

Spring 4-30-2019

Health and social disparities influence opioid misuse among adult females living in rural areas

Tequila Porter

Follow this and additional works at: https://digitalcommons.kennesaw.edu/integrbiol_etd



Part of the [Integrative Biology Commons](#), [Public Health Commons](#), and the [Sociology Commons](#)

Recommended Citation

Porter, Tequila, "Health and social disparities influence opioid misuse among adult females living in rural areas" (2019). *Master of Science in Integrative Biology Theses*. 39.

https://digitalcommons.kennesaw.edu/integrbiol_etd/39

This Thesis is brought to you for free and open access by the Department of Ecology, Evolution, and Organismal Biology at DigitalCommons@Kennesaw State University. It has been accepted for inclusion in Master of Science in Integrative Biology Theses by an authorized administrator of DigitalCommons@Kennesaw State University. For more information, please contact digitalcommons@kennesaw.edu.

Health and social disparities influence opioid misuse among adult females living in rural areas

Principal Investigator: Dr. Evelina Sterling

Committee Members: Dr. Jonathan McMurry and Dr. Lisa Ganser

Kennesaw State University: MSIB Program

Thesis date: 4/30/2019

TABLE OF CONTENTS

Title page.....1

Table of contents.....2

List of thesis chapters.....3

Acknowledgments.....4

Statement of Integration.....5

Thesis.....7-70

Appendix.....71-95

References.....96-99

Chapters

I: Thesis Introduction

- Abstract
- Specific Aims

II: Literature Review

- Addiction as a disease
- Addiction as a social issue
- Gaps in women's health
- Rural vs. Urban differences and opioid use disorders
- Other issues related to women and substance use disorders
 - Pregnancy and opioid use disorders
 - Incarcerated and opioid use disorders
 - Managing opioid use disorders

III: Instrument: National Survey on Drug Use and Health (NSDUH)

- Purpose of the survey
- Overview of why we used the survey

IV: Methodology- (quantitative and qualitative analysis)

- Thesis analysis
- Mixed method approaches
- Convergent Parallel Design
- Explanatory Sequential Design
- Exploratory Sequential Design

V: Results

VI: Discussion

VII: Conclusion

Acknowledgments

I would like to express my sincere appreciation and gratitude to my thesis committee for their dedication and assistance throughout this process. The thesis committee consisted of Dr. Jonathan McMurry and Dr. Lisa Ganser of the Biology Department and Dr. Evelina Sterling from the Sociology department. I would like to especially thank Dr. Jonathan McMurry for hosting a grant for minority students, like myself, to be able to engage in scientific research while being fully funded for their graduate studies here at Kennesaw State University. Dr. McMurry took a great risk with accepting me into this program and I'm extremely grateful for that. Although I'm not the best applicant on paper, he saw the passion and experience I had to do research and took a chance with offering me a position in the Masters of Integrative Biology Program (MSIB) class of 2019. I would also like to extend my appreciation note to the MSIB program directors and coordinators for adjusting elective courses for me to bridge with other departments for a successful thesis project. Finally, I would like to thank Dr. Sterling for accepting me as her first graduate student and serving as the principal investigator for my thesis. I truly want to thank family and friends for being supportive throughout my academic journey. Everyone I've met over the past two years in my Master's program had such great confidence in me and with great zeal, I would like to also thank the community for participating in this project.

Statement of Integration

Kennesaw State University offers a Master of Science in Integrative Biology program designed for training research scientists to critically think across multiple disciplines. In addition, developing the confidence to ask and answer questions probed from all professors within the biomedical science discipline to acquire a deeper understanding of biological systems from small to large scales. For this project, we address questions regarding social and biological factors that influence drug use among adult populations in the United States. We also address questions regarding specific needs of rural North Georgia/Southern Appalachia areas and the effects of the opioid epidemic among these populations, particularly women opioid users living in the rural North Georgia area. Many hours were spent analyzing datasets and conducting one-one interviews with professionals, past users, and family members of past opioid users who are all involved in the prevention and treatment of opioid addiction. Additionally, many hours were spent preparing and forming appropriate recruitment processes for the North Georgia region that has disproportionately been effected with opioid use disorders.

We included opioid users from the National Survey of Drug Use and Health (NSDUH) in this study, and location and access of the study dataset were provided from a federally government-funded organization, the Substance Abuse and Mental Health Services Administration (SAMHSA). Many study participants were recruited from using the Georgia Bureau of Investigation (GBI) records, Georgia Heroin Task Force, The Zone recovery facility, and the Department of Public Health reports (DPH). It was imperative for the success of this project to involve these organizations and it also served to expand the integrative scope of this project and program.

This thesis project is taking on a broad scope of integration, encompassing community, law/policy makers, health-care professionals, statistical analysis, and biological concepts working together to employ techniques from disciplines ranging from sociology, mathematics, and neuroscience. Completion of this project has allowed me to develop creative problem-solving skills as a research scientist, as well as make meaningful connections between diverse biological concepts and social/cultural factors that influence unique substance use disorder behaviors at the community level.

Chapter I: Introduction

Abstract

Since the early 1800s scientists have been working to create the best non-addictive pain medication derived from opium. In the early 1800s morphine was distilled from opium extracted from opium poppy plants (Quinones, 2015). Soon after a chemist invents a synthetic derivative of opium and names it diacetylmorphine (heroin) (Quinones, 2015, (Drugs and Morphine Text, 2018). Heroin originally was a safe cure for morphine addiction. Once this was proven to be false, and as having addictive properties, the government intervened and began initiatives to address the issue. This public crisis quickly grew to what modern scientists and healthcare professionals know now as the "Opioid Epidemic." The opioid epidemic began around the early 1900s when doctors power to prescribe painkillers became more frequent and in larger quantities, to patients who suffered from more moderate pain (Quinones, 2015). This lead researchers such as myself and many others to investigate the addictive determinants of this very popular medication. In this thesis project we hypothesis social factors, along with biological factors, influence opioid use among adult females living in rural areas. Because no current research provides evidence-based data are available on adult female substance use disorders

(SUD), we were inspired to collect data on this overlooked subpopulation. Using a mixed methods approach to address this concern, we quantified a robust and comprehensive dataset obtained from the national level. Also, we conducted a qualitative analysis of the rural North Georgia area to supplement findings from the quantitative analysis data.

The Problem

For this study, we used social and biological theories to elucidate the specific needs of women living in rural North Georgia, who have experience with SUD. The goal of this project is to help establish a better foundation for understanding addictive behaviors and eventually help better healthcare policy, scientist and public healthcare professionals and the community they serve. To address the concerns above, we designed the following experiments:

Hypothesis: Social and cultural factors influence opioid use among adult females living in rural communities, particularly North Georgia.

Specific Aim 1: in this study, I plan to identify the correlation of the evolutionary reward system in the brain with specific common drug addiction factors, which play a role in drug-seeking risky behaviors.

Specific Aim 2: a quantitative analysis on a comprehensive pre-existing dataset (National Survey on Drug Use and Health: NSDUH), will be done to define the unique social and cultural characteristics of rural adult females.

Specific Aim 3: this dataset provides limiting specificity to distinctive rural Georgia/ Southern Appalachian areas. Therefore, supplemental qualitative interviews and focus groups with female past opioid users, family members, and professionals involved with prevention and treatment of opioid use will be done to identify specific social factors of North Georgia/Southern Appalachian residents.

Impact: Understanding social and cultural differences between rural and urban female opioid users will provide specific data to enhance public awareness, as well as, provide documented research on this overlooked population for medical providers and healthcare policy decision makers.

Chapter II: Literature Review

Addiction as a disease

Addiction is a condition that can be both physically and socially a concern for drug users. The opiate molecule is one that simultaneously relieves pain and triggers the reward pathway in the brain. Although opioids were designed to mask symptoms of pain, their addictive properties cannot be overlooked and are often not recognizable to drug users. Addiction occurs when the dopamine reward pathway is triggered and altered from chronic opioid use. A person can become dependent on opioids, which is when normal body functions can no longer function physiologically. Opioids relieve pain through the peripheral nerves or pain neurons. In a normal condition where the body is receiving a pain sensation, the pain neuron would need to change the voltage in the axon terminal end from negative charge to positive charge for to let out the neurotransmitter.

The neurotransmitter binds to the endogenous opioid receptors (mu receptors) in the brain to communicate a pain signal. The only way the pain signal can be activated is for the neurotransmitter to be released, which requires a positive charge in the axon terminal region. The neurotransmitter releases from the axon terminal in the synapse, then bind with the dendrite to receive that pain signal. However, in the presence of chronic opioid exposure (such as Heroin), the opioid will bind to the mu-opioid-receptor and then communicate to a second messenger in the cell. This then causes the potassium channel to open on the axon terminal end and lowers the

voltage potential to be more negative. The increase of negative voltage potential prevents the neurotransmitter from being released out into the synaptic cleft. This leads to a buildup of opioid (Heroin) molecules in the synaptic cleft which also leads to a constant excited state where the dopamine neurotransmitter is always triggered. Eventually, this excited state will lead to addictive behaviors because the excitatory neurotransmitter dopamine is on the transmembrane of the dendrites ready to bind the free opioids (Heroin) in the synaptic cleft.

The brains' reward pathway has evolved over the years to adopt the importance of self-preservation. The reward system is responsible for determining what good or bad stimuli are. The excitatory neurotransmitter is responsible for the motivation and memory of a stimulus. However, dopamine alone does not cause the experience of pleasure but is suggested to be involved with translating detailed memories about reward (e.g., where to get it, how to get it) and contributes significantly to social and environmental stimuli that can be associated with the reward (Hiroi & Agatsuma, Genetic susceptibility to substance dependence, 2004). Three important areas in the brain attribute to addictive behaviors, which are, personality, emotional, and rational. In neuroscience, the definition and primary functions of the reward system are a collection of neural pathways and brain structures that attribute reward-related cognition, such as conditioned learning, incentive learning such as, craving and desire for a reward and positive emotions, particularly emotions related to pleasure (Hiroi & Agatsuma, Genetic susceptibility to substance dependence, 2004).

When a person uses a drug repeatedly, these behaviors can become prevalent and can lead to ones' addiction. For addiction to occur the dopamine reward pathway must be activated, and for the reward/pleasure pathway to be activated, dopamine must communicate through this reward. The neurotransmitter dopamine releases only during a pleasurable or rewarding stimulus.

Therefore, in a normal state, at rest, the inhibitory neurotransmitter GABA will prevent dopamine from being released. In the presence of chronic opioid exposure, GABA is stuck inside the cell where there is a more negative charge and can't reach the outside GABA receptor to communicate effectively (Hiroi & Agatsuma, Genetic susceptibility to substance dependence, 2004). The opioid buildup in the Synapse continues to bind the mu-receptors, while dopamine neurotransmitter bind to the dopamine receptors sitting on the dendrite transmembrane. At this stage, the dosage of opioid exposure is associated with a pleasurable sensation in the brain. Opium was studied extensively for its medicinal properties. The morphine molecule has evolved to fit, "key-in-lock," into the mu-opioid-receptors naturally found in the human brain and spine. Morphine overwhelms the receptor and creates an intense euphoria more-so than any other internal substance.

The rise in opioid misuse has many underlying contributing influential factors such as poor healthcare, family substance abuse history, gender biases, and many others. One important factor about the direct effect of using opioids is, they are highly potent painkillers while notoriously being known for their ability to produce euphoria which can lead to addiction. Previous research studies were aimed to elucidate the gender differences in opioid experience and susceptibility; however, no clear conclusion has been identified. Although there are many sociocultural factors, there are also many biological factors that play a role in pain perception and drug abuse. These authors hypothesized that gender differences among opioid users' experience are a likely result from cross-communication with opioid receptors and estrogen when stimulated by the exogenous opioids, through common downstream transcriptional factors and secondary messengers.

This study focused on primary literature searches, which were analyzed and identified for their knowledge of gender differences, opioid use disorders (OUD) and estrogen and opioid receptor interactions. The group analyzed reports in humans and animals with ten groups of opioids analyzed in humans and seven groups analyzed in animal studies. This team could determine which endogenous opioid receptors were affected for each type of opioid, along with the effect differences seen among women and men.

For years, men have reportedly been affected by OUD more so than women although, women are more likely to experience chronic pain and more severe pain at higher frequencies than men. Results show that Buprenorphine, among receptor ORL1 agonist, MOR partial agonist, KOR antagonist, affects women and men equally. Butorphanol users, among receptors MOR partial agonist and KOR agonist effect women and men the same. Fentanyl at the MOR agonist receptor affects males more than females sometimes but can have similar effects on both sexes. Morphine products at the MOR, KOR and DOR agonist receptor are shown to either affect males more than females or have a similar effect, depending on the source of pain. Heroin at the DOR, KOR and MOR agonist receptors have been shown to affect more adult males with OUD than adult females with OUD. Whereas, young adolescent females are more likely affected by opioids. The remaining drug groups are for supplemental purposes.

In animals, Buprenorphine at the ORL1 agonist, MOR partial agonist, and KOR antagonist males are more affected than females. Butorphanol attaches to the MOR partial agonist and KOR agonist and can affect males and females differently depending on the source of pain. Fentanyl binds to the MOR agonist and more likely effects males more than females. Morphine in animals attaches to the MOR, DOR and KOR agonist and effects male sand females the same or more likely males are affected. For heroin use at the DOR, KOR and MOR agonist,

adult males are more affected than adult females. At the KOR agonist, more adolescent females are affected than adolescent males.

The findings from this review suggest that the direct mechanism of opioids and receptor interactions are considered when studying opioid addiction. It is known that animals without the estrogen receptors ER-alpha, ER-beta, or GPR30 lack the estrogen-regulated opioid effects. Opioids and estrogen receptor functional interactions should be investigated to provide better insight into gender differences in addiction and analgesia, at both the cellular and physiological levels.

Addiction as a social issue

In retrospect, opioid prescriptions were used for therapeutic purposes. Initially, patients with pain due to cancer or major injuries were the only people prescribed prescription opioids. This soon changed, when prescription pain relievers became accessible to people with moderate pain, such as back-pain and arthritis-pain. While prescription opioid dispensing increased, mortality due to opioid overdose increased from 8,050 individuals in 1999 to 33,091 individuals in 2015 (Centers for Disease Control and Prevention, 2014) (Centers for Disease Control and Prevention, 2016)). By 2015, opioids were associated with 63% of all drug overdose deaths in the United States (Centers for Disease Control and Prevention, 2014)). Additionally, from 2010-2015, overdose deaths related to illicit heroin use, spiked from 3,036 to 12,989 individuals (1, 2). The opioid epidemic has not been easy to resolve due to the influx of pharmaceuticals and illicit use of pure heroin products that flood local and national communities. Pure heroin and fentanyl, a synthetic opioid, are two prevalent opioids that take small amounts to produce adverse effects such as, respiratory difficulties and heart failure (Centers for Disease Control and Prevention, 2013) . According to the Centers for Disease Control and Prevention (CDC), southern states

including Georgia experienced a spike in drug reports associated with both heroin and prescription opioid in the year 2010 (Centers for Disease Control and Prevention, 2013). Hence, lending itself to a high-risk population for opioid intervention and prevention that captures real-life characteristics of Georgia/southern state communities (Cicero, Ellis, & Surratt, 2014).

Recent proposals suggest, explaining this epidemic through the following: (a) supply and demand, (b) amalgamated heroin and fentanyl product use, and (c) extremely pure heroin forms (Cooper, et al., 2014). In the community, mixed heroin and fentanyl products have become more accessible with over 2 million people reporting opioid substance disorders. Also, 600,000 of the reports involved the use of heroin (Drugs and Morphine Text, 2018). The easy access, high purity concentration, and inexpensiveness of these drugs result in quicker rewarding effects from the drug use. Consequentially, this traps an addict, and prescription opioids become a gateway for heroin use (Frank, Susan, Ingrid, Brenner, & Levy, 2015).

