaneously or jointly collecting, coding, and analyzing data, which identifies the general themes of the data that require additional information from subjects with specific knowledge about the theme (Flick, 2008). The theory that develops because of the initial data obtained from the study subjects becomes the basis for the sampling. At the same time, the inclusion criteria provide boundaries for the individuals that will be included in the sample.

The purposive sampling approach was used because it can lead to transferability of the findings for a similar situation (Auerbach & Silverstein, 2003). The sampling continues until the data collection achieves theoretical saturation, which is the point where additional sampling does not produce additional data. Theoretical saturation is defined as the point where the theoretical framework under development in the research no longer changes (Auerbach & Silverstein, 2003). The findings complementary findings from both data sources ensured that theoretical saturation was achieved.

### **Identification of Variables**

The association between trauma, substance use, and other behavioral factors and prevalence of heroin misuse were investigated using logistic regression. First creating a univariate model using self-reported heroin use as the independent variable and prevalence of variables indicating Trauma as the dependent variables

and calculated crude odds ratios (OR) and 95% confidence intervals (95% CI) comparing the participants who misused heroin to those who reported no use. Then repeating the process creating a univariate model using self-reported heroin use as the independent variable and prevalence of the substance use, other social, behavioral and demographic factors as the dependent variables. The objective of this study is to understand what behavior and social manifestations of the adolescent experience can be targeted for prevention. The cultural characteristics and risks of opioid misuse subject areas to explore in relationship with heroin misuse.

1. Trauma-related Variables
  - a. Being in a physical fight /fights
  - b. Rape
  - c. Intimate Partner Violence
  - d. Bullied at school
  - e. Bullied online and self-reported heroin use
2. Substance use-related hypotheses
  - a. Alcohol use
  - b. Marijuana Use
  - c. Cocaine Use
  - d. Injection of illegal drugs
3. Other related hypotheses
  - a. Perception of weight
  - b. Sports Team Participation

- c. Seriously considered attempting suicide
- d. Ever had sexual intercourse

**Data Analysis Approaches**

The original datasets were entered into IBM SPSS version 25 for management. The data files for the 2013, 2015, and 2017 YRBSS administrations were merged into one data file. To create a data file with complete responses for each variable included in the analysis, cases missing data for the variables of interest were removed. A total of 12,549 cases with incomplete data were removed from the data file. Table 1 presents the variables and number of cases missing information for the variable. The largest numbers of cases were removed for missing data on physical fights ( $n = 4,376$ ) and sexual intimate partner violence ( $n = 2,101$ ). The smallest numbers of cases were removed from experienced bullying in school ( $n = 32$ ). Finally, an additional 409 cases were removed to eliminate adolescents aged 13 or younger from the dataset. The final file consisted of data for 31,018 cases.

Table 1

*Variables and Number of Cases Missing Data (N = 31018)*

Variable	Number of Cases Missing Data
Heroin use	896
Gender	118
Grade	103
Alcohol use	1562
Cocaine use	81
IPV – Sexual	2101
IPV – Dating	108
Physical fights	4376
Injecting drugs	168
Marijuana use	392

Sexual intercourse	1333
Experienced online bullying	96
Experienced forced sexual intercourse	85
Experienced school bullying	32
Considered suicide	86
Dissatisfaction with weight	473
Sports participation	539

Prior to conducting the logistic regressions, the weight variable was recoded to reflect the intended construct—dissatisfaction with weight. The original five response levels were recoded into two categories, adolescents who perceived that they were over or under weight and adolescents who perceived they were the right weight. Adolescents who were perceived that they were under or overweight were coded ‘0.’ Those who felt they were the appropriate weight were coded ‘1.’ Additionally, the original heroin use variable was recoded into a dichotomous variable. Response option ‘1’ (used 0 times) was recoded into a ‘0.’ Response options 2 through 6 were recoded into a ‘1’ to indicate that the adolescents had used heroin. Finally, the original intimate partner violence variables were dichotomized with responses ‘1’ and ‘2’ coded as ‘0’, and responses ‘3’ through ‘6’ coded as ‘1.’

The relevant assumptions for logistic regression were assessed before beginning the analyses. To conduct a logistic regression the dependent variable must be categorical with mutually exclusive response options (Field, 2013). The dependent variable, heroin use, consists of two response options: never used heroin and used heroin. Adolescents cannot be a member of both groups; therefore, the data met the assumption that the dependent variable was a

categorical variable. Multi-collinearity was assessed using Variance Inflation Factor (VIF) values for the predictors. Table 2 presents the VIF values for the predictor variables. None of the VIF values exceeded 10; therefore, the assumption of multi-collinearity was met.

Table 2

*VIF Values for the Predictor Variables*

Variable	VIF Value
Age	4.67
Gender	1.12
Grade	4.65
Race	1.03
Physical fights	1.26
Experienced forced sexual intercourse	1.22
IPV – Sexual	2.03
IPV – Dating	2.02
Experienced school bullying	1.34
Experienced online bullying	1.36
Considered suicide	1.18
Alcohol use	1.72
Marijuana use	1.78
Cocaine use	1.46
Injecting drugs	1.34
Sexual intercourse	1.57
Sports participation	1.06
Dissatisfaction with weight	1.04

Finally, the assumption of independence was met because the data did not come from repeated or matched observations; therefore, the data points were independent of each other (Pagano, 2012).

### **Qualitative Approach Used in the Mixed Methods Design**

Qualitative methods, like quantitative methods, can be methodically evaluated only if their tenets and procedures are made explicit (Corbin & Strauss, 1990). In this section, the proposed grounded theory procedures are described. Qualitative assumptions about adolescent opioid use were ontological in nature.

The study aimed to gather insight related to the experiences of adolescent opioid users in order to better understand how to tailor prevention efforts. Actual adolescents were not interviewed due to ethical concerns regarding the confidentiality of the subject matter. Participants were questioned about their behavior and were asked about their perceptions strategically to avoid the disclosure of potentially incriminating information. This approach to interviewing research participants about sensitive subject matter has been validated in several studies (Kavanaugh & Ayres, 1998; Lee & Lee, 2012; Mühlenfeld, 2005; Van Meter, 2001).

The research used a qualitative grounded theory research design to generate new theories concerning opioid misuse among adolescents. Grounded theory design was appropriate because of the exploratory nature of this study. The qualitative approach examines the topic from the perspective of the subjects to identify variables and relationships that cannot otherwise be readily identified or measured. The research investigated the perceived risk for opioid misuse from the perspective of persons who misused during their adolescence. This focus helped to identify the specific variables associated with misuse so that prevention efforts can be more narrowly targeted. Many different variables that cannot be easily measured can influence opioid misuse, which makes it impossible to isolate factors that will stimulate opioid misuse without being contextualized by the vantage point of lived experience. Qualitative research uses inductive rather than deductive reasoning, making it a suitable methodology for exploratory research that seeks to develop new insights concerning a given topic (Seidman, 2013).

Research based on inductive reasoning postulates that acceptable conclusions are based on reasoning that moves from the specific to the generic. The qualitative approach does not claim that the conclusions it yields are certain.

### **Grounded Theory**

The grounded theory research design approach is appropriate when the purpose of the research is to produce a broad explanation or a theory of a process, with the theory being shaped by the views of the participants (Bloom, 2014). The grounded theory research design inductively develops the theory through constant interaction with the data as it is collected from subjects (Urquhart, 2012).

Grounded theory research designs are constructive because they collect and analyze data from the perspective of the subjects (Charmaz, 2006).

The research used a grounded theory methodological approach because of the absence of a theory concerning the factors influencing opioid misuse among the specific population of adolescents. Interviews were conducted to examine the variety of risk factors applicable to youth and how these factors can aid in the creation of targeted prevention efforts. In order to ensure the perspective of people with lived experiences, the interviewees were individuals with a history of misusing opioids during adolescence. Due to the subject matter, no demographic information was collected, although such information may have been useful. Subsequent studies data collection should include de-identified demographic information.

## **Eligibility and Recruitment Strategies**

The study population consisted of adults who self-identify as someone that used opioids during adolescence. A convenient sample of subjects participated in a privately directed dialogue with the researcher. The objective of the interactions, while exploratory, was to better understand the nature of opioid use among young people. To access the population the researcher relied on subjects responding to solicitations disseminated in their communities.

The inclusion criteria for participation in the reflective interviews were as follows:

- Adults between the ages of 18 and 27 who self-report the misuse of opioids during their adolescence; and
- Currently reside in the U.S.

The exclusion criteria for the reflective interviews were as follows:

- Persons that appear under the influence of drugs or alcohol at the time of the interview.

Flyers were shared at community task force meetings and shared on social media. The flyer was shared with the hashtags #GetInvolved and #PreventionIsKey. Information about the study was also shared among HIV/HCV prevention and treatment communities online and shared with prevention organizations. A convenient sample was used.

## **Participant Characteristics**

All the interview subjects reported opioid misuse during adolescence. Subjects One and Two reported several years since any opioid misuse while

Subject Three reported more recently misusing. This convenient sample cannot generate generalizable findings for all adolescents but rather offer useful information regarding pathways to opioid misuse. Each subject affirmed that they met the inclusion criteria noted in Chapter Three and agreed to engage in a conversation about adolescent opioid use. The participants were all female, two identified as African American and one identified as White. All of the interviewees had children and one was obviously pregnant.

### **Instrumentation**

The instrument used for data collection is a set of interview questions designed for the proposed study. A unique interview instrument was used instead of a formal instrument for investigating. The interview questions follow the recommendations of Charmaz and are intended to obtain data in grounded theory research. The interview questions gather the data about perceptions of prevention efforts for the population of interest (Charmaz, 2006). The discussion-provoking questions used to generate conversations about misuse with the participants is found in Appendix B.