Individuals initially hooked on prescription opioids, nearly 75% of them will eventually turn to heroin (U.S. Department of Health and Human Services, 2015). The potency and speediness of heroin and fentanyl on the brain make mixing the two far more dangerous than when they're used separately. Due to the high prevalence of these drugs in communities, the opioid epidemic has reached the drastic results we see today and will continue to rise if not addressed quickly (U.S. Department of Health and Human Services, 2015). The simultaneous effects of pain relief and reward have led to the increased use of opioids and adversely, the rise in deaths related to opioid use. These unwanted negative effects have swamped vulnerable populations and support the need for health policy reform, and thereby, more research is needed on this issue.

Continuously, researchers work to reveal the source of opioid addiction. Recent studies determined that many factors including genetic, governmental, and individuals' lifestyle (environment and social) play a significant role in increasing one's susceptibility to opioid addiction (Cicero, Ellis, & Surratt, 2014). From a public health perspective, addiction is continually impacting human health at all levels, from the individual to the family and society. Although treatment is sometimes available for individuals, there is a shortage of successful programs designed to help the families of users and adequate prevention plans to address health disparities, especially in rural areas. Advancements in healthcare and policy will provide more effective prevention education for opioid addiction and to do so, it is important to understand the underlying biological and social factors.

According to the CDC, 2015-2016, between 1999 and 2014 prescription opioid overdose mortality rates were among Native Americans and non-Hispanic white males aged 25 to 54 years old. High prescription opioid (PO) rates (≥ 6 times higher than the national per capita rate) correlate with factors such as high predominately non-Hispanic white population and rural areas affected by a high prevalence of diabetes, arthritis, back pain, high unemployment and high Medicaid enrollment. The CDC, 2016 has recently reported increased mortality rates for women and youth (age 12-17). This led our interest to women and rural geographic locations in Georgia.

Based on nationally representative survey data and local state-based data, it is suggested that rural areas have higher mortality and injury rates, but also adolescents are more likely to use PO than their urban counterparts respectively. Survey data also show that social factors such as depression and poly-drug use are associated with PO and heroin use in rural areas (SAMHSA, 2017). To understand the uniqueness of rural areas we should understand what makes them unique compared to metropolitan populations. The social dynamics that explain why these

residents are more susceptible to opioid misuse remains limited. A model of drug risk factors is grounded in ecological systems theory and Eco-social theory. The macro model suggests that social factors structure the availability of drugs and the norms around use such as inequality, economic deprivation, structural discrimination, and pervasive stressors in the environment.

Over the past two decades, the availability of recreational drugs has shockingly increased, especially with the rise in novel psychoactive substances (NPS). Places such as Australasia, Europe, and North America have played a role in producing NPS like cannabis, stimulants and more recently, opioids. Synthetic NPS such as 'opioid-MT-45' (1-Cyclohexyl-4-(1, 2-diphenylethyl) piperazine, have become widely available through internet and media sources. Opioid MT-45 was discovered in Japan, to have opioid analgesics in the 1970s. However, new NPS often have very scant information on potential toxicity associated with it. This study aimed to elucidate the characteristics of MT-45 as a potential NPS, through the process of data triangulation (Siddiqi, Verney, Dargan, & Wood, 2015).

First, characterizing relevant 'opioid MT-45' associations was done by gathering published scientific and 'grey' information sources to understand MT-45 as an NPS. MEDLINE and PubMed websites were searched using the keywords: 'MT-45' and '1-Cyclohexyl-4-(1, 2-diphenylethyl) piperazine'. Continuously, abstracts from the 2010-2014 North American Congress of Clinical Toxicology (NACCT) and the European Association of Poisons Centres and Clinical Toxicologists (EAPCCT) meetings were examined for the same keywords. Utilizing the search engine 'Google' and several other online drug discussion forums, the same keywords were searched for the 'grey' source. Collectively, the published information was analyzed until theme (theoretical) saturation was identified and extracted from the sources. Also, a second

supplemental search was done on the internet to determine the cost and pricing of 'opioid MT-45'.

Triangulated results showed there were very few articles and published information available on MT-45. A total of 20 reports were found on the discussion forums resource: the EMCDDA-Europol joint report on MT-45, one government report on two deaths related to MT-45 in the US, and one scientific report on acute harm associated with MT-45 use. During the year of this study (2014), there were no population reports related to the prevalence of use of MT-45. Out of the 20 reports found during the searches, the most common route to inject MT-45 was oral (65%), nasal (20%), inhalation (10%), and rectal insertion (5%). The dosage average ranged from 60-100 mg between the 20 cases, with each mode of injection resulting in different amounts of use. There were 17 internet sites identified for selling MT-45 in powder form; 9 had no direct cost information (only account user access) and 8 had accessible cost information available on their site. The most common effect desired by the users was the euphoria 'high,' the long half-life (up to 12 h.), and the potency of the mimicking activity (80%) of morphine. Future studies could further investigate if 'opioid MT-45' is just as addictive as prescription opioids such as Oxycodone and Hydrocodone (Siddiqi, Verney, Dargan, & Wood, 2015).

The methods used for this study could be applied to a fish species model, to identify specific behaviors seen when under the influence of an NPS such as 'opioid MT-45'. The data gathered during the triangulation process can be a guide for future researchers to classify risky behaviors related to NPS use. Data triangulation is a good method to use when using multiple disciplines and areas of research to answer complex questions.

Domestic violence is often associated with emotional, physical, verbal, sexual abuse, financial hardships, or child distress when children are involved. This abuse occurs between

current or former intimate relationships and can be prolonged even after ending the relationship with the abusive partner. For many years, abuse has affected both men and women; however, women are often disproportionately subjected to experiencing domestic violence during their life. In 2001, statistics showed an estimated one in four women experiences abuse from their partner in their lifetime. In addition, the social influencers of why women stay in domestic violence relationships (DVR), has not been thoroughly elucidated. This study aimed to gain local information on violent experiences, among women living in a rural County in North England (Bostock, Plumpton, & Pratt, 2009).

The research team approached their objective by conducting a qualitative study of women in a mixed rural and urban area of Northern England. This qualitative method had the three following aims: explore individual DVR experience, understand tactics used during DVR and effects of abuse and, propose prevention and intervention implications for rural communities. The study consisted of twelve women from this rural area of northern England, who volunteered to participate in this study. The participants were recruited via several voluntary sector services agencies and were asked to share their DVR experience during an interview. The interview lasted for an hour, and there were no compensations for participating, other than informing the public of project findings'. The interviewers used a question guide to conduct the interviews, which was devised by the team and a local women's support group. The produced data were then analyzed using grounded theory, after completion of all interviews. Thereby, following other consistent studies, the group did not begin their interview structure pre-ordained hypotheses about participants' DVR experiences. Utilizing grounded theory begins with ascribing open codes to the interview text and, then interviews were checked, transcribed and themes were

identified. The researchers also consulted with additional women in a support group, to validate and check the meaningfulness of the theme labels (Bostock, Plumpton, & Pratt, 2009).

A total of twelve women participated in this qualitative study, and their information was collected and analyzed thoroughly at a later phase. The participants reported a range of 2-20 years of dealing with domestic abuse, and all of them had been in touch with agencies regarding their DVR experiences. The interviewees aged from 21 to 56 years old, with one lesbian relationship and the remainder in heterosexual relationships. Two participants had young children, and three other participants resided in a Refugee camp during the time of the interview. Although all twelve women encountered services, the nature of the used services varied among each participant, as well as, their demographics and socioeconomic status. One limitation with this article is that all the demographic and socioeconomic data is not presented, and therefore no true representation from this population can be concluded (Bostock, Plumpton, & Pratt, 2009).

A good strategy that the authors used in this study were utilizing open-ended questions during the interviews; this was good because it generated more detailed responses from the participants. After analyzing the data with a grounded theory approach, four themes were identified: (1) how women lived with abuse; (2) the response of systems reinforced or challenged the abuse; (3) commonalities and contradictions in the DVR experience; (4) dealing with the abuse beyond the end of the relationship. The main finding of this study was, safety for women and children who try leaving a DVR depends on resources around the victim. These resources include, but are not limited to: family, friends, police, work colleagues, legal, social and health, and voluntary services. The problem with many these services within this area is, they're not well equipped to support abused victims financially or emotionally. For instance, participants often described leaving the abuser as a process rather than a one-time event. This correlated with

support systems perpetuating practices and views that normalize domestic violence, allow male privilege (such as not challenging the cost of women leaving home, relationship), or placing the responsibility of the relationship on the woman. Future research can focus on the services and their contribution to influence some of the issues presented here (Bostock, Plumpton, & Pratt, 2009) (Bruneau, et al., 2018).

In the past, researchers published literature supporting the concept of secure attachment, which is the psychological connection with others, regarding their ability to successfully adapt environmental stressors over a lifetime. Researchers believe secure attachment contributes to the independence and maturity adaptation in these individuals, dealing with social and problematic challenges. For many years, scientist h conceptualized insecure attachment as a predictive cue for addictive behaviors in adolescents and linked insecure attachment to problematic drug and alcohol abuse among adults. Although there is growing research on how insecure attachment is a risk factor for developing drug or alcohol addiction, there is very little knowledge of how insecure attachment provides resilience against drug or alcohol conditions. In this study, the group aimed to investigate the correlation between attachment security and at-risk drug or alcohol abuse (Bruneau, et al., 2018).

To address the relationship between attachment security and problematic drug or alcohol use, the researchers examined a sample of suicidal, depressed women with several risk factors for problematic drug and alcohol abuse. Using a collaborative collection of baseline pre-intervention assessments data and the African American Women (AAW) sample, the researchers formed a participation group for this study. The AAW were 18-64 years old and reported having homicidal, suicidal, or acute psychotic symptoms in their lifetime or past year (Cooper H. L., et al., 49). The Grady Nia Project, which is aim is to reduce suicidal behavior among AAW, was

the organization responsible for developing the assessments used in their projects. Demographic data was surveyed through a Grady Nia Project questionnaire. Two tests were used for the drug or alcohol assessment: (1) the Brief Michigan Alcoholism Screening Test (b-MAST); (2) the 10-item Drug Abuse Screening Test (DAST-10), which were defined as problematic for drug or alcohol abuse if they scored a six or higher on each test respectively. Relationship Scales Questionnaire (RSQ) is a widely-used adulthood attachment test, and they were used in this study for the attachment security test. In addition, a childhood maltreatment test was given, using the Childhood Trauma Questionnaire-Short Form (CTQ-SF). Finally, statistical regression analyses were conducted using the participant data (Cooper H. L., et al., 49) (Cooper H. L., et al., 2014).

On average, participants were 35.1 years of age, with the youngest being 19 and the oldest 61 years old. About 40% had less than a high school education; 86.2% were unemployed; 37% reported a psychiatric hospitalization, and 54% said they were homeless. Over half of the sample (56%) endorsed problematic use of drug or alcohol, 53% endorsed both, 40% endorsed drugs only, and 7% endorsed alcohol only. Older women had lower attachment security, homeless, and had greater severity of childhood trauma, typically suffered from problematic drug or alcohol use compared to women who did not report substance use. Domestic violence, depressive symptoms, employment status, and educational attainment, did not differ significantly between problematic women and women who do not use substances.

Despite hypothesizing attachment security would be linked to non-problematic drug or alcohol abuse, the researchers found important results. The group found an independent, inverse relationship between attachment security and problematic substance abuse. Surprisingly, AAW

who reported feeling close to family and friends, were about half as likely to report problematic alcohol or drug use, even when accounting for problematic use of drugs alone.

Incarceration over the past several decades has increased tremendously, especially the incarceration among African American males. Since the 1980s, the number of people in jail or prison increased 449%. This huge increase is due to the war on drugs in the US. Drug possession charges account for over 60% of the arrest made in 2008. Black men are disproportionately affected every year, by this trend. Whites were 2.8-5.5 times less likely than blacks to have lower rates of drug-related arrest, in this population-based observation. A growing body of research literature, related to incarceration is emerging and becoming a more powerful social force. However, there is little research on what happens to women who lose their partner to a jail or prison sentence. Therefore, the purpose of this study is to analyze the processes through which partner incarcerations is related to patterns of substance misuse among AAW over time (Cooper H. L., et al., 2014).

To explore this topic, the group conducted a longitudinal qualitative study on women over the course of 11-months. This allowed the team to investigate how losing a partner to jail or prison influenced their substance abuse disorders. Females were eligible for the study if they; (1) live in the Atlanta metropolitan area; (2) be an AAW 18-64 years old; (3) have a primary partner who had entered prison or jail in the past 12-months. This group used mixed strategies to recruit women for this study, such as posting flyers about the study and harm reduction programs. Interviews were conducted in a private space and lasted about 90 to 120 minutes, and the participants were given \$25 to compensate for their efforts in the study.

A total of 17 women were interviewed for this study characterizing the experience of loss of partners in the criminal justice system. The average age for the AAW was 32.2 years old, and

women on average lived with one or no children. Women reported being with their partner for four or more years before he was incarcerated. Almost 60% of the sample had some college education or a college degree. Shockingly, their average income during the year of their partner's arrest was \$15,000 to \$19,999. Women reported low income despite having an education because they were limited to job options due to their substance abuse problems. One limitation the authors faced in this study is the low volume of participants, which may not be accurately representative of this population.

Mass incarceration of Black men has often been understood as a potent manifestation of structural discrimination. Over the years, mass incarceration has become more and more powerful as a social force. This study aimed to elucidate the influence of losing a partner to jail or prison, on AAW drug use issues. A large percent of the women reported “hitting rock bottom” or at their lowest point financially and emotionally after a partner has been incarcerated (Cooper H. L., et al., 2014) (Cooper H. L., et al., 49).

Rural and Urban differences and OUD studies

Between 2010 and 2011, national data reported that 425,000 individuals aged 12 and older were injecting drug users in the United States. Injection drug use is a risk factor for increased overdose, drug dependence and blood-borne infections, which disproportionately affect injection drug users (IDUs) within their first years of injecting. Some factors associated with transitioning from non-injection to injection drug use are homelessness, unemployment, exposure to violence, insecure income, childhood abuse, transactional sex, low education, and early-onset substance use and abuse. The purpose of this study was to determine the rate of transition from non-injection to injection drug use, evaluate the independent association of

specific drugs with lifetime non-injection and injection use and to determine substances most frequently in IDUs initiation to injection, in a rural Appalachian Kentucky population.

The participants were 18 years old and older, resided in Appalachian Kentucky, used heroin, prescription opioids (PO), crack/cocaine or methamphetamine within the past 30 days. A questionnaire was administered by a team interviewer to determine self-reported behaviors. The overall sample size was 503 with 394 being IDUs and 109 were non-IDUs. After the completion of an interview, the respondent was compensated with \$50 for participating in the study. The interviewers queried about the type of substance use, age of first use and first injection, arrest history, and the conclusions were generated.

On average, the respondent's age was 32.5 years old, with a range of 18-65 years old. Participants were predominately non-Hispanic white (94%) and were 57% male and 43% female. About 57% had completed high school, and many had arrest history (65%), and 60% were arrested before injection initiation. History of trauma, age, gender, race, education, homelessness, and employment status did not differ between IDUs and non-IDUs. However, IDUs had significantly higher incomes and were more likely to report criminal history and arrest and sexual activity with other IDUs. Of the IDUs, 48% used OxyContin for their first injection, 30% used stimulants, and 14% used another PO (Staton M. , et al., 2018). Most of the respondents said they started injecting initially after the year 1995, which is when OxyContin was approved for the market. Independent associations were observed between IDU and lifetime use with heroin, OxyContin, stimulants and illicit methadone. Participants who had ever used OxyContin and stimulants were more than 6.5 times more likely to inject drugs. The median time from which IDUs transitioned from the first illicit drug use to the first injection was ten years.