**Reliability.** The reliability of the qualitative instrument used in this study could not be conclusively concluded. Reliability of the interview questions encompasses the ability to use the instrument to obtain similar results consistently. Reliability decreases when using open-ended questions on the study instruments. The nature of open-ended questions is exploratory, and the interviewer can ask follow-up questions based on the initial response of the interviewees (Platt, 2012). Essentially, the course of the conversation cannot be

completely controlled because different interviewers may ask different follow-up questions. The use of the interview protocol improves reliability by establishing guidelines for the interview. The protocol essentially assures that the interviewers perform the same during subsequent interviews.

**Validity.** The validity of the qualitative interview questions is determined by assessing their relationship to the various constructs for which they are intended to elicit information. Validity is established because the subjects provided the intended information in response to the questions. Information from the interviews is used to establish that the questions produce data related to the constructs under investigation.

### **Data Collection Procedures**

The data collection process consisted of conducting face-to-face interviews with three adults who misused opioids during their adolescence. The data were audio recorded with the permission of the interviewees to facilitate the subsequent transcription of the data. The recordings were played aloud over computer speakers and the speed of the audio was slowed to ensure the accuracy of the transcription. The recordings were deleted after they were transcribed. To ensure the information was de-identified the participants were asked not to share any identifying information such as their name. Two of the interviews were conducted in private rooms at the University of Michigan Library and one was conducted in a private porch area at the participant's home. Each interview was between 15 and 30 minutes long.

## **Data Analysis Process**

A process relying on thematic content analysis was used to identify the themes and patterns presented by the subjects during the interviews. The analysis process initially involved transcribing the data to a format that could be used for manual analysis. The transcription process involved some cleaning of the data to remove hesitations and unintelligible expressions contained in the interview recordings. The analysis included manual coding. The choice to not use a coding software was based on the availability of software for the researcher and the observation that the software could not identify derivations and paraphrases of specific terms because the subjects often used slang and vernacular constructions that did not contain formal English usage (Evans, 2013).

The initial analysis was conducted to identify the major themes or categories found in the data, which are the nodes. Three primary themes emerged across the three interviews regarding pathways to opioid use: poly-substance use, relationships with primary social and familial groups, and access to opioids. Further manual coding of the transcripts helped to determine whether the statements of the interviewees constituted a pattern related to a major theme. The coding focused on the use of synonyms, paraphrases, and slang or colloquial terms that were associated with the general concept associated with a theme. The process also involved multiple readings of the transcripts to ensure that all patterns contained in the themes were identified. A record was also made of the decisions concerning the inclusion of data related to a theme. The specific process for the manual coding relied on colored post-it notes to document any information

related to opioid misuse including behaviors or beliefs associated with adolescent opioid misuse.

The final step in the data analysis was the use of descriptive coding to synthesize the themes and patterns into a coherent narrative that expresses the perceptions of the subjects of the study. The presentation approach summarizes the content of the interviews in terms of the central themes that emerged during the data interpretation process. The presentation provides a verbatim text from the interviewee.

## **Chapter 4: Quantitative Findings**

The purpose of the study was to examine factors that lead to opioid misuse in adolescents. The hypothesized predictive relationships between the variables that may represent contributing factors for opioid misuse and use of heroin were analyzed. Data from the 2013, 2015, and 2017 Youth Risk Behavior Surveillance System (YRBSS) surveys were analyzed using logistic regression. The following research question and hypotheses were posed to guide the study:

RQ1: Do demographic characteristics, traumatic event experiences, substance use, and other contributing factors predict if adolescents used heroin (yes or no)?

H10: Demographic characteristics, traumatic event experiences, substance use, and other contributing factors do not predict if adolescents used heroin.

H11: Demographic characteristics, traumatic event experiences, substance use, and other contributing factors do predict if adolescents used heroin.

### **Data Management**

Univariate chi-square tests and multiple logistic regression analyses were conducted to address the hypotheses for this study. This chapter presents the data management for the dataset, and the results of the univariate and multiple logistic regression analyses.

### **Chi-Square Tests**

A series of univariate analyses were conducted to assess the associations between the predictor variables and heroin use in adolescents. Table 3 presents the results of the chi-square analyses for the demographic variables included in

the analyses. Within SPSS, odds ratios are only calculated for 2X2 contingency tables (chi-square analyses). Because the demographic variables were not dichotomized in the analysis odds ratios could not be calculated.

Statistical significance was assessed between age and heroin use,  $\chi^2(4) = 13.28, p = .010$ , grade and heroin use,  $\chi^2(4) = 146.20, p < .001$ , gender and heroin use,  $\chi^2(1) = 35.89, p < .001$ , and race and heroin use,  $\chi^2(4) = 22.35, p < .001$ . These findings suggested that within the sample age, grade, gender, and race were associated with if adolescents had ever used heroin. The results for age and grade demonstrated that respondents who were 18 and over ( $n = 67, 1.4\%$ ) and those who were ungraded or in a grade other than those listed reported higher percentages of heroin use ( $n = 6, 27.3\%$ ). It is important to note that the number of respondents who were placed in the ungraded or other grade category was significantly lower than the number of students classified in the other grade categories.

The results for gender indicated that a higher percentage of male adolescents reported that they had used heroin ( $n = 213, 1.4\%$ ) than female adolescents ( $n = 113, 0.7\%$ ). Finally, the results for race indicated that American Indian or Alaska Native adolescents ( $n = 18, 2.1\%$ ) and Native Hawaiian or Other Pacific Islander adolescents ( $n = 8, 1.9\%$ ) had the highest percentage of respondents indicating that they had tried heroin. Black or African American adolescents had the lowest percentage of respondents indicating that they had tried heroin ( $n = 31, 0.6\%$ ). However, similar to the results for heroin use by grade results for race should be interpreted with caution because of the low

number of American Indian or Alaska Native and Native Hawaiian or Other Pacific Islander respondents.

Table 3

*Results of the Chi-square Tests for Demographic Variables*

		Ever used heroin		<i>p</i> value
		No	Yes	
Age	14 years old	3228 (99.3)	23 (0.7)	.010
	15 years old	7169 (99.1)	63 (0.9)	
	16 years old	7646 (98.8)	91 (1.2)	
	17 years old	7987 (99.0)	82 (1.0)	
	18 years old	4662 (98.6)	67 (1.4)	
Grade	9 <sup>th</sup> grade	7792 (99.0)	75 (1.0)	< .001
	10 <sup>th</sup> grade	7439 (98.9)	80 (1.1)	
	11 <sup>th</sup> grade	7731 (98.9)	83 (1.1)	
	12 <sup>th</sup> grade	7714 (98.9)	82 (1.1)	
	Ungraded/Other grade	16 (72.7)	6 (27.3)	
Gender	Female	15756 (99.3)	113 (0.7)	< .001
	Male	14936 (98.6)	213 (1.4)	
Race	White	22923 (98.9)	256 (1.1)	< .001
	Black	5075 (99.4)	31 (0.6)	
	Asian	1432 (99.1)	13 (0.9)	
	Native Hawaiian or Other Pacific Islander	419 (98.1)	8 (1.9)	
	American Indian or Alaska Native	843 (97.9)	18 (2.1)	

Table 4 presents the results of the chi-square analyses for the substance use variables included in the analyses. Because the substance use variables were dichotomized in the analyses, odds ratios were calculated. Statistical significance was assessed for alcohol use,  $\chi^2(1) = 118.48, p < .001, OR = 8.23$ ; marijuana use,  $\chi^2(1) = 393.56, p < .001, OR = 23.24$ ; cocaine use,  $\chi^2(1) = 4761.54, p < .001, OR = 132.02$ ; and injected drug use,  $\chi^2(1) = 12346.02, p < .001, OR = 497.71$ . These findings suggested that within the sample alcohol use, marijuana use, cocaine use, and injected drug use were associated with if adolescents used heroin.

The analyses indicated that for all substance use variables use of a substance was linked with an increased likelihood of using heroin. The results for alcohol use indicated that a higher percentage of adolescents who drank alcohol reported that they had used heroin ( $n = 306$ , 1.5%) than those who had not drunk alcohol ( $n = 20$ , 0.2%). For cocaine use, 19.4% ( $n = 272$ ) of adolescents who had ever used cocaine also tried heroin. More adolescents who had injected illegal drugs tried heroin ( $n = 191$ , 68.7%) than those who had not injected illegal drugs ( $n = 135$ , 0.4%). Finally, adolescents who had used marijuana were more likely to have used heroin ( $n = 306$ , 2.5%) than those who had not used marijuana ( $n = 20$ , 0.1%). It should be noted that the odds ratios for the association between alcohol use and heroin use was relatively low compared with the other substance abuse variables. Adolescents who injected illegal drugs were 497.71 times more likely to use heroin than those who had not injected illegal drugs.

Table 4

*Results of the Chi-square Tests for Substance Use Variables*

	Ever used heroin		<i>p</i> value	OR*	
	No	Yes			
Ever drank alcohol	Yes	19956 (98.5)	306 (1.5)	< .001	8.33
	No	10736 (99.8)	20 (0.2)		
Ever used marijuana	Yes	12183 (97.5)	306 (2.5)	< .001	23.24
	No	18509 (99.9)	20 (0.1)		
Ever used cocaine	Yes	1128 (80.6)	272 (19.4)	< .001	132.02
	No	29564 (99.8)	54 (0.2)		
Ever injected illegal drugs	Yes	87 (31.3)	191 (68.7)	< .001	497.71
	No	30605 (99.6)	135 (0.4)		

*\*Reported OR values are unadjusted odds ratio values*

Table 5 presents the results of the chi-square analyses for the traumatic events variables included in the analyses. Because the traumatic events variables were dichotomized in the analyses, odds ratios were calculated. Statistical

significance was assessed for physical fights,  $\chi^2(1) = 412.45, p < .001, OR = 8.09$ ; forced sexual intercourse,  $\chi^2(1) = 593.84, p < .001, OR = 9.98$ ; sexual intimate partner violence,  $\chi^2(1) = 481.98, p < .001, OR = 8.69$ ; physical intimate partner violence,  $\chi^2(1) = 591.33, p < .001, OR = 10.05$ ; school bullying,  $\chi^2(1) = 83.34, p < .001, OR = 2.74$ ; online bullying,  $\chi^2(1) = 124.65, p < .001, OR = 3.42$ ; and seriously considered suicide,  $\chi^2(1) = 292.50, p < .001, OR = 5.52$ . These findings suggested that within the sample these traumatic events were associated with if adolescents used heroin.

The analyses indicated that for all traumatic event variables experiencing a traumatic event was linked with an increased likelihood of using heroin. For physical fighting 3.2% ( $n = 229$ ) of those who had a physical fight reported that they had used heroin compared to only 0.4% ( $n = 97$ ) of those who had not been involved in a physical fight. Of those who had been physically forced to have sexual intercourse, 6.4% ( $n = 130$ ) of adolescents who had been forced to have sexual intercourse also tried heroin. Only 0.7% ( $n = 196$ ) of those who had not been forced to have sexual intercourse tried heroin. Higher percentages of adolescents who had experienced sexual ( $n = 117, 5.9%$ ) and physical ( $n = 126, 6.5%$ ) intimate partner violence had also used heroin than those who had not experienced either type of intimate partner violence. Similar to the intimate partner violence findings, higher percentages of adolescents who experienced in school bullying ( $n = 124, 2.2%$ ) and online bullying ( $n = 116, 2.6%$ ) also used heroin than their counterparts who had not experienced bullying. Finally, adolescents who had seriously considered suicide were more likely to have used

heroin ( $n = 173, 3.2\%$ ) than those who had not seriously considered suicide ( $n = 153, 0.6\%$ ). The odds ratios for sexual intimate partner violence ( $OR = 8.69$ ) and physical intimate partner violence ( $OR = 10.05$ ) indicated that having experienced either of these forms of intimate partner violence increased the likelihood that adolescents would use heroin greater than the other traumatic events tested in the study.

Table 5

*Results of the Chi-square Tests for Traumatic Event Variables*

		Ever used heroin		<i>p</i> value	OR*
		No	Yes		
Were in a physical fight	Yes	6934 (96.8)	229 (3.2)	< .001	8.33
	No	23758 (99.6)	97 (0.4)		
Were forced to have sexual intercourse	Yes	1912 (93.6)	130 (6.4)	< .001	10.00
	No	28780 (99.3)	196 (0.7)		
Experienced sexual dating violence	Yes	1857 (94.1)	117 (5.9)	< .001	8.69
	No	28835 (99.3)	209 (0.7)		
Experienced physical dating violence	Yes	1810 (93.5)	126 (6.5)	< .001	10.05
	No	28882 (99.3)	200 (0.7)		
Were bullied on school property	Yes	5616 (97.8)	124 (2.2)	< .001	2.70
	No	25076 (99.2)	202 (0.8)		
Were bullied online	Yes	4272 (97.4)	116 (2.6)	< .001	3.45
	No	26420 (99.2)	210 (0.8)		
Seriously considered attempting suicide	Yes	5215 (96.8)	173 (3.2)	< .001	5.56
	No	25477 (99.4)	153 (0.6)		

Table 6 presents the results of the chi-square analyses for the other contributing variables included in the analyses. Because the traumatic events variables were dichotomized in the analyses, odds ratios were calculated. Statistical significance was assessed for having experienced sexual intercourse,  $\chi^2(1) = 276.90, p < .001, OR = 10.67$ . No statistical significance was assessed for trying to modify their weight,  $\chi^2(1) = 2.56, p = .109, OR = 0.84$ , or having played on at least one sports team,  $\chi^2(1) = 0.07, p = .791, OR = 1.03$ . These findings suggested that within the sample having experienced sexual intercourse was

associated with if adolescents used heroin, while dissatisfaction with weight and if adolescents played on a sports team was not associated with heroin use. The results for having experienced sexual intercourse indicated that a higher percentage of adolescents who had sexual intercourse reported that they had used heroin ( $n = 290, 2.1\%$ ) than those who had not experienced intercourse ( $n = 36, 0.2\%$ ), and that those adolescents who had sexual intercourse were 10.67 times more likely to use heroin.

Table 6

*Results of the Chi-square Tests for Other Contributing Variables*

		Ever used heroin		<i>p</i> value	OR*
		No	Yes		
Ever had sexual intercourse	Yes	13205 (97.9)	290 (2.1)	< .001	10.69
	No	17487 (99.8)	36 (0.2)		
Not satisfied with weight	Yes	14264 (98.8)	166 (1.2)	.109	0.84
	No	16428 (99.0)	160 (1.0)		
Played on at least one sports team	Yes	16627 (98.9)	179 (1.1)	.791	1.03
	No	14065 (99.0)	147 (1.0)		

**Multiple Logistic Regression**

Finally, multiple logistic regressions were conducted to determine if the tested variables contributed to the likelihood of using heroin when controlling for race, grade, and gender. The regression models were tested in hierarchical blocks so the influence of the control variables could be assessed in Model 1 and the other contributing factors could be tested in Model 2. The results of the analyses are arranged by groups of variables with multiple logistic regression results for the substance use variables presented in Table 7, traumatic events variables presented in Table 8, and other contributing variables presented in Table 9.

For alcohol use the overall regression model was statistically significant ( $p < .001$ , Nagelkerke  $R^2 = 0.06$ ). The regression model with the control variables and alcohol use contributed to approximately 6% of the likelihood of having used heroin. The regression models for cocaine use ( $p < .001$ , Nagelkerke  $R^2 = 0.42$ ), marijuana use ( $p < .001$ , Nagelkerke  $R^2 = 0.14$ ), and injection of illegal drugs ( $p < .001$ , Nagelkerke  $R^2 = 0.44$ ) were also statistically significant.

After controlling for race, gender, and grade, adolescent alcohol use was a significant predictor of if they used heroin,  $p < .001$ ,  $\text{Exp}(B) = 8.67$ . Similar to alcohol use, marijuana use,  $p < .001$ ,  $\text{Exp}(B) = 24.15$ ; cocaine use,  $p < .001$ ,  $\text{Exp}(B) = 144.06$ ; and injection of illegal drugs,  $p < .001$ ,  $\text{Exp}(B) = 476.81$ , were significant predictors of if adolescents used heroin. These findings indicated that the likelihood of using heroin was greater if adolescents used alcohol, cocaine, marijuana, or injected illegal drugs when controlling for race, grade, and gender. The Nagelkerke  $R^2$  values for cocaine use (0.42) and injected drug use (0.44) were high in comparison to the other  $R^2$  values reported. The results indicated that the tested model containing cocaine contributed to 42% of the likelihood of heroin use in adolescents while the tested model containing injected drug use contributed to 44% of the likelihood of heroin use in adolescents.

Table 7

*Results of the Multiple Logistic Regressions for Substance Use*

		<i>B</i>	S.E.	Wald	df	<i>p</i> value	Exp( <i>B</i> )	95% CI for Exp( <i>B</i> )		<i>p</i> value	R <sup>2</sup>
								Lower	Upper		
Alcohol use	Race	0.00	0.05	0.00	1	.947	1.00	0.90	1.10	< .001	0.06
	Grade	-0.04	0.05	0.58	1	.446	0.96	0.87	1.06		
	Gender	0.75	0.12	40.42	1	.000	2.11	1.67	2.65		
	Ever drank alcohol	-2.16	0.23	86.38	1	.000	8.67	0.07	0.18		
	Constant	-7.38	0.39	361.36	1	.000	0.00				
Marijuana use	Race	0.04	0.05	0.67	1	.413	1.05	0.94	1.16	< .001	0.14
	Grade	-0.12	0.05	5.79	1	.016	0.88	0.80	0.98		
	Gender	0.64	0.12	29.79	1	.000	1.90	1.51	2.39		
	Ever used marijuana	-3.18	0.23	188.11	1	.000	24.15	0.03	0.07		
	Constant	-7.75	0.40	10.45	1	.000	0.00				
Cocaine use	Race	-0.10	0.05	3.65	1	.056	0.90	0.81	1.00	< .001	0.42
	Grade	-0.23	0.06	17.14	1	.000	0.80	0.71	0.89		
	Gender	0.38	0.13	8.64	1	.003	1.46	1.13	1.87		
	Ever used cocaine	-4.97	0.16	1019.77	1	.000	0.01	0.01	0.01		
	Constant	5.90	0.42	281.28	1	.000	0.00				
Injected drug use	Race	-0.01	0.07	0.01	1	.932	0.99	0.87	1.13	< .001	0.44
	Grade	0.04	0.06	0.44	1	.506	1.04	0.92	1.18		
	Gender	0.47	0.15	10.10	1	.001	1.60	1.20	2.13		
	Ever injected any illegal drug	-6.17	0.16	1556.91	1	.000	476.81	0.00	0.00		
	Constant	6.23	0.50	221.68	1	.000	0.00				

All of the regression models for the traumatic events were statistically significant, indicating that experiencing the tested traumatic events contributed to the likelihood of using heroin. Whether adolescents engaged in physical fights was statistically significant ( $p < .001$ , Nagelkerke  $R^2 = 0.10$ ), with the model containing the control variables and physical fights contributing to approximately 10% of the likelihood of having used heroin. After controlling for race, gender, and grade, physical fighting was a significant predictor of if adolescents used

heroin,  $p < .001$ ,  $\text{Exp}(B) = 0.13$ . Similarly, the models for forced sexual intercourse ( $p < .001$ , Nagelkerke  $R^2 = 0.12$ ), sexual intimate partner violence ( $p < .001$ , Nagelkerke  $R^2 = 0.10$ ), physical intimate partner violence ( $p < .001$ , Nagelkerke  $R^2 = 0.11$ ), bullying on school grounds ( $p < .001$ , Nagelkerke  $R^2 = 0.04$ ), online bullying ( $p < .001$ , Nagelkerke  $R^2 = 0.05$ ), and seriously considering attempting suicide ( $p < .001$ , Nagelkerke  $R^2 = 0.09$ ).