In this rural Appalachia sample, 78% had a history of IDU, and it is extremely important to note that OxyContin was most frequently involved in the initiation of injection. For participants initiating injection with OxyContin, the median time from which they began OxyContin use to their first injection of OxyContin was only three years. In many studies, OxyContin has been reported to be easy to break down and filter to inject, which may explain the rise in injection use since 1995 (Staton M. , et al., 2018). A total of eight specific drugs were associated with increased risk for transitioning to IDU. Some limitations in this study are: the location is very specific and cannot be made general across all rural locations, the variables were very specific and do not capture all vulnerable risk factors associated with drug use and abuse.

For many years, injection drug use was associated with the transmission of Hepatitis C (HCV) and HIV and posed a significant public health concern among the United States (Strickland J. C., 2017) (Strickland J. C., 2017) (Staton M. , et al., 2018). However, little research has focused on the correlation of injection drug use (IDU) among rural opioid users, and other subgroups, practically women. In the Appalachia area, in rural areas specifically, the prevalence of IDU among drug users estimated as high as 75%-78%. Therefore, this study aims to understand better the health correlations of IDU among rural women living in the Appalachia area, by examining (1) differences between non-injectors and injectors and (2) the unique correlates of recent IDU and past IDU.

The recruitment phase of this study included 900 women from 3 rural jail facilities in Appalachian. Each woman was randomly selected for their interview session, which was held in a private group room within the prison facility. The screening assessments were administered in a group setting with exceptions for participants with limited reading ability. The interviews lasted about 20 minutes and the instruments used are: NIDA modified Alcohol Smoking

Substance Involved Screening Test (NM-ASSIST) and demographics. Injection drug use status was based on self-reported data.

The average age of this group of women is 32 years old, and 99% are white. Of the participants, about 68.3% reported having at least a high school education or GED. Women in this study self-reported IDU, which 75.3% of the participants reported IDU in their lifetime. In addition, 60% of this group reported IDU within the year before their incarceration. Results show new injectors were younger compared to non-injectors however, no differences were observed between past injectors and non-injectors. Results also show, having an injecting partner, more male sexual partners, and drug use severity are strongly correlated with injection practices (Terplan, Longinaker, & Appel, 2015) (Strickland J. C., 2017) (Strickland J. C., 2017).

HCV infections and a steady increase in opioid injection are strong correlations to IDU and are higher in the Appalachian women drug using population. Findings from this study have consisted of previous studies that demonstrated a link between HCV and IDU. New injectors and past injectors both reported riskier sexual behaviors compared to non-injectors. This study and others should be used as a guide for future research to focus on relationship context reducing high-risk injection practices (Strickland J. C., 2017) (Lander, et al., 2010).

Treatment Episode Data Set, the National Survey on Drug Use and Health (NSDUH), the National Institute on Drug Abuse (NIDA) and Drug Abuse Warning Network (DAWN) have all reported an increase in prescription medication over the last decade. In rural Virginia alone, overdose related to drugs increased by 300% between 1997 and 2003. During the last decade alarming increases in an overdose which involved prescription medications, identified by toxicology. However, little is known about this group of decedents other than prescription poisoning identified by toxicology and their age at the time of death. A more detailed description

of this group is needed to elucidate influencing factors to this substance use issue fully.

Therefore, this group examines and reports on the manner and assigned toxicological cause of death (COD), notably antidepressants, benzodiazepines and prescription opioids (PO) and their demographics.

Utilizing drug overdose case records from the Office of the Chief Medical Examiner (OCME) in rural western Virginia, the group studied cases classified as poisoning deaths occurring between 1997 and 2003. The group reviewed a total of 889 cases, excluding four due to poisoning in young children, with the youngest case being 14 years of age. Information such as race, gender, employment status and date of birth were extracted from the death certificates. In addition, the toxicology reports were examined for enumeration. The analyses were in the form of cross-tabulations, where chi-square tests were performed for statistical significance.

In 1997 overdose related to drugs consisted of 69 reports and in 2003 a total of 220 cases of overdose were reported, specifically in rural western Virginia. Overall, cases with a COD involving poly-drug use resulted in 58% of the cases. Opioids impacted 74% of the cases; with heroin present in 2.4%, hydrocodone present in 20.4%, methadone in 28% and oxycodone in 19.6% of the cases. Antidepressants were found in 49% of all the cases and Benzodiazepines present in 39.3% of the cases. Because the population in this area is predominately white, the cases were 96.8% white and 63% were males (Wunsch, Nakamoto, Behonick, & Massello, 2009) (U.S. Department of Health and Human Services, 2015) (Surrat, Staton, Leukefeld, Oser, & Webster, 2018). The female decedents reviewed were mainly older women with the average age being 43 years old. Also, the greatest number of deaths occurred among adults aged 36-45 years old. For most cases, the decedents had at least a high school education and were employed either part-time or full-time. Another important note is that men were more likely unemployed or

disabled. The most common manner of death was by accident; male (78.9%) death was classified more an accident than female (57.8%); female (38.3%) deaths were classified more as suicide than male (18.1%) death. In addition, this group found PO were more likely to be used in rural areas than in metropolitan areas.

Despite younger individuals reporting PO misuse in the NSDUH, this data shows that older adults aged 35-45 years are mainly affected by the opioid epidemic, specifically in this area. PO medications and death rates are highest in rural areas, regarding this examined population. Poly-drug use was predominately associated with the reviewed cases. Some limitations with this study are: they are only looking at one specific area and these findings may not be generalizable; the group should consider how rural is defined throughout the entire state, not just western to determine if there are geographic differences on rural communities all over, there is no way to determine the quantity of drug used prior to the overdose; poly-drug use is hard to differentiate when identifying the main COD.

Pregnancy and opioid use disorders (OUD) studies

For many years, social scientists have suggested differences, barriers, and challenges between rural and urban residents, regarding their lifestyle, health, and access to essential resources. This evidence lies in the fact that, in rural areas, particularly in the Southern USA, women have higher rates of morbidity and mortality due to cervical cancer than women in urban locations. Primarily, black women are disproportionately affected and are more likely to die from cervical cancer than white women. Moreover, the main cause of cervical cancer is the human papillomavirus (HPV), which recent vaccine interventions have been implemented among young females age 9-26 years of age. Surprisingly, no systematic approach has been taken to thoroughly examine racial differences in vaccine acceptability in a rural place (Wunsch,

Nakamoto, Behonick, & Massello, 2009) (Terplan, Longinaker, & Appel, 2015) (Lander, et al., 2010). The objective of this study is, to examine whether rural black and white women have different attitudes and knowledge about HPV, HPV vaccine, and cervical cancer, to inform future vaccine interventions of this high-risk population.

Under a North Carolina at Chapel Hill institutional review board (IRB), adult women were recruited and given a self-administered questionnaire to complete for this study. Three aspects were measured and analyzed during the participant protocol. First, general HPV awareness was assessed through the “understanding of the natural history of HPV infection” prompt. The second prompt addressed the effectiveness of HPV vaccinations and if they are perceived as being able to prevent cervical cancer. Lastly, the third prompt focused on the severity and likelihood of cervical cancer. Once the questionnaires were completed, the participants were compensated with twenty dollars. Linear and logistic regression models were used to analyze the racial differences among the project participants. The analyses were completed unadjusted and then repeated controlling for socioeconomic status, age, and recruitment site.

Participant yield for this study was 138 women, 91 black (66%) and 47 (34%) were white. The following data were produced from the general demographic, infection, vaccination, and cancer-related question results. The women aged 18-84 years old and the average age was 42 years old. Black women were recruited more in the public clinic than white women who participated in the study (86% vs. 70%, $P < .05$). In addition, black women reported a higher socioeconomic status than white women (31% vs. 11%, $P < .05$) who participated in this study. Compared to white women at 57%, only 24% of black women reported ever hearing about HPV. For the HPV general knowledge scale, black women scored lower than whites (29% correct vs.

42% correct, respectively). Regardless of race, about 20% of the respondents had heard of HPV vaccines before (Wunsch, Nakamoto, Behonick, & Massello, 2009). Blacks were less likely to agree that vaccines, in general, are beneficial and agreed that they are unnecessary, more than whites. Unfortunately, blacks were less likely to believe they were at risk of getting cervical cancer than whites (59% vs. 79%, $P < .05$). Future research could investigate the cultural and religious beliefs of the same population and determine how that effects the differences observed in this study.

There are several reasons why black and white women differ regarding their knowledge and understanding of health issues, such as HPV. With little research on the rural Southern United States, this project highlights some of the areas to focus on future healthcare interventions for this vulnerable population. Misperceptions and miscommunication about diseases can be a barrier against vaccine uptake, especially among the black rural community. These health educational needs among black rural women provide evidence that there is a need to develop better information on HPV, to make women and women who are a parent more aware of their high-risk and susceptibility (Staton M. , et al., 2018).

Historically, the delivery of healthcare in rural areas has been difficult due to numerous social and environmental factors. West Virginia is one of the many states with ongoing challenges such as lack of health professionals and health care access in rural areas. From 1994 to 2004 rates of opioid dependence have been higher among rural locations. The objective of this study is to inform the public of the prevalence of substance abuse among pregnant women in the West Virginia area.

The group performed a review of the literature to generate common themes or issues present in each study or article. The observed data were used to generalize about this specific population, to inform the public about this alarming issue.

A relevant major issue among this population is Neonatal Abstinence Syndrome (NAS) which is affecting more and more newborns annually. This mother and fetus opioid-dependent challenge is often associated with fear of child protective services, addiction stigma, and legal implications. NAS cost an estimated \$720 million dollars a year to manage the care of mothers and newborns suffering from opioid dependence. According to data in the National Survey of Drug Use and Health (NSDUH), substance abuse among pregnant women is between 3% and 15%, depending on the age group. The group also highlights opioid use during pregnancy is associated with a high incidence of placental insufficiency premature rupture of membrane, preeclampsia and other conditions. Although there are treatments available for opioid dependence, administration during pregnancy should be fully examined before, during and after gestation.

In West Virginia, there is a lack of drug treatment programs available for women, with approximately nine programs within WV that specifically target pregnant addicted vulnerable populations. Four major factors play a role in the shortage of treatment for pregnant opioid-addicted women. First, physician practitioners are more likely to be dissuaded from treating pregnant women and neonates with substance abuse issues. Second, addicted is that women are more likely to have complications during pregnancy. Third, this vulnerable group is at higher risk for contracting Hepatitis C and HIV. Finally, in addition, mental health issues and drug use while pregnant, doctors tend to fear legal liability for these women and their newborns. Some limitations with this study are: they are only analyzing the literature for these common themes

and not surveying people. On the other hand, their findings are important because they are using them to create a better integrative approach to address NAS and substance abuse among pregnant women.

In the United States, prescription opioid (PO) abuse has reached epidemic proportions. The rates of substance abuse admissions and deaths attributable to the PO over the past two decades have markedly increased. In addition, POs are identified as a precursor for heroin use. Without a defined optimal amount of PO after cesarean delivery, physicians struggle with over-prescribing for their patients. This caveat has led to increased abuse of PO due to lingering leftover medications after they are no longer useful to the patient. This study aims to determine, after cesarean delivery, what amount of opioid analgesics are prescribed and consumed once discharged from a hospital setting.

To investigate this concern among women a survey was generated and administered to women from across the US. A total of six hospitals were utilized in this study: Wake Forest Health Science Center (Winston-Salem, NC), the University of Michigan (Ann Arbor, MI), Massachusetts General Hospital (Boston, MA), Columbia University Medical Center (New York, NY) and Stanford University Medical Center (Palo Alto, CA). After two weeks of delivering via cesarean and discharge from the hospital, women were contacted via phone calls to do the interview. The structured interviews entailed questions regarding medication side-effects, the opioids used and their analgesics at the time of the interview, and their overall satisfaction of their PO. In addition, information on patient demographics was collected.

The recruitment process resulted in 1,065 women participants for this study, with a final sample size of 720 women. Results showed that 82% of the filled prescriptions were for Oxycodone. The proportion of women who reported pain relief satisfactory was similar across all

cases. The actual pain scores after delivery were also high and similar. About 15% of the women said the quantity they were prescribed was too low and about 36% said it was too much. Women who were prescribed higher quantities reported the highest prevalence of experienced opioid-related side-effects (71%). Women with smaller quantities of medication were the least likely to report experiences of side-effects. Reports also show that the larger number of tablets dispensed correlates with a larger amount consumed and often a large amount of leftover.

From the analysis done in this study, the research team concluded the amount of PO did correlate with the amount consumed. With little to no information available on opioid use after cesarean delivery, physicians battle with prescribing appropriate amounts upon discharge patients. The excess amounts of PO may predispose people to a higher risk of consumptions without improvement in pain control.

Methadone and buprenorphine are treatments used in opioid maintenance treatment (OMT) programs and can serve both for opioid-dependent patients in general and for those who are pregnant and opioid-dependent. Neonatal abstinence syndrome (NAS), methadone and buprenorphine exposure are associated with 40%-90% of newborns. Characteristics of NAS result in hyperirritability of the gastrointestinal, the central nervous system, respiratory and autonomic nervous system. Many research studies have investigated the effects of breastfeeding on NAS since breastfeeding is the optimal source on nutrition for the mother-fetus interactions. The study aims to determine the rate and duration of breastfeeding through a national cohort of Norwegian women receiving OMT. Then they compared the characteristics of breastfeeding to those who did not breastfeed. They hypothesized that females in OMT experience lower rates and shorter duration of breastfeeding than other Norwegian women and that buprenorphine-

exposed and methadone-exposed newborns being breastfed require shorter pharmacological treatment for NAS than non-breastfed newborns with similar conditions.

Utilizing Norwegian medical birth record and addiction reports, the authors performed a retrospective study from 1999 to 2009. The study included 136 women who gave birth to a total of 161 children over that decade time frame. After finalizing the data based on the desired criteria, a total of 124 mothers and children were included in the final analyses in this study. A questionnaire was created to address issues around pregnant women, NAS, opioid-dependence and treatment options methadone and buprenorphine. The authors went through the database of medical-birth records and manually filled in the questionnaire data.

Results showed that 12% of women breastfeeding had used opiates or other substances during gestation and 21% of women not breastfeeding used opiates or other substances. About 74% of the breastfeeding women were in methadone treatment (MMT) during pregnancy, and 78% were in buprenorphine treatment (BMT) and initiated breastfeeding after delivery. The rates of breastfeeding at 4, 8, 12, 26 and 52 weeks of infant age were 58/56%, 53/39%, 46/34%, 21/15% and 7/5% for women in MMT and BMT, respectively. The median length of breastfeeding was 12 weeks for women in MMT and seven weeks for women in BMT. The methadone-exposed (MMT) newborns being breastfed had a significantly lower incidence of NAS (53%) than methadone-exposed newborns not being breastfed (80%).

Overall these findings suggest that breastfeeding may serve as a great resource to diminish NAS among at-risk mother patients. Some limitations are they did not report any racial or educational data to support their participant demographics; they also did not consider all children in the household in their study, only the first child delivered was analyzed in this study.

Further investigation of breastfeeding pros and cons regarding NAS, will give insight to future prevention and intervention approaches.