Forced sexual intercourse,  $p < .001$ ,  $\text{Exp}(B) = 15.35$ ; sexual intimate partner violence,  $p < .001$ ,  $\text{Exp}(B) = 12.41$ ; physical intimate partner violence,  $p < .001$ ,  $\text{Exp}(B) = 11.83$ ; bullying on school grounds,  $p < .001$ ,  $\text{Exp}(B) = 3.11$ ; online bullying,  $p < .001$ ,  $\text{Exp}(B) = 4.29$ ; and seriously considering attempting suicide,  $p < .001$ ,  $\text{Exp}(B) = 6.81$ , were significant predictors of if adolescents used heroin. These findings indicated that the likelihood of using heroin was greater if adolescents experienced physical fights, forced sexual intercourse, sexual or physical intimate partner violence, bullying in school or online, or seriously considered suicide. However, it should be noted that the  $\text{Exp}(B)$  values were greater for forced sexual intercourse and the two types of intimate partner violence which reflected the results of the chi-square analyses.

Table 8

*Results of the Multiple Logistic Regressions for Traumatic Events*

		B	S.E.	Wald	df	p value	Exp(B)	95% CI for Exp(B)		p value	R <sup>2</sup>
								Lower	Upper		
Physical fight	Race	0.09	0.05	2.73	1	.099	1.09	0.98	1.22	< .001	0.10
	Grade	0.15	0.05	8.36	1	.004	1.16	1.05	1.28		
	Gender	0.40	0.12	11.03	1	.001	1.48	1.18	1.87		
	Were in a physical fight	-2.08	0.12	280.84	1	.000	7.98	0.10	0.16		
	Constant	-6.88	0.35	392.35	1	.000	0.00				
Forced sexual intercourse	Race	0.04	0.05	0.64	1	.423	1.04	0.94	1.16	< .001	0.12
	Grade	0.01	0.05	0.02	1	.879	1.01	0.91	1.11		
	Gender	1.27	0.13	99.46	1	.000	3.55	2.77	4.55		
	Forced sexual intercourse	-2.73	0.13	475.17	1	.000	15.35	0.05	0.08		
	Constant	-7.29	0.36	407.13	1	.000	0.00				
IPV – Sexual	Race	0.03	0.05	0.35	1	.554	1.03	0.93	1.15	< .001	0.10
	Grade	0.06	0.05	1.30	1	.254	1.06	0.96	1.17		
	Gender	1.15	0.13	84.30	1	.000	3.15	2.46	4.02		
	Experienced sexual dating violence	2.52	0.13	403.47	1	.000	12.41	9.70	15.86		
	Constant	-7.09	0.36	391.00	1	.000	0.00				
IPV – Physical	Race	0.04	0.05	0.44	1	.508	1.04	0.93	1.15	< .001	0.11
	Grade	0.00	0.05	0.01	1	.931	1.00	0.91	1.11		
	Gender	0.94	0.12	61.39	1	.000	2.57	2.03	3.25		
	Experienced physical dating violence	2.47	0.12	428.53	1	.000	11.83	9.36	14.95		
	Constant	-6.66	0.35	372.75	1	.000	0.00				
School bullying	Race	0.01	0.05	0.02	1	.897	1.01	0.91	1.12	< .001	0.04
	Grade	0.12	0.05	5.43	1	.020	1.12	1.02	1.24		

	Gender	0.79	0.12	45.09	1	.000	2.21	1.75	2.78		
	Experienced bullying on school property	-1.14	0.12	93.67	1	.000	3.11	0.26	0.40		
	Constant	-6.43	0.35	355.51	1	.000	0.00				
Online bullying	Race	0.01	0.05	0.01	1	.920	1.01	0.91	1.11	< .001	0.05
	Grade	0.09	0.05	3.02	1	.082	1.09	0.99	1.20		
	Gender	0.94	0.12	60.19	1	.000	2.55	2.01	3.22		
	Experienced bullying online	-1.46	0.12	145.75	1	.000	4.29	0.18	0.30		
	Constant	-6.60	0.35	364.82	1	.000	0.00				
Seriously considered attempting suicide	Race	0.02	0.05	0.17	1	.679	1.02	0.92	1.13	< .001	0.09
	Grade	0.06	0.05	1.45	1	.228	1.06	0.96	1.17		
	Gender	1.03	0.12	72.68	1	.000	2.79	2.20	3.53		
	Considered attempting suicide	-1.92	0.12	279.62	1	.000	6.81	0.12	0.18		
	Constant	-7.05	0.34	420.81	1	.000	0.00				

Finally, the remaining contributing factors were tested. Of the contributing factors experienced sexual intercourse ( $p < .001$ , Nagelkerke  $R^2 = 0.10$ ) was statistically significant. The model consisting of experienced sexual intercourse and the control variables contributed to 10% of the likelihood of having used heroin in adolescents. The regression models containing perception of weight ( $p = .053$ , Nagelkerke  $R^2 = 0.01$ ) and played at least one team sport ( $p = .822$ , Nagelkerke  $R^2 = 0.01$ ) along with the control variables were not statistically significant. This finding indicated that the regression models did not provide a statistically significant contribution to the likelihood of having used heroin in adolescents.

After controlling for race, gender, and grade, experienced sexual intercourse was a significant predictor of adolescents using heroin,  $p < .001$ ,  $\text{Exp}(B) = 11.64$ . This finding indicated that the likelihood of using heroin was greater if the adolescent had experienced sexual intercourse. However, it is important to note that the Nagelkerke  $R^2$  value for the statistically significant regression model was low, indicating that the regression model provided only a small contribution to the likelihood of adolescent heroin use.

Table 9

*Results of the Multiple Logistic Regressions for Other Contributing Factors*

		<i>B</i>	S.E.	Wald	df	<i>p</i> value	Exp( <i>B</i> )	<i>p</i> value	Nagelkerke R <sup>2</sup>
Experienced sexual intercourse	Race	0.08	0.06	1.94	1	.164	1.08	< .001	0.10
	Grade	-0.17	0.05	11.11	1	.001	0.84		
	Gender	0.61	0.12	26.81	1	.000	1.84		
	Ever had sexual intercourse	2.45	0.18	185.69	1	.000	11.64		
	Constant	-7.10	0.37	366.47	1	.000	0.00		
Weight	Race	0.03	0.05	0.39	1	.533	1.03	.053	0.01
	Grade	0.06	0.05	1.57	1	.210	1.06		
	Gender	0.70	0.12	35.68	1	.000	2.01		
	Weight	-0.22	0.11	3.75	1	.053	0.81		
	Constant	-5.84	0.34	299.76	1	.000	0.00		
Played on at least one sports team	Race	0.04	0.05	0.46	1	.498	1.04	.822	0.01
	Grade	0.06	0.05	1.50	1	.220	1.06		
	Gender	0.69	0.12	34.46	1	.000	1.99		
	Sports	-0.03	0.11	0.05	1	.822	0.98		
	Constant	-5.98	0.34	307.95	1	.000	0.00		

The purpose of this study was to examine factors that lead to opioid misuse in adolescents. The hypothesized predictive relationships between the variables that may represent contributing factors for opioid misuse, specifically use of heroin, were analyzed. A sample of data was drawn from the 2013, 2015, and 2017 Youth Risk Behavior Surveillance System. A total of 12,549 cases were removed from the dataset. The final dataset consisted of data for 31,018 adolescents between the ages of 14 and 18. Chi square analyses and logistic regressions were conducted to assess the predictive relationships.

The results of the chi square analyses indicated that statistically significant relationships existed between all of the contributing factors and heroin use, except satisfaction with weight and participation in team sports. The highest unadjusted odds

ratios existed for sexual intimate partner violence (OR = 8.69) and physical intimate partner violence (OR = 10.05). The findings suggested that adolescents who experienced these types of intimate partner violence were more likely to have tried heroin.

The results of the binary logistic regressions were similar to the results of the chi square analyses. Statistical significance was assessed for all the regression models with the exception of satisfaction with weight and played team sports. The majority of the Nagelkerke R<sup>2</sup> values were low (between 0.01 and 0.14). The highest Nagelkerke R<sup>2</sup> values were observed for cocaine use (0.42) and injected drug use (0.44). These findings indicated that the regression model consisting of race, gender, grade, and cocaine accounted for 42% of the variance in likelihood to use heroin. The regression model consisting of race, gender, grade, and injected drug use accounted for 44% of the variance in likelihood to use heroin.

This chapter contained a description of the data management conducted on the datasets used within this study. The results of the statistical analyses, which consisted of chi square tests and logistic regressions, were presented in this chapter. Chapter 6 will provide interpretation of the findings and recommendations for future researchers and practitioners.