Incarceration and OUD studies

In the United States, opioids have grown to be one of the most popular drugs of choice. According to a government agency in the US (SAMHSA), and opioid use disorder (OUD) is defined as an inability to limit or control use, physical dependence, tolerance, and continued use in the presence of negative consequences. In addition, OUD has impacted pregnant women for the over the last two decades. Between 1999 and 2014, maternal opioid use has quadrupled from 1.5 per 1000 delivery hospitalizations to 6.5 during pregnancy. This study aimed to identify and recommend strategies to optimize the care of pregnant incarcerated women with OUD, emphasizing the importance of appropriate counseling and treatment with opioid agonist pharmacotherapy.

To address what practices are best to use on pregnant women who are incarcerated, the research team performed a thorough search of the primary literature. Once theoretical saturation was reached from their search, the team described the most commonly used practices among this specific subpopulation.

The researchers found that the following data best-supported treatment during pregnancy: Buprenorphine, methadone, and naltrexone are the three MAT medications approved by the U.S. Food and Drug Administration (FDA). Both buprenorphine and methadone have been studied for their safety and effectiveness in pregnant populations, whereas naltrexone is not recommended in pregnancy. Methadone has been used in treatment for 40 years and is an opioid receptor agonist, lessening symptoms of withdrawal and reducing effects of other opioids such as heroin, morphine, or oxycodone. Its effectiveness is supported by meta-analyses of randomized trials.

However, buprenorphine for OUD treatment is a partial opioid agonist, meaning that it binds to opioid receptors producing a weaker effect than full agonists like methadone. It also has a "ceiling effect," meaning that the opioid effects increase with dosage to a certain threshold at which a larger dose does not produce a larger response, reducing the potential for misuse and death from overdose. On the other hand, naltrexone is not recommended during pregnancy due to the need to withdraw from all opioids before initiation, causing potential morbidity and mortality risks for the woman and their fetus if she drops out of naltrexone treatment.

Treatment of OUD in pregnant incarcerated women is an increasingly important health concern for correctional facilities. The evidence-based treatment of OUD in pregnant women is either methadone or buprenorphine and associated mental health services such as cognitive behavioral therapy and group sessions. Despite these options and proven benefits, many jails and prisons do not offer methadone or buprenorphine to newly incarcerated women with OUD or patients enrolled in methadone maintenance programs, leading to acute opioid withdrawal. The consequences of withdrawal are especially grave in pregnant women. Providing programs for incarcerated pregnant patients will serve the community standard of care, improve the health of a vulnerable population of pregnant women, and work toward optimal health outcomes for both women and their newborns.

Opioid use is common among correctional populations, yet few inmates receive treatment during incarceration or post-release, particularly in rural areas. This article examines associations of buprenorphine use, licit and illicit, health services use, and risk for re-arrest within three months of jail release among rural opioid-involved women. The aim of this study is to determine the relationship between buprenorphine use and reoccurring arrest among women in highly vulnerable social and health conditions.

Women were randomly selected from three rural Appalachian jails. Those with moderate to severe opioid-involvement on the NM-ASSIST and data on patterns of buprenorphine use ($n = 188$) are in this analysis. Logistic regression analyses examined predictors of reoccurring arrest within three months of release from incarceration.

The results showed there was an average age of 32-years of among the women used in this study. Unfortunately, only white women participated in the study, which is a limitation the authors plan to resolve. At the time of the follow-up, 22.7% ($n=39$) of these women had been arrested again; 5.2% ($n=9$) reported receiving medical assistant treatment (MAT), which all consisted of the buprenorphine treatment. Significant risk factors for re-arrest included: injection use, number of illicit buprenorphine days, number of days high and withdrawal symptoms in the follow-up period. It is important to note that the only form of a protective factor, was having a regular source of healthcare at the time of the follow-up.

Rural opioid-involved women released from jail are highly vulnerable to re-arrest and lack access to supportive care systems for substance treatment. Innovations in integrating MAT into reentry to improve access is recommended. The authors could look further into the post lifestyle of these women and generate a method to track their lifestyle for 6-months, after release, to determine more specifically what may be the causes of this "re-arrest" observation. The authors should also consider analyzing the same group within an urban setting.

Many time when people suffer from substance use disorders, they are placed in jail because of misconduct. However, incarceration may help resolve criminal issues and bad behavior among people, it does not always help with the drug use issues attached to that individual. Often law enforcement and healthcare officials struggle with satisfactory solutions to this problem because not all women are the same and do not experience jail or drug use the

same. This study aims to examine the criminal justice factors associated with hepatitis C virus (HCV) antibody reactivity and drug use, among women in rural areas across the United States.

The participants in this study were randomly selected from the three jails used in this research analysis. A total of 277 women were included in this analysis, demonstrated history of injection drug use and came from three rural jails in Kentucky. Each participant completed a health and drug use questionnaire and received antibody testing for HCV after the survey was complete. They were given incentives to accommodate for their participation.

Most of the women tested reactive to the HCV antibody (69%). Reactivity was associated with risk factors such as early age of the first arrest, criminal history, unsterile needle use, stigma, including an increased likelihood of prison incarceration, and a longer incarceration history was associated with HCV reactive tests. Participants also endorsed several barriers to seeking healthcare before entering jail that were more prevalent in women testing HCV reactive regardless of HCV status awareness before entering jail.

Injection and high-risk sharing practices, as well as criminal justice factors, were significantly associated with HCV reactivity. Future research and practice could focus on opportunities for linkages to HCV treatment during incarceration as well as during community re-entry to help overcome real or perceived treatment barriers. The current study highlights the importance of the criminal justice system as a non-traditional, real-world setting to examine drug use and related health consequences such as HCV by describing the association of high-risk drug use and criminal justice consequences with HCV among rural women recruited from local jails.

Managing OUD studies

Historically, prescription opioids (PO) were prescribed to people with moderate pain caused by war injuries or from cancer. With the increase in opioid prescriptions, mortality rates

associated with opioid overdose have shockingly increased. Therefore, substantial controversy has risen in emergency departments (ED) across the US, due to guidelines designed to optimize written opioid prescription rates. Information and knowledge about physician perceptions regarding PO guidelines and how they apply these guidelines are scant. In this study, researchers elucidate important themes among ED physicians attitude toward awareness, the definition, use, and opinion, regarding PO guidelines.

To evaluate physicians' opinions related to PO, a series of semi-structured qualitative interviews were conducted in this study. Using the American College of Emergency Physicians Scientific Assembly (October 2012, Denver, CO), the researchers recruited and interviewed 61 doctors. To keep away from any bias in the study, participants varied in socioeconomic status, experience, and geographic region. Once all interviews were completed, the research team analyzed the interview data with modified grounded theory. This allowed the team to develop a theory from the data, which offers an explanation to a more complex question.

Based on the interview results, doctors aware of PO guidelines defined them as state and national level policies that have been altered and implemented uniquely by each individual hospital. Physicians also said guidelines primarily are used to communicate decisions made on the limit of prescriptions written to patients on discharge, rather than utilized for decision making. Regarding the general attitudes toward PO, physicians' opinions varied. Future research could analyze how physicians play a role in gaining the trust of PO and heroin addicts, to help with their treatment and recovery process. The findings from this study suggest that PO guidelines within the hospital setting, often supersede national and state level guidelines. In addition, physicians tend to apply these guidelines primarily as a tool to communicate.

Understanding physicians' perspective on the PO can provide health and law policies, with research-based evidence on ways to address the opioid epidemic.

In the Canadian healthcare system, opioid use disorder (OUD) is the most challenging form of addiction for the past two decades. Synthetic opioids such as fentanyl, carfentanyl and prescription opioids (PO) such as oxycodone are increasingly dominating the opioid epidemic across the world. With an increase in drug treatment program admissions and overdose deaths, there is a critical need to enhance prevention and harm reduction to address this issue locally and nationwide. Therefore, the objective of this study is to generate a specific guideline document for healthcare professionals to use in Canada, as they face the opioid use disorder (OUD) continuum.

The research team used a structured literature search approach to develop this national guideline. The Canadian Research Institute in Substance Misuse (CRISM) network is composed of four regional networks (Ontario, Quebec-Atlantic, British Columbia and Prairies), which developed these guidelines. Utilizing a hierarchical approach, relevant search terms and structured search strategies were searched in Cochrane library databases, Web of science and PubMed. First meta-analyses and systematic reviews were given the most weight. Secondly, observational studies, quasi-experimental studies, individual randomized controlled trials (RCTs) were weighted. Lastly, personal and expert opinion of the literature were weighted. The review committee consisted of 43 individuals ranging from physicians to community program managers.

Therapeutic medications such as buprenorphine-naloxone and methadone are considered as "first-and-second-line treatment options. These reversal medications are primarily the first line of defense for overdose symptoms. These recommendations have a moderate to the high rating for quality and a strong rating for the strength of the recommendation. Support and treatment interventions from a psychosocial point of view, should routinely be offered in conjunction with

pharmacological treatments. Another alternative approach is the physician specialists led approach. This involves a "slow-release oral morphine treatment" that is administered directly from the prescribing doctor. The adjunct or alternative options have a moderate quality of evidence but, strong strength of recommendation-SOR (with one exception and weak SOR). Although this study is specific to Canada, the opioid epidemic is continuing to affect people across the world, especially the US. This study provides good guidelines and recommendations for managing/ treatment of opioid use disorders. Additional research is needed to investigate the ideal length of treatment further.

The role of the women in the world has changed slightly and has allowed for more freedom among women, than what was previously the "norm." Women are still seen as the caregiver and the person to care for the home in their role in society, especially here in the United States. Before the 1990s women who used drugs were often prostitutes or had a chronic medical or mental health condition. Women who use drugs today are mothers, a wife, and a full-time employee or student. This ideal role of what a woman should be and look-like caused increased stigmatization and negativity among female drug users. Therefore, the author's purpose of this study was to examine the available options and need for women-centered substance use disorder treatment in the United States between 2002 and 2009. The authors obtained characteristics of facilities from the National Survey of Substance Abuse Treatment Services and treatment need data from the National Survey on Drug Use and Health. They also examined differences in the provision of women-centered programs by urbanization level in data from the National Center for Health Statistics 2006 Rural-Urban County Continuum.

The main results from this study are; of the 13 000 facilities surveyed annually, the proportion offering women-centered services declined from 43% in 2002 to 40% in 2009

($P < .001$). Urban location, state population size, and Medicaid payment predicted provision of such services as trauma-related and domestic violence counseling, child care, and housing assistance (all, $P < .001$). Prevalence of women with unmet need ranged from 81% to 95% across states.

Change in the availability of women-centered drug treatment services was minimal from 2002 to 2009, even though the need for treatment was high in all states. Opioid use has nearly quadrupled among individuals in the US and particularly has been steadily increasing among women. Women are expected to meet these high standards and maintain this reputation when they are suffering from SUD, which can often lead to more substance use. The paper utilized a great source to capture all the US and not just a secluded area. The NSDUH survey is the most robust and comprehensive national dataset available with drug-use information.

Chapter III: Instrument (NSDUH)

The Substance Abuse and Mental Health Services Administration (SAMHSA), provides publicly accessible data on drug use, health status, and mental health conditions among populations across the United States. This organization conducts a National survey and creates a codebook for the National Survey on Drug Use and Health (NSDUH) data. Previously, the survey was named the National Household Survey on Drug Abuse (NHSDA). The Center for Behavioral Health Statistics and Quality (CBHSQ) within SAMHSA, sponsors NSUDH. It is conducted by Research Triangle Park, North Carolina (SAMHSA, 2017).

The survey codebook provides names of each variable, the variable description, the meaning of value codes, and an unweighted univariate frequency distribution results. The variables were mostly original interview items, except for a few changes that will later be discussed. Also, the directions for creating a subset of variables and the variable source and

recoding specifications are documented in the 2016 codebook. In addition, case ID interview date, computerized interview scores are included in this file. To an extent, the variable name indicates the variable meaning. Naming variables have been consistent across surveys when the content of questions is similar, or the specifications haven't changed. If variables don't have the same name across the years, there is an indication that they are existing differences. In this situation, analysts should examine the codebook file in detail before conducting any analysis (SAMHSA, 2017).

Reasons for variable changes and recoding are found in the comments section found above the specific variable and the corresponding appendix file. Normally, if variables undergo any changes, they're documented the same year they occur. However, the latest version may not always describe changes from prior years. Therefore, researchers interested in multiyear trends should familiarize themselves with the codebook report for all years of interest to identify any specific changes that could affect their results.

NSDUH Overview

The 2016 NSDUH is the 36th in a series and is currently the primary method of measuring prevalence and social-relationships associated with drug use in the United States. This series of national surveys provide information on the use of illicit drugs, alcohol, and tobacco among members of the US civilian, who are noninstitutionalized and of age twelve years old and older. Also, the survey includes several sets of questions tailored to addressing mental health issues. Surveys have been conducted since 1971, with the earliest data provided on the 1979 survey. In 1999, the survey underwent a complete redesign with additional improvements done in the 2002 survey.

In 1999, the method of data collection changed from a paper questionnaire administration to a computer-assisted administration to a computer-assisted administration. Alternatively, the updated survey design went from a strictly national design to including a state-to-state based sampling plan. Before 1999, the survey was done by using paper-and-pencil interviewing (PAPI) that lasted for about an hour. The PAPI technique included a questionnaire booklet completed by an interviewer and answer sheets completed by the respondent (SAMHSA, 2017). Sensitive substance use related questions appeared on the answer sheets, so the interviewer was unaware of the responses. The interviewer would ask less sensitive questions, such as demographics, the number of people in the home, highest completed educational level, employment status and others out loud and then record them in a questionnaire booklet (SAMHSA, 2017).

Recently, the survey has been carried out using computer-assisted interviewing (CAI) methods. Currently, the survey uses a combination of computer-assisted personal interviewing (CAPI) conducted by an interviewer and audio computer assisted self-interviewing (ACASI) (SAMHSA, 2017). Using ACASI provides respondents with a highly private and confidential means of responding to questions and increases the level of honest reporting of illicit drug use and other sensitive behavior. Between 1999 and 2013 the survey sample was employed to 50-state bases. The eight states with the largest population were labeled as large sample states (Florida, California, Illinois, Michigan, New York, Ohio, Pennsylvania, and Texas) with sampling size targets of 3,600 individuals. The 42 states remaining had a sampling target size of 900 individuals (SAMHSA, 2017).

The 2014-2017 sampling plan took on a more cost-efficient allocation for larger states while maintaining sufficient sample sizes in the smaller states (SAMHSA, 2017). The designed plan yielded “4,560 completed interviews in California; 3,300 completed interviews each in

Florida, New York, and Texas; 2,400 completed interviews each in Illinois, Michigan, Ohio, and Pennsylvania; 1,500 completed interviews each in Georgia, New Jersey, North Carolina, and Virginia; 967 completed interviews in Hawaii; and 960 completed interviews in each of the remaining 37 states and the District of Columbia” (SAMHSA, 2017). Consistent with previous designs, the newer versions oversamples for youth age twelve years old to seventeen years old and young adults age 18 years old to 25 years old. However, the updated model places great emphasis on sampling the 26-year-old and older community. Ultimately, this will give a more accurate and realistic estimation of drug use and associated mental health measures. In the 2016 sampling design, the following allocations were given: “twenty-five percent for youth age twelve years old to seventeen years old, twenty-five percent for young adults age eighteen years old to twenty-five years old, fifth-teen percent for adults age twenty-six to thirty-four years old, twenty percent for adults age thirty-five to forty-nine, and fifth-teen percent for adults age fifty and older” (SAMHSA, 2017).

In addition to the 2002 survey name change, other changes such as giving each NSDUH respondent a \$30 incentive to complete the survey made some improvements. The sample size achieved for the 2016 survey was 67, 942 individuals. “For each state sampling strata called state sampling regions (SSRs) were created and depending on, composite size measures, states were geographically split into approximately equal region sizes” (SAMHSA, 2017). This allowed each region within a state, to conduct the same amount of interview sessions during the data-collection phase. “The United States was divided into a total of 750 SSRs, resulting in thirty-six SSRs from California; thirty SSRs in Florida, New York, and Texas; twenty-four SSRs in Illinois, Michigan, Ohio, and Pennsylvania; fifth-teen SSRs in North Carolina Georgia, Virginia,

and New Jersey; and twelve SSRs in the thirty-eight remaining states and the District of Columbia” (SAMHSA, 2017).

Stage one of the selection process began with the construction of an area that contains one record for each census tract in the United States. Census tract data served as the primary sampling units (PSUs) for this survey design. “When necessary, aggregated census tracts were used within SSRs until each tract met the minimum dwelling unit (DU) requirement. The minimum DU requirement was 250 in urban areas and 200 DUs in rural areas, therefore the following states had 250: California, Florida, Georgia, Illinois, Michigan, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Texas, and Virginia” (SAMHSA, 2017). The District of Columbia and remaining states followed guidelines for the minimum requirement which is 150 DUs in urban areas and 100 DUs in rural areas. Overall, with survey-question alterations and updates regarding pain relievers, the survey has significantly improved its response rate since 2002 (SAMHSA, 2017).

Chapter IV: Methodology (quantitative and qualitative analysis)

To access the NSDUH data, I simply went on the SAMHSA website and downloaded the SPSS file to the computer. In addition, I also downloaded the SPSS software package, which is the Statistical Package for Social Sciences program. This data file was coded with each individual case (56,897 total participants) by rows, and all 2,664 variables were coded by columns. To familiarize myself with statistics and social science analyses techniques, I took an online SPSS course. This course was designed to provide the working-student community and research students with the skills to use SPSS on data of interest. Simultaneously while taking this course and performing classwork analysis, I ran the test through SPSS on my thesis data. This training better prepared me to tackle the vast 2016 NSDUH dataset that was not easily digestible.

After organizing the data file into a more manageable format and identifying specific variables to be tested, I clustered them into three specific themes: Health, Risky behaviors, and Demographics. The selected variables for this project were chosen based on their relativeness to opioid use, specifically with women. The health theme included variables that addressed the overall health status, conditions, and or cost of healthcare, regarding opioid use. Risky behavior theme included any other drug or alcohol use and any criminal offenses or encounters with punishment from the law. The demographics theme included socioeconomic variables. For this study, opioid use was defined as any opium-derived prescription pain medicine, heroin, or illicit use of opioids in 2016. Rural locations were defined as areas with less than 100,000 residents, and urban areas were more than 100,000 residents. A mixed methods approach was implemented in this study because it provides better supportive veracity of the complex questions we addressed in this study.

Mixed method approaches consist of collecting data analysis from both quantitative and qualitative data for a single study. The data are collected concurrently or sequentially; for this study, we used a sequential approach. This method involves integrating all the data at one or more stages of the research process (Petrosyan, 2018). There are several mixed methods designs commonly used among social scientists: convergent parallel design, explanatory sequential design, exploratory sequential design, and the embedded design. This essay will discuss three major types and elaborate on why they fit into this thesis.

Convergent Parallel Design

Convergent parallel design is sometimes also called triangulation design. This means researchers use "concurrent timing" to incorporate quantitative and qualitative studies during the same phase of the research timeline. Both are equally important in addressing the research

problem, and both have equal priority during the process. However, this design keeps both studies independent during the "data collection and analysis" and "then matches the results of each analysis during the overall interpretation" (Petrosyan, 2018). The convergent design uses triangulated methods by directly comparing quantitative findings with qualitative results for validation and corroboration. This will ultimately help develop a complete clarification of a phenomenon.

Like all research efforts in the science world, each method has its advantages and disadvantages. The good thing about this design is that data can be collected and analyzed using each data's type of traditional techniques, which can be done at the same time. On the other hand, there are some challenges presented when using this approach. Usually, each data type has an equal weight in the research design and requires much effort and expertise to collect. Forming a collaborative team of researchers to include members who have quantitative and qualitative expertise, is used to address the multiple disciplines integrated into the study. Researchers using this method should be aware of the consequences of having different samples that differ in size. Having different sample groups can cause difficulty when trying to merge data files for interpretations. Although the two separate data types produce meaningful results, contradictions that appear may give new insights to the problem but may require additional data to resolve.

Explanatory Sequential Design

The name of this design gives way to the actual definition, which is this design uses sequential timing. To start the collection and analysis of quantitative data are given priority to addressing the study's problem. The second phase is to collect and analyze the qualitative data sequentially. Therefore, the qualitative format of the study is created to follow the results from the first quantitative analysis. Afterward, the researcher will interpret ways that the qualitative

findings explain results from the initial quantitative portion. The purpose of this design is to use quantitative findings to guide researchers to purposeful sampling for a qualitative stage (Petrosyan, 2018).

The benefits of this design are: it has a straightforward two-phase structure, where the researcher conducts the two methods in separate phases, and the initial phase can lend itself to "emergent approaches" for the second phase. The explanatory design is also more appealing to analysts because of its strong quantitative orientation. In addition, the challenges are a long-time process for the researcher, difficulty with the Institutional Review Board (IRB) approval for the recruitment and participation selection, determining which quantitative results to explain further, and what criteria to use for the participants of the second phase. Therefore, field researchers can amalgamate their eclectic mix methods to aggrandize their studies' story.

Exploratory Sequential Design

Like the explanatory design, exploratory uses sequential timing as well. However, the qualitative data collection and analysis phase is given priority first in exploratory. Building onto the qualitative results, the researcher conducts a quantitative second phase. This second phase tests the initial findings, and the researcher can then interpret their results. This design allows researchers to generalize information on a small sample to a larger population. Additionally, the first phase identifies critical variables for the second phase when variables are unknown. The phenomenon can be explored in depth, and the prevalence of its dimensions can be measured with this design.

Exploratory advantages are: describing, implantation, and reporting of this design is straightforward, and a new instrument can be formed as one of the potential yields of the research procedure. In contrast, the challenges are: it's a time-consuming research process, IRB

approval for the quantitative phase is difficult, to avoid bias, using small samples for the first phase and a larger sample for the second phase should be considered, and investigators should be meticulous about the scores produced from the instrument, so the study's story is bolstered and not enervated by biases.

The foundation of this thesis work is based on the mixed methods approach. Of the above designs, this project has incorporated the concepts of convergent, exploratory, and explanatory techniques to address opioid use among adult females. The following variables were identified as necessary through quantitative analysis and should be further explored during a qualitative phase: income, race, education, poverty, drug treatment services, occupational status, resource access, drug types and usage, criminal history, and health status. This led to the descriptive testing which lends itself to the second qualitative analysis phase.

First, in the quantitative analysis phase, frequency distribution tables were produced. Then chi-square independence test on cross-tabulations of the variables was run on all the variables and the corresponding p-values were recorded and interpreted. For organizational purposes, variables proven to have some relationship with the opioid user subpopulation are included in the results section, and non-related variables can be found in the appendix section. Qualitative analysis of the rural North Georgia/Southern Appalachia area to support findings from the initial first phase. An IRB application was created and approved (Study #: 19-021) through KSU. Once approved for one-on-one interviews, a list of professional healthcare contacts in the North Georgia area was used for recruitment. Interviews were conducted using a "snowball" contact approach, and interviews were carried out until theoretical saturation was reached.

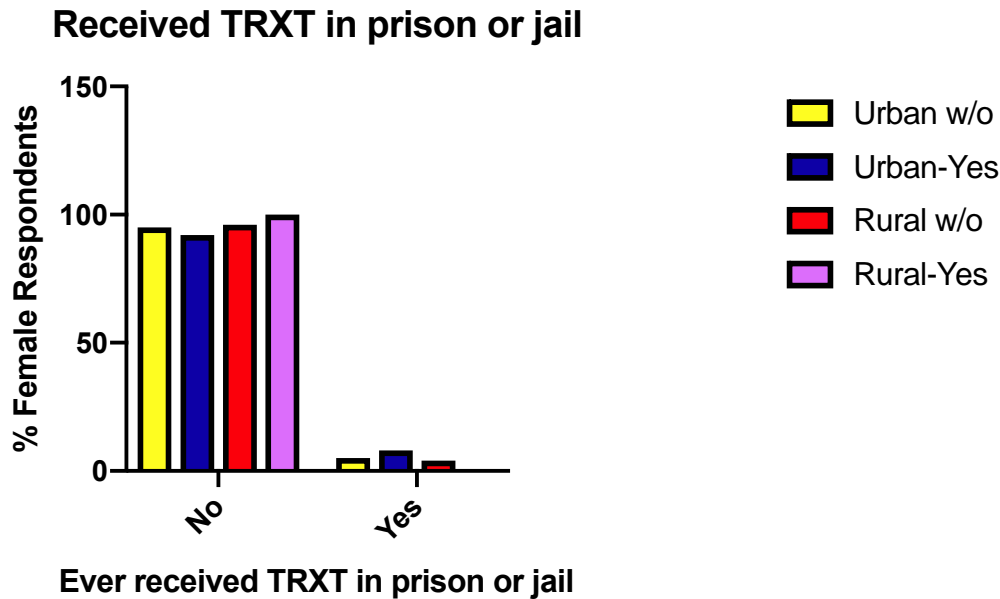
Chapter V: Results

The following section includes tables of findings from the variables analyzed during the first phase. The variables derived from the NSDUH 2016 report are available through the SAMHSA website. In this dataset, there are 56,897 total responds and of that 22,772 are adult females (18 years old and older). Further investigating determined there are a total of 1,133 adult females who reported misusing opioids in this survey. Because we were specifically interested in rural women, the following groups (of the 22,772 cases) were created for analysis: urban or no rural females without opioid past year misuse (coded as NRNO), urban or no rural females with past year opioid use (coded as NRO), and rural females without opioid misuse (coded as RNO, and rural females with opioid past year misuse (coded as RO).

A total of 85 variables were utilized from the NSDUH, including a combined re-coded variable for location and opioid misuse. Out of the 85 variables, only 26 have statistically significant results and show apparent differences between the rural and urban locations. The remainder 57 variables include the following: the number of employers in the past year, overall health insurance coverage, participant in the US Armed Forces, parole, ever been arrested and booked, ever stayed in the hospital overnight in the past year, welfare/childcare help, reason for misusing pain medication, if your religious beliefs are important, cancer, cirrhosis of the liver, kidney disease, chronic bronchitis, asthma, tramadol use, oxycodone use, hydrocodone use, OxyContin use, Oxymorphone use, buprenorphine use, fentanyl use, morphine, codeine, methadone, hydromorphone, Demerol, employment status, sold illegal drugs, HIV/AIDS, heroin or pain medication use, income, education, smoked heroin, sniffed heroin, used cocaine with last alcohol drink, used heroin with last alcohol drink, how difficult is it to obtain crack, probation, treatment in a private doctors office, heart condition, sugar diabetes, high blood pressure, tried to kill yourself, difficulty hearing, difficulty seeing, difficulty dressing and bathing, difficulty doing

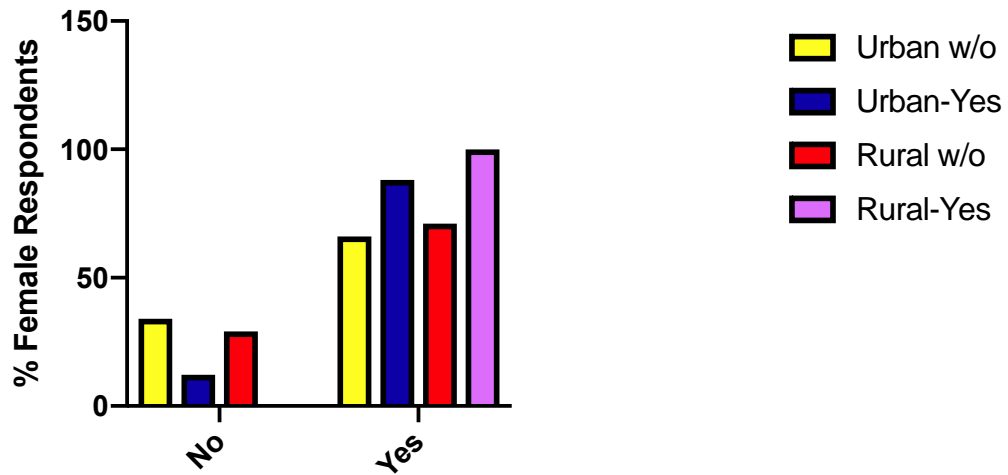
errands alone, Medicare, written drug policy at work, family receives SSI, it is important for your friends to share the same religious beliefs, number of persons in the HH, number of children in the house under 18 years old, number of persons 65 years or older in HH, was the interview too long, and was the interview hard to understand. These 58 variables have no statistical significance and show no difference between rural and urban locations.

Variable Theme 1: Health



Graph 1: Received treatment in prison or jail. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

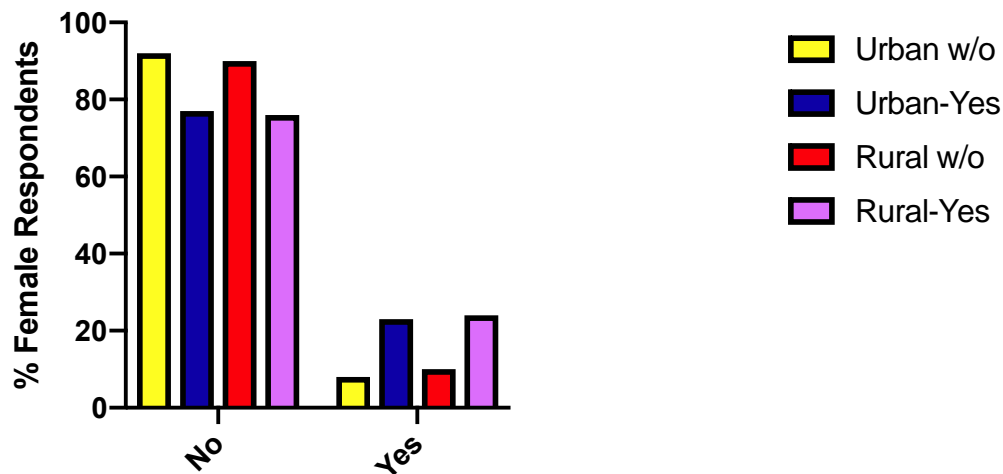
Emotional problems kept you from leaving the house



Emotional problems kept you from leaving the house in the past year

Graph 2: Trouble leaving the house, due to emotional issues. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