## **Chapter 5: Qualitative Results**

This qualitative grounded theory study is a supplement to the quantitative inquiry in chapter 4. The purpose is to identify pathways for opioid misuse among youth and includes determining a theoretical model to describe social and situational factors related to opioid misuse. The study also has the purpose of identifying recommendations for future interventions aimed at opioid use prevention. This chapter includes findings from vignettes and discussion recorded during the interviews. The chapter contains results of a grounded theory investigation conducted to reveal pathways that lead to opioid misuse for adolescents answering the following research questions:

RQ1: What elevates the risk for youth opioid misuse?

RQ2: What factors, contributing to youth opioid misuse can be targeted for prevention?

The presentation of the data is organized around the research questions of the study. The interpretation process examined the data to determine the pathways revealed by the statements of the subjects. The second research question examined the factors contributing to the use of opioids among the subjects of the study. Lastly, there was important discussion emerging from the transcripts regarding the consequences and prevention of opioid misuse. The outcome of the behavior has relevant bearing on developing deterrents to the use among youth.

### **Structural Text Analysis of Interviews**

The first research question of the study is: What elevates the risk for youth opioid misuse? The interpretation of the data provided by the interviewees produced the three major themes related to risk: (a) poly-substance use, (b) relationships with primary social

and familial groups, and (c) access to opioids. The selection of the three central themes was based on the criteria that all of the interviewees mentioned an aspect of the theme during the interview. The patterns within the themes are also based on the frequency of discussion by the interviewees. In the discussion of the themes, only numbers are used to preserve confidentiality.

**Poly-substance use.** One aspect of poly-substance use that emerged from these interviews was the participants' description of the progression of drug use. In the following quotes it is clear that opioids were used in tandem with other substances or that opioids were used after being introduced to other substance. There was no single pattern of use of more than one substance.

[1] They just don't jump out and do heroin like we started with pills uppers and downers. He used downers I used Uppers. Then we graduated to cocaine then we graduated to acid. We did do crack but we were older when we did crack.

[2] ...there was time when I had Benzodiazepines I was on Klonopin, prescribed Klonopin and I would over use and then I would have to wait until my prescription got refilled and I would be looking for something else to use until then.

[2] I snorted heroin 2 times, but I did not like. My use was synthetic opioids so its Vicodin.

[3] I was gettin' high and using different drugs.

**Relationships with primary social and familial groups.** Peers and parental relationships emerged in the data as either a stressor related to their choice to use or encouragement to use. The examples provided speak to the connection that these relationships have with opioid use. The participants indicated that perceived broken relationships with parents or familial groups has influence on the choice to misuse. The influence of model behavior by parents was more emphasized in interview two. Also, the normalcy of addiction or perceived dysfunction in the home appeared to have a relationship with opioid use.

The sense of belonging played into the choice to misuse. As seen in the direct quotes fitting in with peers and feeling disconnection with parents influenced use. Participant three became visibly upset when mention the relationship that she felt had the most influenced her use. It was unclear whom the relationship was with, but it was of significance to her. Interviewee one spoke of her use in relationship to her then partner. Interviewee three also described not being emotionally fulfilled at home.

[1] They make it to where they are protecting their image more than finding out what you really want. I was told to do this and told to do that. I didn't want to be in no Miss Jabberwock Pageant. That didn't even thrill me. I didn't even like the girls that were in it, because they were stuck up and snooty. And I just didn't want to be with that crowd but I was forced to do all that stuff. I was forced to join this club that club.

[1] Situations you know where the mom will beat them most of the time or they had to watch their brothers or sisters or their (moms) boyfriend would try to have sex with them and stuff like that.

[1] Unfortunately a lot of my friends who had professional parents we all, a lot of us did drugs. A lot of us did drugs.

[2] Parents... we have really waged war on emotion. Don't cry you shouldn't feel this way you shouldn't be that way.

[2] A lot of them don't have any you know single parent homes and really it all goes back to you know not being able to deal with pain.

[2] I wasn't raised in a household where we were practicing coconsciousness or awareness or any kind of emotional well-being.

[2] My father was an addict and it (drug use) was something that was normal to me.

[2] My dad left the home it was just a free for all and I found the group that was partying using alcohol and marijuana and then it was just fun.

[2] trauma and its dysfunction in the family that was the root of my addiction.

[3] If I would have never met a certain person in my life. I woulda never, you know, led on with that person then my life woulda been a whole lot easier and different.

**Access to opioids.** The ease of access to opioids was the most concerning finding. The interviews described the ability to obtain opioids from peers, family, doctors, and even strangers. Prescriptions written to the young person or someone in their social circle made it easy to obtain. The third interviewee describes grooming behaviors from persons in her environment; she was given drugs for free and later exchanged sex for drugs. It is clear from the interviews that young people who may have no money can still access opioids.

[1] They are easy to obtain not only that but family members usually have those in their medicine cabinet. Which is well-known and also their Friends family.

[1] They will ask if it is okay to use the bathroom that's how we used to steal stuff going into people's bathroom and taking them.

[1] I could go up on Saginaw Street right now and buy some.

[2] buying them off the street or getting them from somebody else or somebody else's prescription.

[2] lack of awareness that the doctors had was incredible. And fear that they had from their own patients. Because their patients are in so much pain that they are pushing the doctors to really write. And that's what I did.

[2] I kept coming up with all these things, these minor pain issues and they were prescribing me.

[2] I could go to any emergency room and complain of something and they were writing scripts for me.

[2] Heroin is cheaper and easier to get than the synthetics.

[2] (Access from) parents, grandparents, right, you know doctors. There are doctors that are over writing prescriptions and dr. shopping.

[2] I bought I was buying Vicodin from people I knew.

[3] (pills) They can be passed out like in the streets for free.

[3] It was there everywhere you go. In a certain part of the neighborhood some, like I said prostitute for it. Some give it to 'em just to give it to 'em and try to be nice of sharing when they really know it was death upon 'em.

[3] (opioids) ..it's just here. It's free, everywhere.

### **Conclusions of the Thematic Coding Analysis**

The diversity among opioids that were misused and consumption of other substances referred to as “drugs” appeared in all three interviews. It was unclear if opioid misuse was preceded by other substance use or if other substances were used after the misuse of opioids. The home life and relationships with parents and other significant social relationships had an influence on misuse. There was no clear distinction on the type of parental influence that supported misuse. Two of the interviewees explicitly identified parental relationships in connection with their choice to misuse. The third interviewee made mention of an important relationship that influenced their choice to misuse. Challenges or perceived dysfunction in important relationships may influence choices around opioid misuse. The availability of opioids varied but there was no observed challenge noted with regards to obtaining them. All three interviewees noted strategies to obtain opioids if they were not readily available.

**Code co-occurring model.** To further investigate the relationship of consequences and prevention of opioid misuse, a co-occurring model was used. The data was coded for both the consequences and prevention of opioid misuse and then segments with codes that overlapped with prevention and consequences were identified. The relationship between prevention and a lack of fear about using was consistent in all three interviews. Additionally, there was a consistent expression that prevention was connected to social relationships. Peer, partner, and parental relationships emerged in the data as either a stressor related to their choice to use or as an encouragement to use. They also discussed the importance of a sense of belonging when asked Why or under what circumstances do young people start misusing opioids. The following text express the factors related to prevention.

**Factors related to lack of fear or information.**

[1] You think you're invincible number one.

[2] It really comes down to a lack of education and awareness but its addiction.

[2] You give someone who has had problems with addiction; like drinking and then you give them a script for psychotic meds like Benzodiazepines you are just compounding an issue.

[3] People that have not experienced how the high feel don't understand it.

[3] I mean, like I said, we need more activity. You know what I'm saying. More drug preventions explaining what will happen before you try this, you know. I feel like we need more knowledge about drugs floating around, you know what I'm saying, than it already is.

### **Factors related to relationship.**

[1] Constant (pause) being in constant communication (with parents) will deter them from doing it.

[1] They may see their friends doing it but they won't do it. Because they have,(pause) they know they have a safety net of their parents.

[2] Communication and having more transparency between doctors and patient

[3] More activities, for one. I like more mature activities and being like able to really connect with one another.

[3] You know (peers who also used) sit down and talk to one another without young people being so mad at everything and all that.

The relationship between the effects of use on relationships was also noted.

Additionally, there was a consistent expression that use could cause negative outcomes connected to increased stress or trauma. The following text express what factors was related to the effects of use.

[1] They kept doing it to the point to where he lost his job you know all his teeth and everything.

[2] Kids that are dying mostly from overdoses 18- to 25-year olds.

[2] My drug addiction slowly crept up on me.

[2] It took time until it was a full-blown addiction. I never used every day but I was a binger and that lead to a series of very unfortunate events where I ended up loosing custody of my daughter.

[3] Once I hit it I got addicted to it and it was just like, okay, I want more. I don't care what's going on. I don't care what's happening. I just want more.

[3] I got addicted to it. I just wanted to get high. It was like it took over my body for a long time where I didn't care where it came from. I didn't care what I did for it. So I turned a lot of prostituting, a lot for a lot of different drugs. You get what I'm saying? And the main thing was actually when I started on pills, it was for the pills. I was turning tricks for the pills. It was a lot of stress. When I couldn't get it I was irritated.

[3] I always had a high tolerance for drugs where a lot of people couldn't tell if I was high or sober, you get what I'm saying, until I started explaining myself and they started hearing it from other people mouths that I was gettin' high and using different drugs. They'll come ask me. I denied it, you know. It leads to lie after lie with that. I didn't have much opportunity except to turn to prostitution for it because I wasn't gettin' no money and it was my only option.

[3] This will mess your life up before they even think about even, you know, going to that life.

The following chapter will contain a summary of the study and the conclusions drawn from the analysis of the findings from both the quantitative and qualitative analysis. The chapter will also relate the findings to the major questions associated with the purpose of the study. In addition, the chapter will present implications of the findings for practice as well as directions for future research examining the pathways leading to opioid misuse among adolescent.

## **Chapter 6: Discussion**

In the absence of a comprehensive understanding about the drivers of opioid consumption for youth, prevention will be less effective. The dangers of opioid addiction, especially for adolescents, are at the forefront of the issues haunting Americans today. This has led to a greater sense of urgency in addressing the issue and the known risk factors in order to find preventative solutions for the future. Though not all risk factors are controllable, a combination of these efforts, such as limiting access to opioids, limiting prescription of opioids to youth or providing education to youth on both drug abuse and emotional coping methods and resources, ought to result in an overall and significant decrease in opioid use in adolescents in the United States.

### **Interpretation of the Findings**

The qualitative and quantitative findings worked in tandem with each other. The first observations of the YRBS data influenced the development of the qualitative questions. The findings from the qualitative interviews influenced the selection of variables used for analysis. When all the data was analyzed all the findings were viewed side by side to inform each other.

The findings will inform interventions using health belief and transtheoretical models because they illuminate risks and correlates to opioid misuse. During adolescence youth gain independence. The study suggested that this experience of independence might have a relationship with opioid misuse. The findings from this study support the idea that experiences, access, and divergent substance use are determinants related to opioid misuse for youth. The encounters described by the interviewee's detailed parental challenges, and independent behaviors consistent with coming of age. They also

categorized a progression of use. Suggesting that over time they either graduated from other substances to opioids or their consumption increased. The quantitative findings indicate that youth over 16 years old and students in 10th grade or higher used heroin more than younger students in 9th grade. Not surprisingly age and grade have a relationship with the consumption of opioids in particularly heroin. The relationship between age and use of opioids indicates that prevention efforts should start prior to high school.

Since the late 2000's the literature has supported risk reduction efforts for non-medical use of prescription drugs for adolescents that have experienced trauma such as witnessing significant violence (McCauley et al., 2010). While this study was able to investigate the relationship between trauma and opioid use, more research is needed in this area. These findings indicate that the relationship between trauma and opioid misuse was a factor in the choices made by the interviewees. The variables used to represent traumatic events in the quantitative analysis were linked to an increase in the likelihood of heroin consumption. Of the traumatic stressors, physical dating violence (PDV) and sexual dating violence (SDV) had the strongest statistical relationship with heroin misuse. While it is unclear if heroin use started before or after the traumatic event it is clear that students that report dating violence of any kind should be targeted for opioid prevention.

Ease of access to opioid medications has created an enormous risk factor for opioid dependence, because of the risk of addiction within the first few uses (Miech et al., 2015). The risk for adolescents increases when they are provided with a prescription for an opioid to aid in the pain management of an injury such as a bone break or fracture. Instances such as these do not come from an intent to do harm, yet they can impose a

large risk to adolescents, particularly because their brains are still developing (Schrager et al., 2014). After a teenager has been exposed and becomes addicted to a drug, he or she has a high likelihood of resorting to theft of prescription opioids, the purchase of non-prescribed opioids on the street, and transitioning to heroin as a cheaper and more widely available option (Schrager et al., 2014). Findings support the assumption that access has a relationship with misuse. More research is needed to identify strategies to reduce access and deter youth consumption.

Parental monitoring was discussed in the interviews. Increased positive parental engagement and monitoring could aid in limiting access to opioids for youth. Other strategies to restricting access such, as provider education has been effective in recent years. Trusted adults should closely monitor youth that are prescribed opioids and limit access to the prescriptions of others. Prevention interventions for young people should include a peer-led intervention aimed at reducing access in tandem with other strategies.

Findings indicate that opioid misuse for adolescents is interrelated with the misuse of other substances. Young persons that use alcohol or misuse any drug prescription or street drug should be targeted for opioid prevention. Existing research on opioid use in adolescents agrees with these risk factors, emphasizing the danger of the experimentation of opioids due to their highly addictive quality (Compton et al., 2015). Typically, when teens experiment with drugs, it is often with substances such as marijuana, alcohol, and nicotine, although some would move on to harder substances such as cocaine, methamphetamine, hallucinogens, and at times, heroin (Miech et al., 2015). The relationship between cocaine and heroin use was one of the strongest findings

from this study. The polarizing effect of the two substances may explain the association, but more research is needed.

There was not a noted sense of fear related to opioids in the interviews when the participants referenced other drugs. All of the participants reported opioids as just one of the substances with addictive principles that they used during their youth. It did not appear that opioids were weighted as being more dangerous than any other substances. The lack of a sense of worry or fear of addiction prior to use indicates a prevention opportunity for education on the long-term effects of opioid misuse. Findings from the interview suggest that even fear of vanity-based effects of use such as tooth decay may be a deterrent for use in this population. When specifically looking at heroin use, the consumption of cocaine, or a history of illegally injecting drugs was linked with an increased likelihood of using. Adolescents who drank and used marijuana were also likely to use heroin, but consumption of Alcohol and marijuana was high among youth that never used heroin. More investigation on this phenomenon is needed. Additionally, because cannabinoids can have positive effects in persons with diseases that cause chronic pain (Grant, Atkinson, Gouaux, & Wilsey, 2012) more research is needed to determine if there is a correlation with the experience of pain among youth that use cannabis and do not use opioids compared to those that use opioids but don't use cannabis. The impact of opioids versus other substances was not seemingly understood in the interviews. Nevertheless, it was clear that prevention efforts should be inclusive of the negative effects specific to opioid misuse.

## **Limitations of the Findings**

Useful information about opioid misuse in youth was extracted from the investigative processes in this study. However, this exploratory inquiry was limited by the study design. Future mixed method studies should use an instrument specifically designed to gather information about opioid misuse. The secondary data analysis limited the quantitative findings to heroin use and was not inclusive of prescription opioid misuse. Future studies should also include a larger sample size for the interviews and the review of the interview questions as they were not piloted prior to use. The interviews were limited to three persons and inadvertently not enough demographic data was collected. A more comprehensive exploration is needed to confirm the findings.

Because descriptors such as rural verses urban and addict verses patient have a racial undertone a struggle that was constant in this study process was how to develop interventions that aid in the prevention of opioid misuse without stigmatizing any particular group. Netherland and Hansen argued in 2016 that the framing of the opioid crisis reinforces the stigmatization and race based disposition of the War on Drugs and is maintained by the lack of explicit discussion of race in the service of color blind ideology (Netherland & Hansen, 2016). The decision to avoid social and cultural identities led to study design choices that may have inadvertently introduced bias. More effort could have been made to examine the social construction of race and opioid misuse in the interviews. The ability to examine students by geographical region would have also proven beneficial. Factors related to living in rural verses and urban environment may contribute to misuse but this study did not examine those differences. This information was available and could have been used to inform what is known about heroin use in the

quantitative inquiry. Not considering the full identities of youth that misuse is a limitation of this study.

Another limitation was that there was no ability in the study to account for addiction. The need to establish the distinction between misuse and addiction became clear after the study design was developed and data collection and evaluation had already started. Without the ability to delineate between youth that experimented with opioids and youth who were addicted to opioids contributing factors could be misinterpreted. A further limitation is the data available for the secondary data analysis was not inclusive of all opioid misuse. By excluding opioids that were misused in other forms such as prescription opioids or illegal fentanyl the full picture of opioid use was not represented. The questions extracted from the YRBS were not designed to specifically capture information about factors related to opioid misuse. The design of a survey instrument to garner specific information about opioid use is needed to support the findings of this study. The survey instrument should include, behavioral, situational, and social factors related to opioid misuse.

### **Suggestions for Further Research**

The findings of this study were exploratory with the goal of illuminating areas for future research. Future studies should be inclusive of the social and cultural difference among youth. Social and cultural identities are complex. This study generated useful information about pathways to misuse but did not account for differences among sub-populations. Examining subpopulations more will yield useful information for developing targeted interventions. More persons who identify as male in the study reported heroin use compared to persons who identify as female, but none of the interviewees were male.

More studies examining opioid consumption difference's based on gender identity are needed. Future studies should also examine differences among youth with non-binary gender identities and youth who have sexual identities other than straight separately. This would aid in the development of interventions for Lesbian, Gay, Transgender, Queer, and Questioning (LGBTQ) youth. In a 2012 study conducted in Los Angeles and New York, it was found that LGBTQ young adults are more likely to report misuse of prescription opioids and tranquilizers.

Future studies focusing on sub-populations of youth should also explore pregnant and parenting adolescents that misuse. Despite being under 28 years of age, all of the interviewees were mothers, one of whom had a child who already uses marijuana and another who had a child removed from their home because of opioid misuse. Additionally, the likelihood of heroin use was greater if the respondent reported ever having sex. It is noted that in this study having sex only had a small contribution to the likelihood of adolescent heroin use. However, sexual partner violence and being forced to have sex had a stronger relationship with heroin use. Future studies should investigate this further, to properly inform prevention interventions.

Dissatisfaction with body size was not strongly supported as a factor contributing to opioid misuse in the study. Although one of the interviewees indicated not being "shapely" as a factor that contributed to her opioid use when specifically looking at heroin use the qualitative findings did not indicate that perception of weight provided a statistically significant contribution to the likelihood that a young person would use heroin. More research is needed to identify what factors contributing to negative self-perception may have influence on opioid misuse.

Participation in team sports was not a statistically significant contribution to the likelihood of having used heroin for the students in the study. While sports has long been identified as a protective factor for substance use among youth, the relationship between access to opioids and sports team participation remains understudied. In 2014 a study found that young people with a male identity participating in sports have more access to opioids and access puts them at risk (Veliz et al., 2014). Access was identified by the interviewees in this study as a factor contributing to mis-cues further supporting the idea that more research is needed to explain the relationship between access to opioids and participation in sports.