Serious difficulty remembering and concentrating

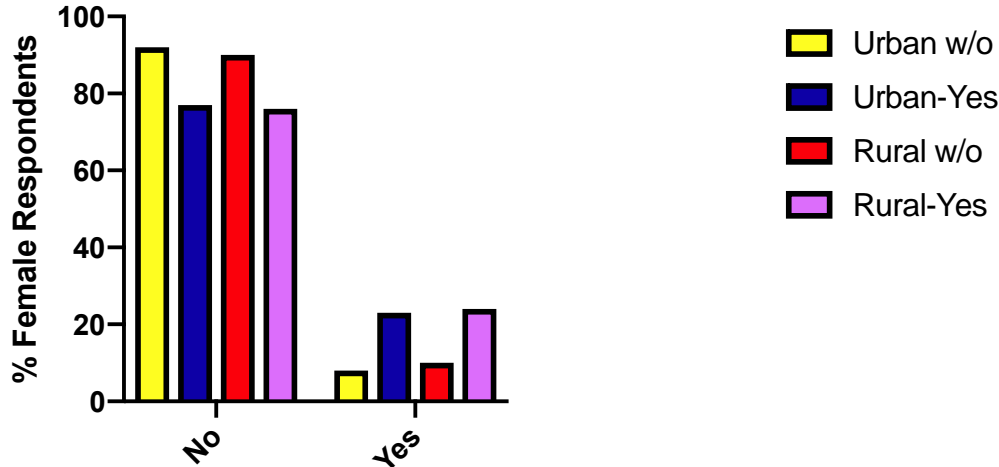


Hard to remember and concentrate

Graph 3: Serious difficulty remembering and concentrating. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and

rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

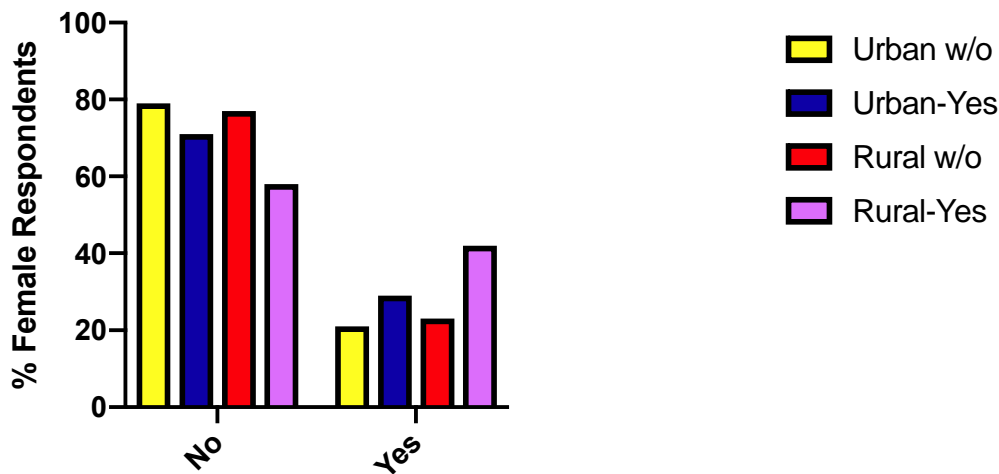
Serious difficulty walking or climbing



Serious difficulty walking or climbing

Graph 4: Serious difficulty walking or climbing. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

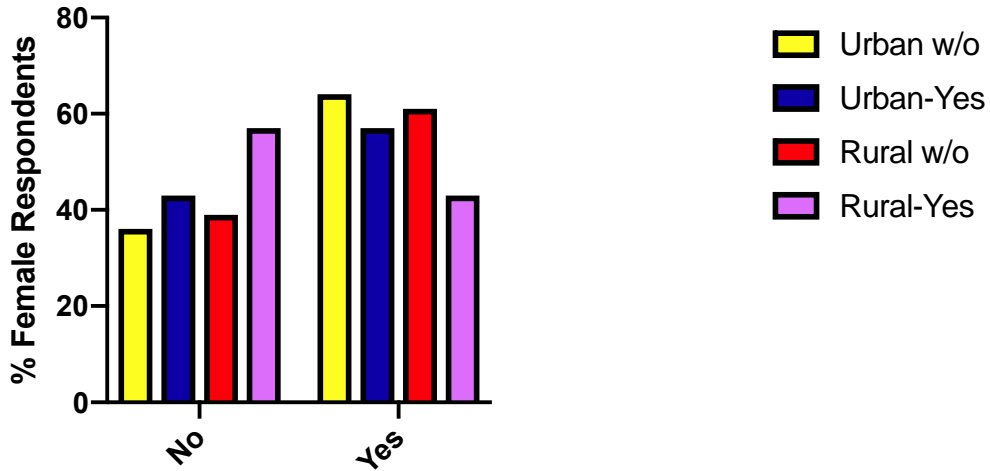
Are you covered by medicaid



Are you covered by Medicaid

Graph 5: Medicaid coverage. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

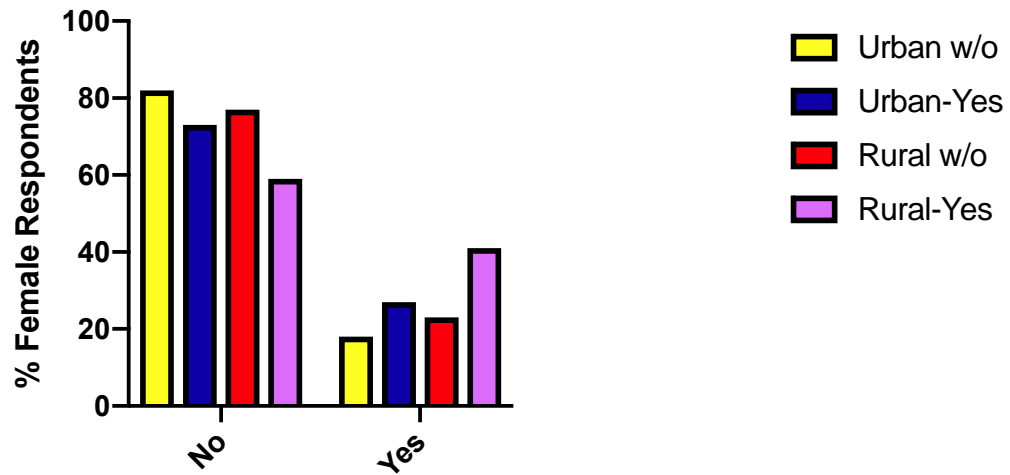
Are you covered by private health insurance



Are you covered by private health insurance

Graph 6: private health insurance coverage. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

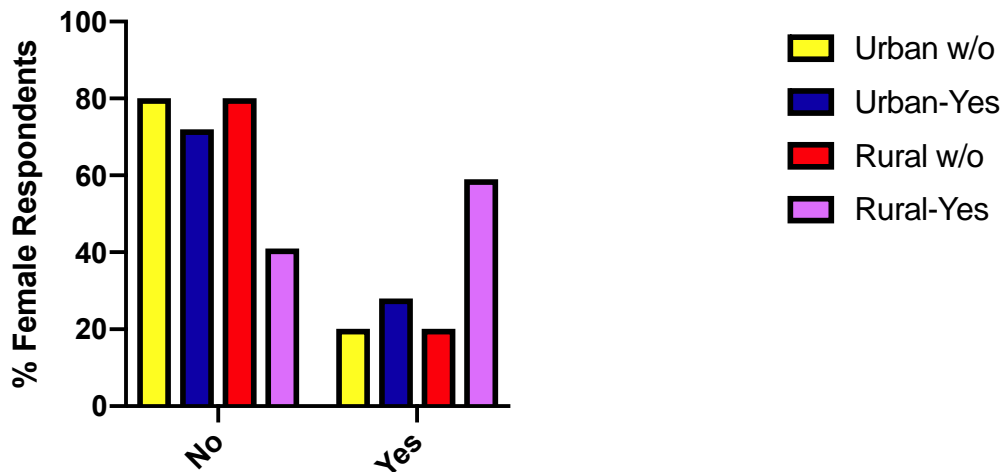
Received TRXT in hospital/overnighth stay in the past year



Ever received TRXT in hospital/overnight in the past year

Graph 7: Treatment from overnight stay at the hospital. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

Received TRXT in rehab center in past year

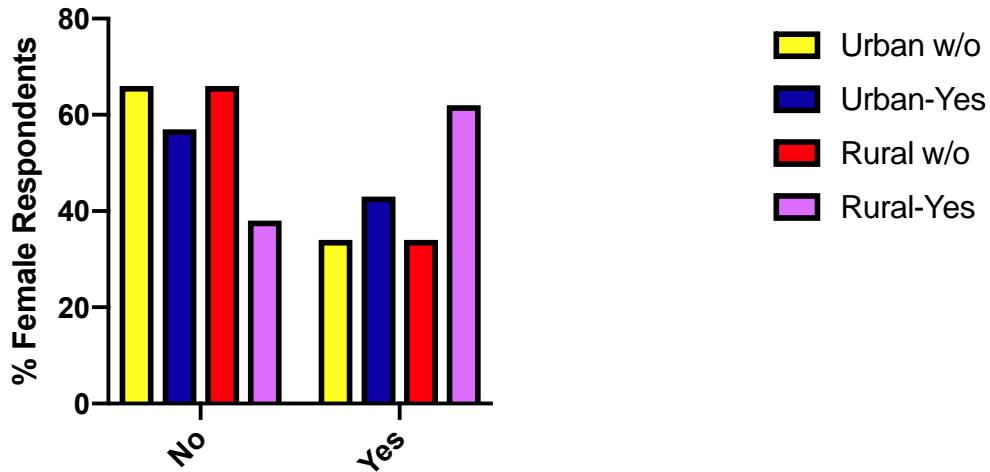


Ever received TRXT in rehab center in the past year

Graph 8: Treatment in rehab center. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural

female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

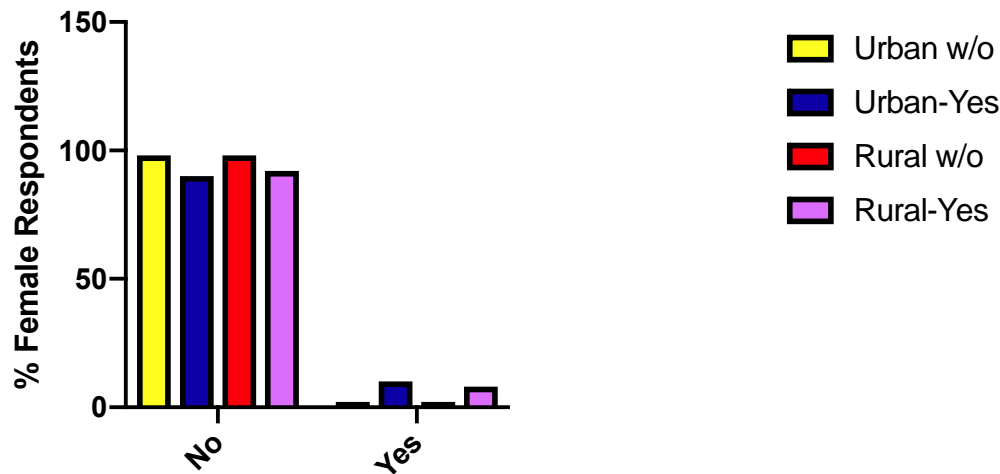
Received TRXT in mental health center in past year



Ever received TRXT in mental health center in the past year

Graph 9: Treatment in mental health center. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

Ever told you had Hepatitis B or C

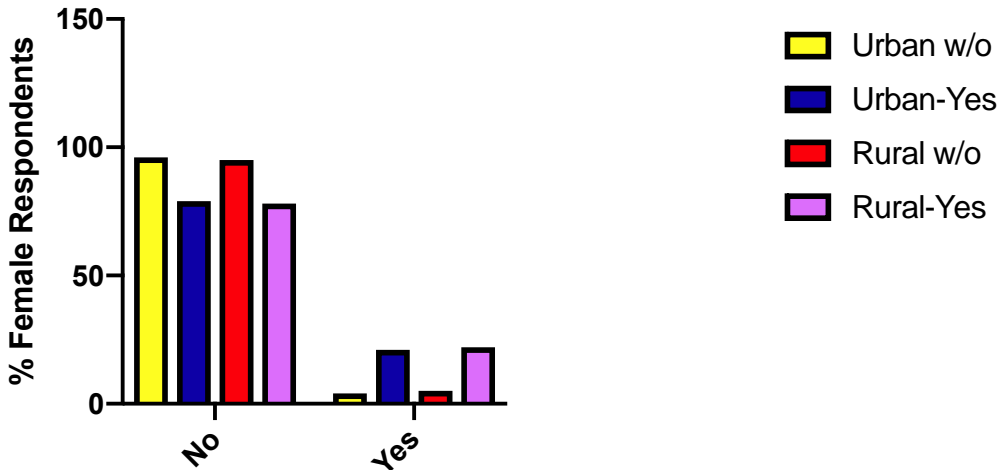


Ever told you had Hepatitis B or C

Graph 10: Hepatitis B or C condition. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a

urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

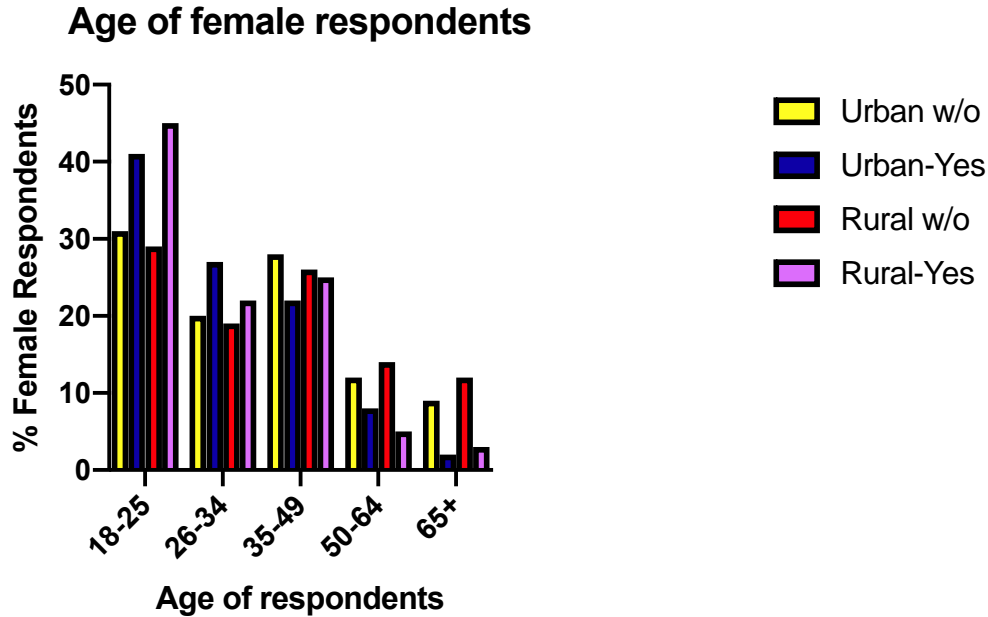
Ever received alcohol or drug treatment



Ever received alcohol or drug treatment

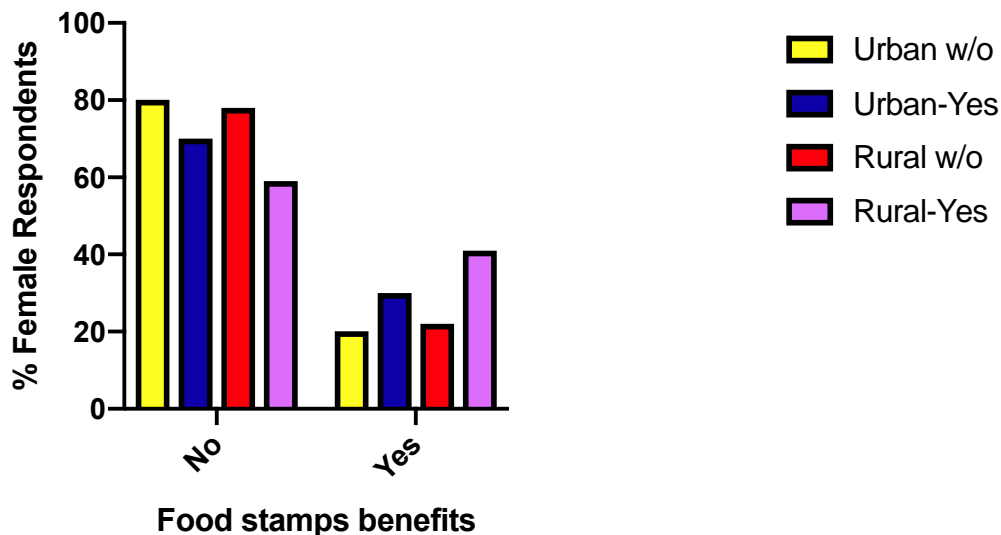
Graph 11: Have you ever received alcohol or drug treatment. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