## **Conclusions**

Although not all risk factors to adolescent opioid misuse are controllable, there are several that are, including limiting access to opioids, limiting prescription of opioids to youth, providing education to youth regarding dangers of drug abuse to combat effort of peer pressure, and educating teens on how to cope with depression and other emotional issues they encounter (Griffin et al., 2010). For instance, the CDC reported a decline in adolescent abuse when parents practiced greater diligence in keeping medications locked, opioid and otherwise, denying access to their teens (Spoth et al., 2013). Moreover, a panel overseeing the prescription of opioids to adolescents recommended that these prescriptions be barred short of a severe or urgent need and that physicians locate a different method of pain management (Spoth et al., 2013). These two prevention methods will target the easier access methods that adolescents often have access and it is largely controllable.

Education regarding drugs and their dangers, particularly that of opioid use, should be implemented into the education system vigorously as it has been effective in discouraging drug use and combat peer pressure that is often experienced during the teenage years (Griffin et al., 2010). Additionally, education and counseling programs in schools can be effective, offering education on managing depression and emotional distress (Griffin et al., 2010). In providing adolescents the skills they need to cope, it is likely the risk factor for opioid use declines as the teen has the ability to handle and manage their emotions, or perhaps feel confident knowing there are people available to help such as a school counselor (Spoth et al., 2013).

In combination with the presence of peer pressure, experimentation with opioids is likely to have devastating consequences for the youth and their family. However, the general consensus gathered from the qualitative interviews was that adolescent use did not have to have lasting effects on their life. This was expressed by using past tense references to their use and related behavior, and observed sense of hopefulness when discussing prevention. There is hope in intervention strategies for young opiate misusers as well as in prevention efforts that will stop young people from ever misusing. Until we adopt a framework that acknowledges root causes of misuse, efforts to mitigate the impact of the opioid crisis will fail to save the lives of youth and young adults who die from opioid overdose.

## Appendix A: List of Abbreviations

Centers for Disease Control	(CDC)
Confidence interval	(CI)
Dating violence victimization	(DVV)
Diagnostic and Statistical Manual	(DSM)
Food and Drug Administration	(FDA)
Hepatitis C virus	(HCV)
Human Immunodeficiency Virus	(HIV)
Intimate partner violence	(IPV)
Joint Commission on Accreditation of Healthcare Organizations	(JCAHO)
Journal of the American Medical Association	(JAMA)
Lesbian, Gay, Transgender, Queer, and Questioning	(LGBTQ)
Market Data Retrieval	(MDR)
Navy Manning Plan for Officers	(NMPO)
non-medical use of opioid prescriptions	(NMUOP)
National Survey on Drug Use and Health	(NSDUH)
Odds ratio	(OR)
Primary sampling unit	(PSU)
Secondary sampling unit	(SSU)
United States	(U.S.)
Variance Inflation Factor	(VIF)
Youth Risk Behavior Surveillance Survey	(YRBS)

## Appendix B: Questionnaire

### Interview Questions

During the interview: The guided conversation will aim to understand better factors that contributed to opioid misuse for the participants. Participants are given a copy of the consent and asked to read along as it is read aloud to them. Each participant will be asked the following set of questions; additional clarifying questions will also be asked as needed.

1. What, in your opinion, constitutes inappropriate use of prescription opioids?
2. What are some factors specific to being young that lead people to misuse prescription opioids or street drugs like Heroin?
3. Why or under what circumstances do people start misusing prescription opioids or heroin?
4. What are the dangers associated with heroin use for young people? What about prescription opioids?
5. How do young people obtain prescription opioids?
6. How or under what circumstances did you start to misuse?

## Youth Risk Behavior Surveillance Survey (YRBS) Questions

Variable	2013	2015	2017
Age	Q1	Q1	Q1
Sex	Q2	Q2	Q2
Grade	Q3	Q3	Q3
Race	Q5	Q5	Q5
Physical Fight	Q18	Q18	Q1
PhysicalFights2	QN18	QN18	QN17
Forced Intercourse	Q21	Q21	Q19
IPV – Dating	Q22	Q22	Q22
IPVDating2	QN22	QN22	QN22
IPV – Sex	Q23	Q23	Q21
IPVSex2	QN23	QN23	QN21
Bullying – School	Q24	Q24	Q23
SchoolBullying2	QN24	QN24	QN23
Bullying – Online	Q25	Q25	Q24
OnlineBullying2	QN25	QN25	QN24
Considered Suicide	Q27	Q27	Q26
ConsideredSuicide2	QN27	QN27	QN26
Ever Use Alcohol	Q41	Q41	Q40
Alcohol2	QN41	QN41	QN40
Ever Use Marijuana	Q47	Q47	Q46

Marijuana2	QN47	QN47	QN46
Ever Use Cocaine	Q50	Q50	Q49
Cocaine2	QN50	QN50	QN49
Ever Use Heroin	Q52	Q52	Q51
HeroinR	Recode of Q52	Recode of Q52	Recode of Q51
Injected Drug Use	Q57	Q58	Q57
Injection2	QN57	QN58	QN57
Sexual Intercourse	Q59	Q60	Q59
Perception of Weight	Q66	Q69	Q68
WeightR	Recode of Q66	Recode of Q69	Recode of Q68
Sports Participation	Q84	Q84	Q83
Sports2	QN84	QN84	QN83

## **Appendix C: Informed Consent**

### INDIANA UNIVERSITY STUDY INFORMATION SHEET FOR CONTRIBUTING FACTORS FOR OPIOID MISUSE AMONG US ADOLESCENTS

You are invited to participate in a research study to better understanding risk of Opioid misuse among young people. This study will examine risks for the use and abuse of opioids among youth. You were selected as a possible subject because your self-reported that when you were young you misused opioids. Your lived experience as a youth provides you with key insight on what should and could be done around prevention. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

The study is being conducted by student Co-Investigator Deidre Hurse PhD. Candidate, as a part of the Department of Health & Rehabilitation Sciences Indiana University under the direction of Faculty Principal Investigator Brent L. Arnold Ph.D., ATC, FNATA. It is not a funded study and is done as part of a doctoral dissertation.

#### **Study Purpose**

The purpose of this study is to better understand opioid misuse among young people. Better understanding factors related to the population will help in the development of prevention efforts for those at risk for opioid misuse.

#### **Procedures for the Study**

If you agree to be in the study, you will do the following things:

You will participate in a one on one discussion about your thoughts on what puts young people at risk for misusing opioids. The discussion will be audio recorded and will last

between 30 and 60 minutes. The information you share will be used to help advise researchers on prevention programs for young people.

To protect your confidentiality, we will only meet face to face in a private area. Please take a moment to look around and make sure you are comfortable talking about the topic in this space. If you want to reschedule and meet at another location that can be arranged. You may provide your email address if you want when the study is over you can have an overview of what the study found emailed to you. Your email address and responses will be kept in strict confidence.

Your participation in this study is voluntary. You may refuse to participate at any time without penalty. If you wish, a copy of this document can be sent to you via email.

### **Risks and Benefits**

The risks of participating in this research are minimal and could result in you being uncomfortable. If that happens at any time you are able to skip any question or exit the interview. There is also a risk of loss of confidentiality, however every measure possible will be taken to avoid any breach in confidentiality.

Only the researchers in this study will have access to all of the data. The IU Institutional Review Board or its designees can review the study records. If the results of this study are published, no personal identifying information will be released.

You are not expected to benefit from participating in this research.

### **Confidentiality**

Efforts will be made to keep your personal information confidential. We cannot guarantee absolute confidentiality. Your personal information may be disclosed if required by law. Your identity will be held in confidence in reports in which the study

may be published Tape recordings of the interview will be made to ensure accuracy and only the researchers will have access to them. All data will be stored on an SD card. No cloud-based storage will be used. All documents and audio recordings will be kept in digital form on the SD Card in a locked office with access only by study personnel. All records will be kept for seven full years after the study or kept in accordance with the department policies whichever is longer.

Organizations that may inspect and/or copy your research records for quality assurance and data analysis include groups such as the study investigator and his/her research associates, the Indiana University Institutional Review Board or its designees, as allowed by law, state or federal agencies, specifically the Office for Human Research Protections (OHRP) etc., who may need to access the research records.

### **Payment**

You will not receive payment for taking part in this study.

### **Contacts for Questions or Problems**

For questions about the study, contact the researcher. If you have questions about this evaluation project, please contact: Student Co-Investigator Deidre Hurse PhD. Candidate, [dverdun@iupui.edu](mailto:dverdun@iupui.edu) or call [REDACTED]. Department of Health & Rehabilitation Sciences Indiana University Address: 1140 W Michigan St, Indianapolis, IN 46202 Or Faculty Principal Investigator - Brent L. Arnold Ph.D., ATC, FNATA.

For questions about your rights as a research participant or to discuss problems, complaints or concerns about a research study, or to obtain information, or offer input, contact the IU Human Subjects Office at (317) 278-3458 or (800) 696-2949.

### **Voluntary Nature of Study**

Taking part in this study is voluntary. You may choose not to take part or may leave the study at any time. Leaving the study will not result in any penalty or loss of benefits to which you are entitled. Your decision whether or not to participate in this study will not affect your current or future relations with Indiana University or its affiliates.

## References

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doi:<https://doi.org/10.1016/j.jadohealth.2013.09.002>
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doi:10.1080/10550887.2012.735564
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## **Curriculum Vitae**

**Deidre N. Hurse**

### **EDUCATION**

#### **Ph.D.**

*Concentration Health Services Research, Minor Health Literacy*, Indiana University IUPUI School of Health and Human Sciences, Indianapolis IN, October 2019

#### **Master of Public Administration (MPA)**

*Focus Healthcare Management*, University of Michigan-Horace Rackham School of Graduate Studies, Ann Arbor MI, May 2008

#### **Bachelor of Social Work (BSW)**

University of Michigan-Flint, Flint, MI, May 2004

### **SKILLS AND QUALIFICATIONS**

- Online teaching
- Grant/Contract management, proposal writing, and budget preparation
- Excellent oral and written communication skills
- Proficient in Microsoft Office Suite and statistical analysis software
- Preparation of Internal Review Board (IRB) applications
- Research report writing and program management
- Motivational Interviewing
- Counseling and risk reduction experience
- Substance abuse prevention program development
- Inclusion and diversity facilitator

- Youth program development

## **RESEARCH EXPERIENCE**

### **2009-2010**

*Active Increasing Animal Foods in Diets of HIV-Infected Kenyan Women and Their Children*, Indiana University-Purdue University Indianapolis Funded by National Institutes of Health Eunice Kennedy Shriver National Institute of Child Health & Human Development

### **2007-2009**

*Genesee County Health Literacy Project*, University of Michigan-Flint Funded by Ruth Mott Foundation

### **2007-2009**

*Colorectal Cancer Prevention Among African American Males Over 50*, University of Michigan-Flint Funded by Blue Cross/Blue Shield of Michigan

### **2006-2007**

*Project Export Diabetic Dietary, Behavioral Changes Among Minority Populations*, University of Michigan-Flint Funded by National Institutes of Health Office of Minority Health

**2005-2006**

*Project Export HIV/AIDS Prevention Among Minority Populations*, University of Michigan-Flint Funded by National Institutes of Health Office of Minority Health

**EMPLOYMENT**

**2019-Present**

*Interim Executive Director*, Michigan Community Health Worker Alliance, Ann Arbor, Michigan (MiCHWA)

**2017-2018**

*Director of Operations and Enabling Services*, Michigan Primary Care Association Lansing, Michigan

**2008-2017**

*Lecture II*, University of Michigan –Department of Public Health and Health Sciences, Flint, Michigan

**2010-2017**

*HIV Prevention Manager*, Great Lakes Bay, Federally Qualified Health Center (FQHC), Saginaw, Michigan

**2009-2010**

*Research Grant Coordinator*, University-Perdue University Indianapolis, School of Health & Rehabilitation Sciences, Department of Nutrition and Dietetics, Indiana

**2005-2009**

*Instructional Consultant*, Urban Health, and Wellness Center, School of Health Professions and Studies, University of Michigan, Flint, Michigan

**2003-2004**

*HIV Case Management Intern, YOUR Center, Flint, Michigan*

**2003-2005**

*Assistant Residential Manager, Whaley Children's Center, Flint, Michigan*

**1998-2000**

*Program Director, Jenny Craig Weight Loss, Flint, Michigan*

**PUBLICATIONS/PRESENTATIONS**

**Presenter: Deidre Hurse**

*Adding CHWs to the Defensive Line: Bridging Clinical and Community Barriers to Comprehensive Patient Care, Midwest Forum on Hospitals, Health Systems, and Population Health: Partnerships to Build a Culture of Health, 2017, Chicago, Illinois*

**Presenters: Deidre Hurse, Ph.D. Candidate; & Angelia Williams, MSN**

*Transforming Primary Care for LGBT Persons, LGBT Health Summit: Meeting the Primary Care Needs of the Lesbian, Gay, Bi-sexual and Transgender Population, 2016, Michigan*

**Presenters: Deidre Hurse, MPA, LBSW, CPS; Antione Martin, BA; & Shandowyn**

**Parker, Ph.D., MPH**

*Culture of "Hook Up" Social Networks and Usefulness in HIV Prevention Among Males That Have Sex With Males, American Public Health Association Annual Meeting, 2015*

**Presenters: Shannon McMorrow, MPH, Ph.D.; Amanda Forsmark, MHE, BA;  
DeidreHurse, MPA, LBSW: Health Delivery Inc.; Shaquandra Hamilton,  
B.S., M.S.; Shannon Smith, B.S.; & Samantha Sweeney, B.S.**

*Photovoice Assessment of Factors Affecting Obesity for African-American Teen  
Girls*, The Health, Wellness & Society Knowledge Community, Fourth  
International Conference, 2014

**Authors: Augustine O. Agho, Ph.D.; Shan Parker, Ph.D.; Patrick A. Rivers, Ph.D.;  
Christina Mushi-Brunt, Ph.D.; Deidre Hurse, MPA; & Mary Ann Kozak,  
DrPH**

*Health Literacy and Colorectal Cancer Knowledge and Awareness Among  
African-American Males*, International Journal of Health Promotion and  
Education, Volume 50, Issue 1, 2012

**Authors: Joseph Inungu, Ph.D.; Averetta Lewis, Ph.D.; Younis Mustafa, Ph.D.;  
Jessica Wood, BA; Sarah O'Brien, BS; & Deidre Hurse, MPA**

*HIV Testing Among Adolescents and Youth in the United States: Update From the  
2009 Behavioral Risk Factor Surveillance System*, The Open AIDS Journal, 2011,  
5, 80-85

**Authors: Deidre Hurse, MPA, Indiana University; Abraham Siika, Ph.D., Moi  
University; Caroline Sawe, BS, Moi University; & Judith Ernst, Ph.D.,  
Indiana University**

*Experience and Challenges in the Recruitment and Retention of HIV-Infected  
Rural Kenyan Women and Their Children Into a Randomized Nutrition*

*Intervention Study*, Research Brief 10-02-HNP, Global Livestock Collaborative  
Research Support Program, January 2010

**Presenters: Deidre Hurse, MPA; Austin Agho, Ph.D.; Shan Parker, Ph.D.; E.**

**Yvonne Lewis, BBA, BS; & Paul Adams, MD**

*Knowledge and Awareness of the Benefits of Colorectal Cancer Screening among  
African American Males*, Institute for Healthcare Advancement Health Literacy  
Conference, Irvine, California, May 2008

**Presenter: Deidre Hurse, BSW**

*Change Choice and Power: Understanding Women's HIV Risk Within the Context  
of Oppression and the Role of Power in Intimate Sexual Relationships*, HIV/AIDS  
Collaborative Annual "Sex, Sexuality, and the Spirit" Conference, Flint,  
Michigan, January 2008

**Presenters: Deidre Hurse, BSW; Kai Wright, BS; & Maria Salinas, BA**

*Healthy Eating on a Budget*, YWCA-Flint, Faith Access to Community Economic  
Development (FACED) Youth Build, Flint, Michigan, July 2007

**Presenters: Deidre Hurse, MPA; Austin Agho, Ph.D.; & Shan Parker, Ph.D.**

*Genesee County Health Literacy Project (GCHLP)*, Institute for Healthcare  
Advancements Health Literacy Conference, Anaheim, California, May 2007

**Presenters: Deidre Hurse, BSW; Shandowny Parker, Ph.D., MPH; & Joan E.**

**Cowdery, Ph.D.**

*Examining a Culturally Appropriate Intervention Utilizing a Social Network  
Approach to Reducing HIV Infections: Lessons Learned*, Michigan Department of

Community Health Annual STD/HIV Conference Kalamazoo, Michigan,  
November 2006

## **FUNDED NON-RESEARCH GRANTS/CONTRACTS**

### **\$18,000**

*Advocates for Youth's Youth of Color Initiative*, Funded to Health Delivery Inc.,  
2010, Coauthored with Angelia Williams, MSN

### **\$500**

*Michigan Department of Community Health HIV Testing Day Grant*, Funded to  
Health Delivery Inc., 2012, 2013

### **\$122,956 annually**

*Michigan Department of Community Health HIV Prevention Service*, Funded to  
Health Delivery Inc., 2012 to 2018

### **\$95,000 annually**

*Mid-State Health Network*, Funded to Health Delivery Inc., 2012 to 2018

## **WORKSHOPS AND CERTIFICATIONS**

### **2015**

*ASO/CBO Leadership Training & Certificate Program*

### **2014**

*Certified Prevention Specialist: Michigan Certification Board for Addiction  
Professionals (MCBAP)*

### **2013**

*HIV Case Management Standards Assessment*

*Anti-Retroviral Treatment and Access to Services (ARTAS)*

*Comprehensive Risk Counseling and Services (CRCS)*

2012/2016

Personal Cognitive Counseling

2010/2012

HVC Basic Educator Certification

2010

State of Michigan HIV/AIDS Prevention Options for Positives

2006

Challenging Racism Facilitator Certification

2005

HUD-funded Grant-writing Workshop

2004

SISTA (HIV Prevention) Certification

2003/2010

State of Michigan HIV/AIDS Testing And Test Counseling Certification

2003

Attachment and the oppositional defiant child

**RESEARCH CERTIFICATION**

**2018**

*PEERRS University of Michigan*, Foundations of Good Research Practice,

Research Administration, Conflict of Interest, Human Subjects - Biomedical &

Health Sciences, Human Subjects - Social & Behavioral Sciences, Authorship,

Publication and Peer Review

**2010**

*Indiana University Protection of Human Research Participants Certification*

**SERVICE ACTIVITIES**

**2000**

*Young Neighbors of America*

**1998-2009**

*Angels Outreach Program*

**2003-Present**

*AIDS Fundraiser Volunteer*

**2005-2010**

*Voices of Homeless Persons, Fundraising and Development*

**2010-Present**

*Saginaw County HIV/AIDS Task-Force, Co-Chair*

**2010-Present**

*American Public Health Association*

**2012-2016**

*International AIDS Society*

**2015-Present**

*Studio on the Go, Board of Directors*

**2015-2017**

*Michigan HIV/AIDS Council (MHAC), Co-Chair*

**2017-2019**

*Michigan Community Health Worker Alliance*