Variable Theme 2: Demographics



Graph 12: Age. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

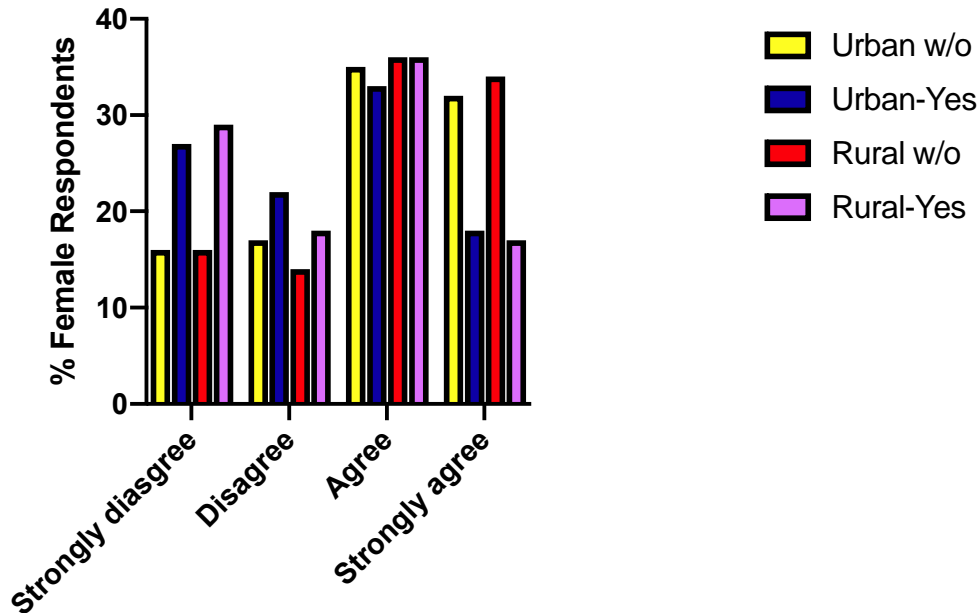
Family/respondent received food stamps



Graph 13: Food stamps benefits for the family/respondent. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they

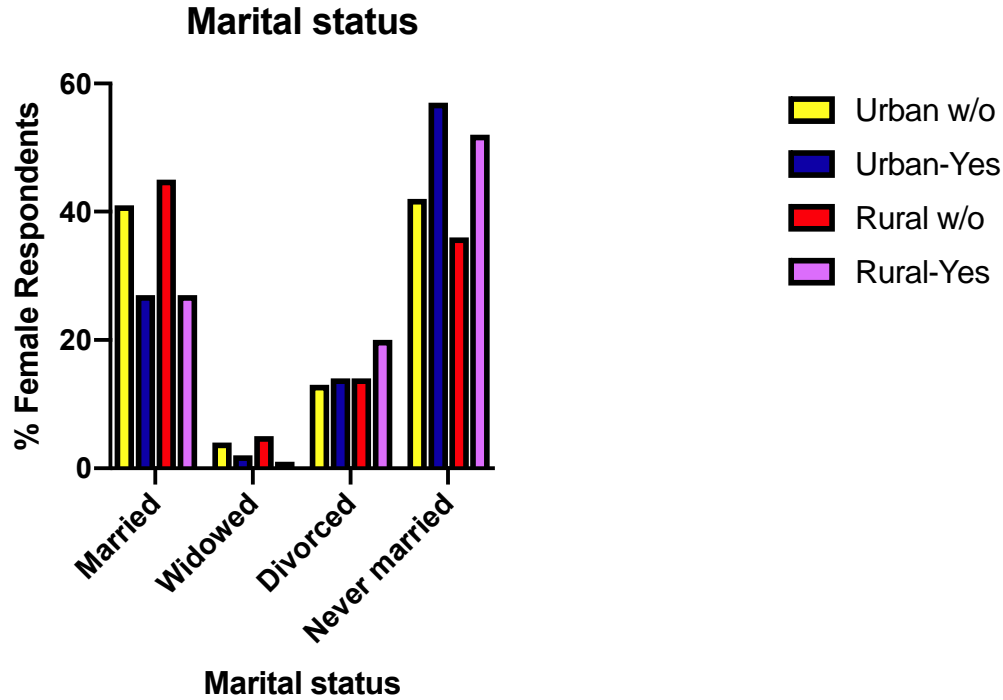
are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

Religion influences my decisions



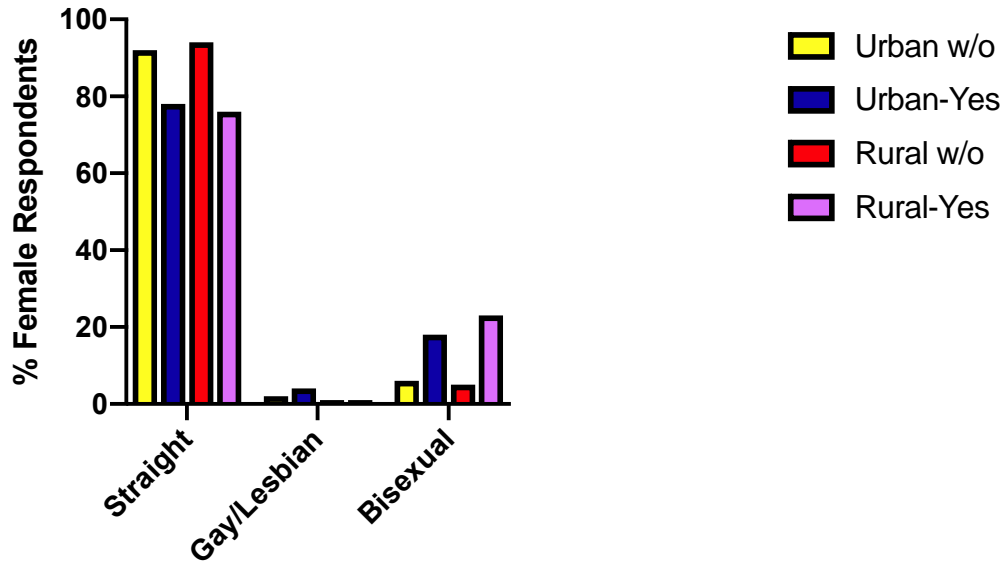
Does your religion affect your decision making

Graph 14: Religion influences decisions. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.



Graph 15: Marital status. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

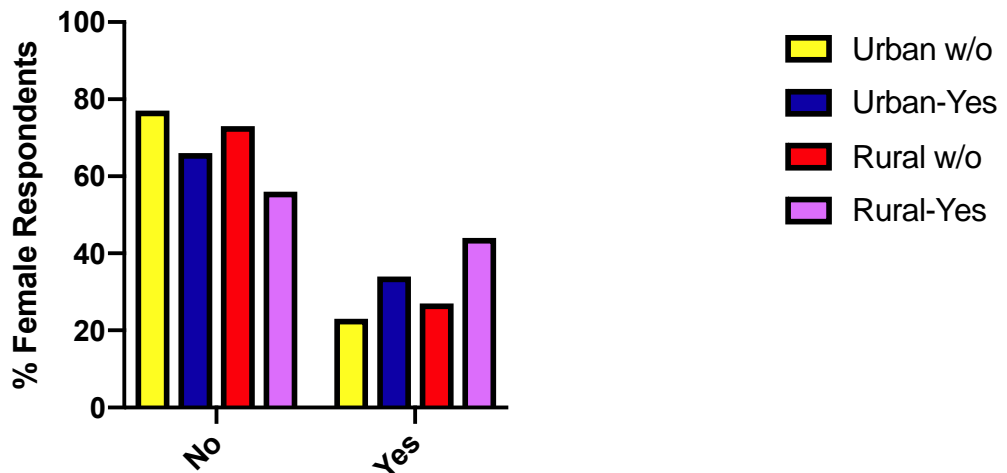
Sexual identity of female respondents



Sexual preference of respondents

Graph 16: Sexual preference. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

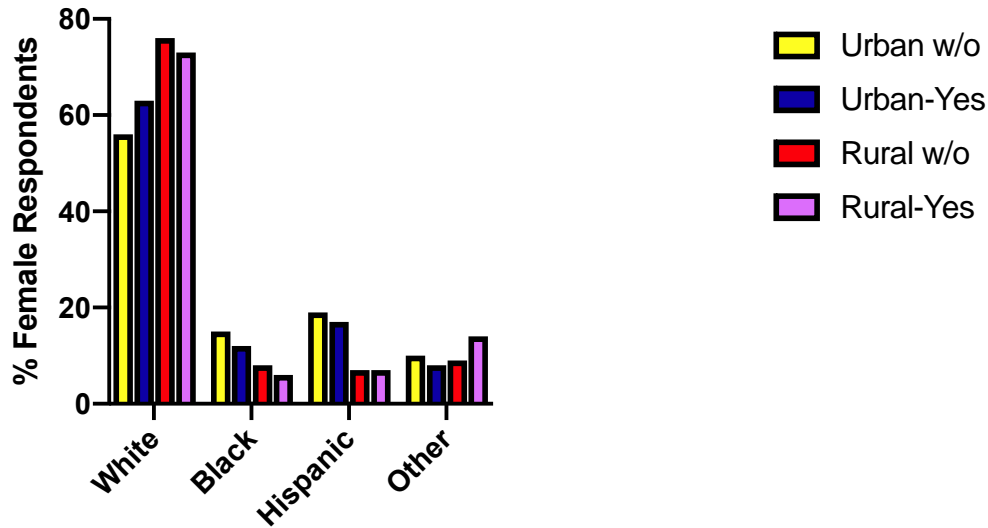
Participated in one or more government assistance programs



Attended one or more government help programs

Graph 17: Family needed government assistance. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

Race of 2016 dataset

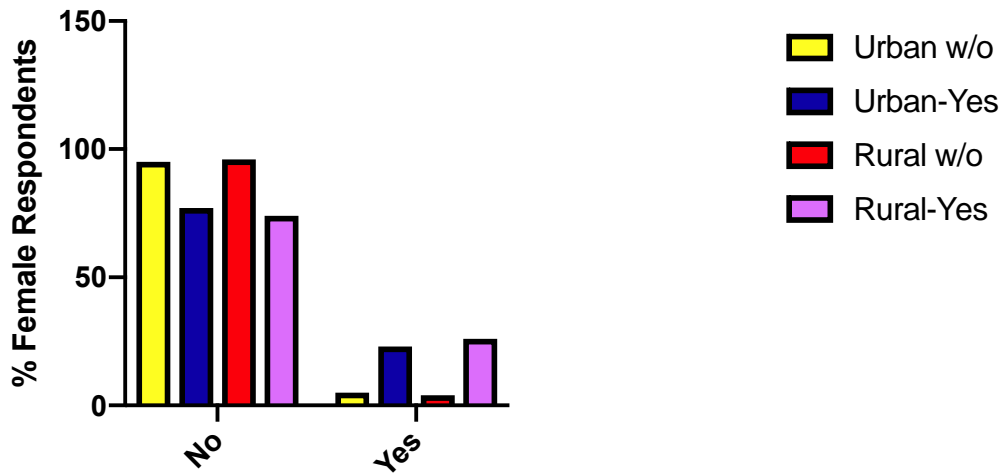


Race background of NSDUH 2016

Graph 18: Race. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

Variable Theme 3: Risky behaviors

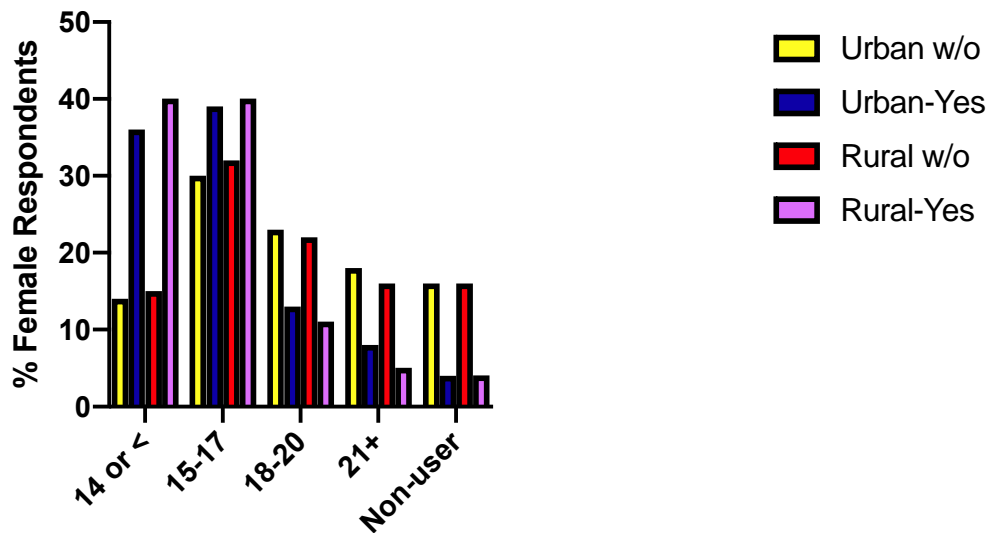
Approached by someone selling drugs



Approached by someone selling drugs

Graph 19: Approached by someone selling drugs. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

Alcohol age of first use

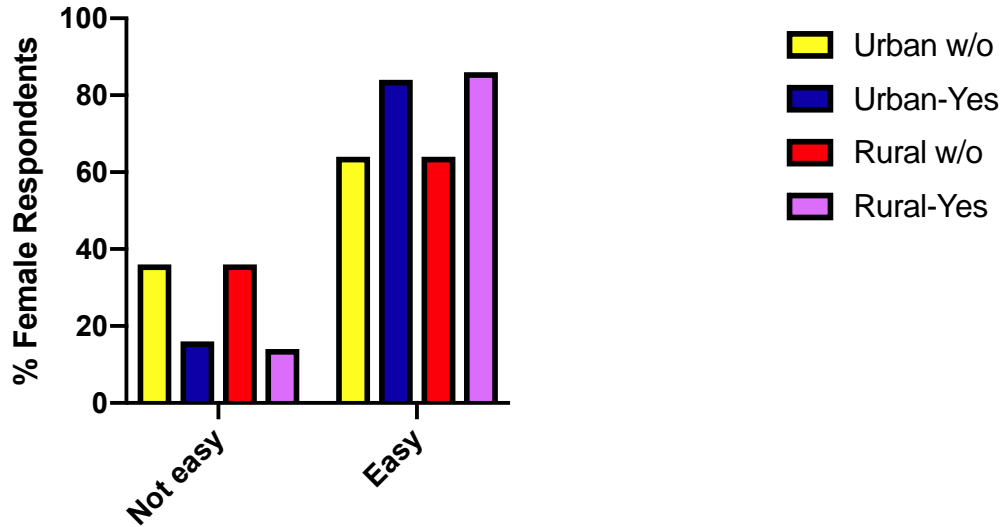


Alcohol age of first use

Graph 20: How old were you when you had your first alcohol drink. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow)

means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

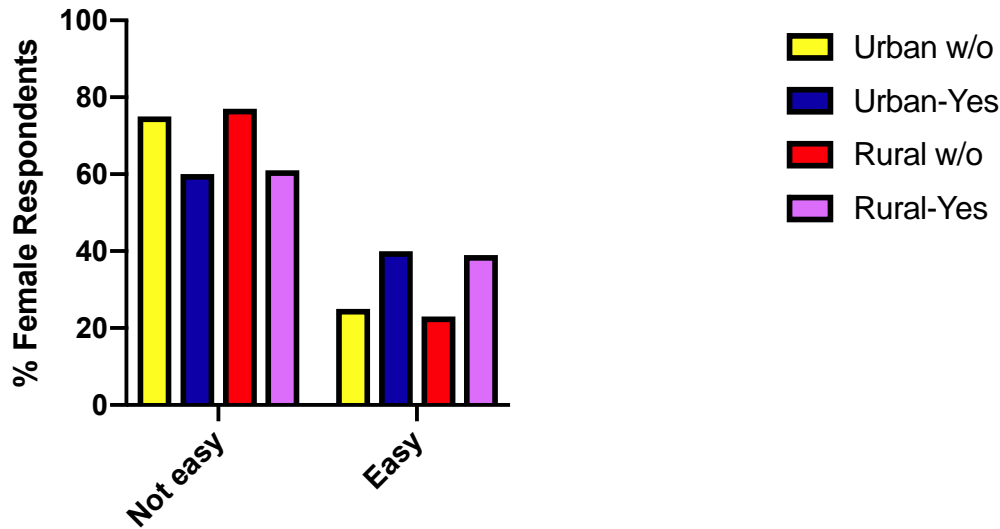
How easy is it to obtain marijuana



How easy is it to obtain marijuana

Graph 21: How difficult is it to obtain marijuana. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

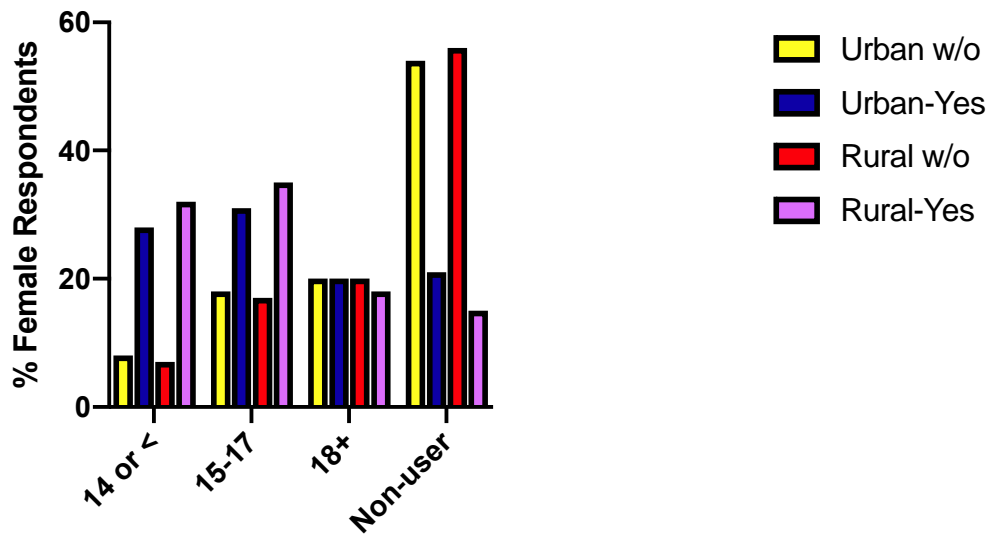
How easy is it to obtain cocaine



How easy is it to obtain cocaine

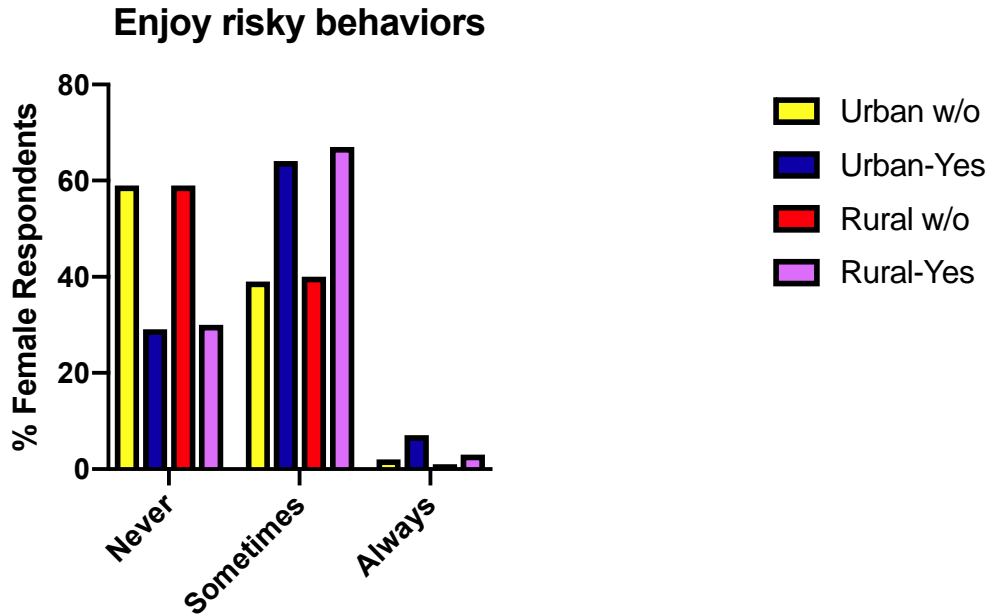
Graph 22: How difficult is it to obtain cocaine. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

Marijuana age of first use



Marijuana age of first use

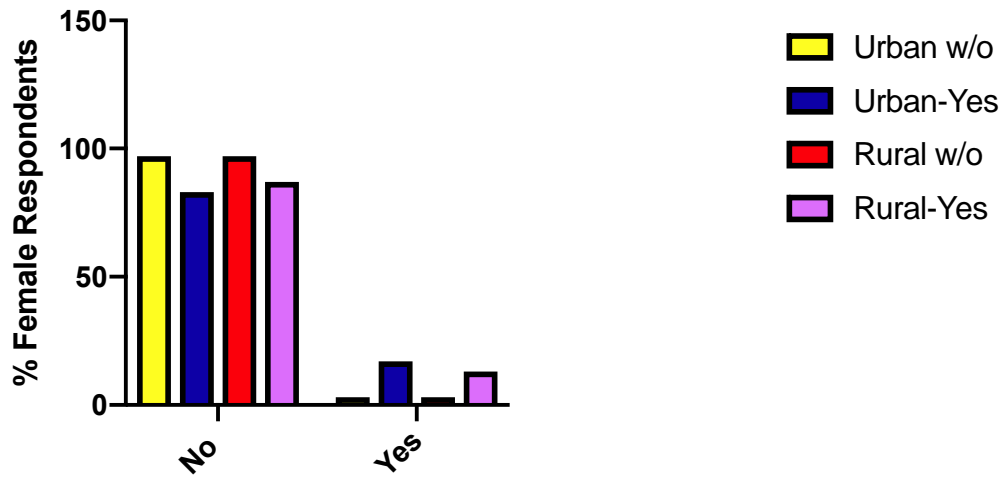
Graph 23: How old were you when you first tried marijuana. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.



Get a real kick out of risky behaviors

Graph 24: Enjoy risky behaviors. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

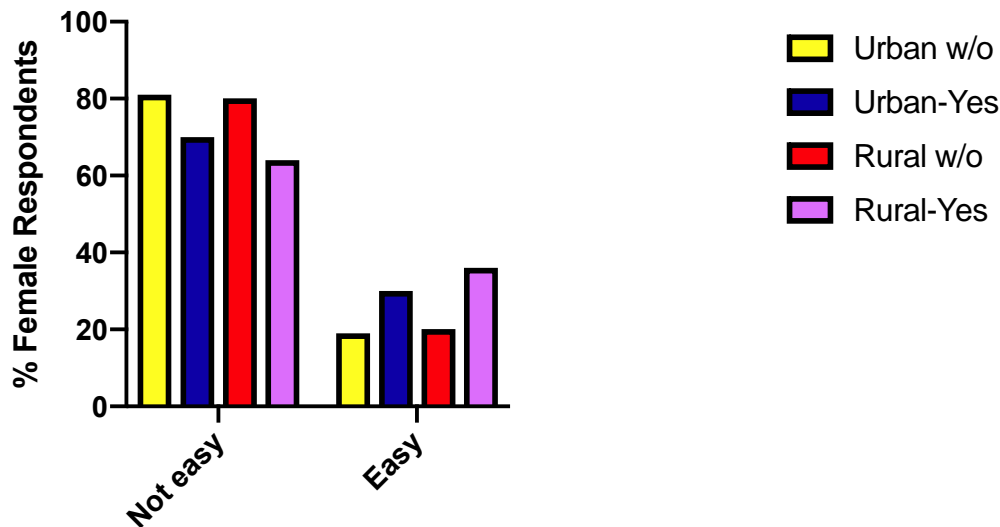
Marijuana with last alcohol use



Used Marijuana with last alcohol use

Graph 25: Marijuana and alcohol use. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

How easy is it to obtain heroin



How easy is it to obtain heroin

Graph 26: Heroin access difficulty. This bar chart represents the percentage of female respondents in this survey. There are four groups: urban-w/o (yellow) means they are just a

urban resident who is not misusing opioids, urban-yes (blue) means they are a urban resident and misuse opioids, rural-w/o means (red) they are just a rural resident, and rural-yes (purple) means they are a rural resident and misuse opioids. The statistics show there is a relationship and rural female users are unique compared to their urban counterparts. *p-value vs. urban. The graph was generated using Graph-Pad prism 7.

Matching qualitative theme quotes

Health

- “There are 15 facilities in North GA focused on opioid addiction, but we only hear about two”...
 - Two places (one on KSU campus and the other in Marietta)
- “Transportation issues are common disconnects among drug/alcohol programs and users”...
- “We know nothing about the quality of these programs and their success rates”...
- “Rural areas lack adequate healthcare programs, hospitals, etc.”...
- “Women have to work multiple jobs to support their family and their habits”...
- “Doctor shopping”...
- “Pharmacies are not doing a good job of tracking prescription orders across locations/businesses”...
- “Throwing money at the opioid epidemic won’t fix-it, we need more action and community engagement”... “The policy needs to be changed...”

Demographics

- “Focus on childbearing age 12-44 years old”...
- “Heroin casual use is more prevalent among younger group”...
- “Prescription opioids misuse is more common among older/senior adults”...
- “Heroin is the cheaper option”...
- “The aging community depend on and trust their primary doctor and local pharmacies”...

- “I can’t get addicted because the doctor prescribed the medication”...
- “Predominately a white community issue”...
- “We don’t hear anything about other races and their opioid use...the research is not there”...
- Treatment- “90% white and then the others”...
- Researcher- “55% white and then the others”...
- Prevention- “23% white and then the others”...
- “The women I work with are 50% African American and 50% Hispanic...but we don’t anything about these populations until NAS”...

Risky behaviors

- “Women are often seen as dirty or shunned because of their drug use”...
- “Prescription pain killers lead to heroin use- heroin is the cheaper option”...
- “Women have the most access to medications in the house because they’re in charge of storage and usually give medicine to sick or ill children”...

Overall, health, demographics and risky behaviors variables or questions, which includes poly-drug use, were analyzed at both the quantitative and qualitative level. Some variables were originally viewed from just the NSDUH dataset, however other variables were used based on the insight provided from the qualitative interview phase of the study.

Chapter VI: Discussion

The purpose of this study was to identify and investigate social factors that could potentially be the underlying driving influential factors for increased opioid use. Rarely do researchers focus specifically on the female subpopulation nor the rural communities. The lack

of evidence-based and research data-driven studies on these vulnerable populations have made it extremely difficult to characterize these groups. The work conducted in this study has provided some insight to the vulnerable populations that are overlooked in the science and health field.

The following variables have been identified as having some relationship to opioid misuse among the female population: income, race, education, poverty, drug treatment services, occupational status, resource access, drug types and usage, criminal history, and health status. Tables of the cross-tabulation and chi-square p-value data have been provided in the results section of this essay. Based on the results, rural female opioid users tends to affect less poor women. It tends to affect women who have some college education the most. White rural female opioid users tend to be disproportionately affected compared to other races such as blacks and Hispanics. Almost half of the female opioid users have utilized government assistance programs. Prescription pain reliever use only resulted in the highest percent for opioid misuse among rural females. Most of the rural females reported working full time. Interestingly, not many rural female opioid users reported receiving drug or alcohol treatment. In conclusion of the first phase of this study, rural females are most likely to experience opioid use differently from men and their urban-female counterparts. This sets a foundation for the need for special attention to be giving to this group and their rural health disparities.

Appendix:

Percentage charts from Graph-pad prism 7

	All females	NRNO	NRO	RNO	RO
In poverty	27%	20%	26%	23.3%	33%
2X poverty	23%	21.6%	22%	26.0%	29%
More than 2X	49%	58.4%	52%	50.7%	38%
Missing	1%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

Chart 1: P-value = .000 (alpha = .05). In addition, (1.2%) are missing. Poverty status: Female opioid user’s n = 1,133 total. The following percent are for the overall adult female population: 27% in poverty, 23% 2X pov, 49%, more than 2X pov, and 1% missing. This table displays the quantitative data from the poverty variable in the NSDUH. The variable asks about poverty status and has three categories: in poverty, making 2X the federal poverty threshold, and making more than 2X the federal poverty threshold. The “all females” column represents all the adult females (22,772) in the survey. One percent of this subpopulation didn’t report their status. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Less than HS	11.7%	11.5%	12.1%	12.3%	15%
HS	24.2%	23%	25.2%	28.8%	28.5%
Some college	36.1%	35.3%	39.5%	38.3%	40.2%
College Grad	28%	30.2%	23.2%	20.6%	16.3%
Total	100%	100%	100%	100%	100%

Chart 2: P-value = .000 (alpha = .05). Education level: Female opioid user’s n = 1,133 total. The following percent are for the overall adult female population: 11.7% less than HS, 24.2% HS, 36.1% some college, and 28% college grads. This table displays the quantitative data from the education variable in the NSDUH. The variable asks about education levels and has four categories: less than high-school, high-school diploma, some college, and college graduate. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
White	60.2%	56.1%	63.3%	76.2%	73.4%
Black	13.2%	15%	11.5%	7.7%	5.6%
Hispanic	17%	19.3%	16.6%	7.3%	6.5%
Other	9.6%	9.6%	8.6%	8.8%	14.5%
Total	100%	100%	100%	100%	100%

Table 3: P-value = .000 (alpha = .05). Race: Female opioid user’s n = 1,133 total. The following percent are for the overall adult female population: 60.2% white, 13.2% black, 17.0% Hispanic,

and 9.6% other. This table displays the quantitative data from the race variable in the NSDUH. The variable asks about the racial background and has four categories: white, black, Hispanic, and other. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Less than 20k	23%	21.5%	28%	26.4%	35%
20-49k	32%	31%	34%	36%	40.2%
50-74k	15.2%	15.3%	15.5%	15%	9%
More than 75k	29.8%	32.2%	22.5%	22.6%	15.8%
Total	100%	100%	100%	100%	100%

Chart 4: P-value = .000 (alpha = .05). Income: Female opioid user’s n = 1,133 total. The following percent are for the overall adult female population: 23% less than \$20,000, 32% \$20-49,999, 15.2% \$50-74,999, and 29.8% reported making over \$75,000. This table displays the quantitative data from the income variable in the NSDUH. The variable asks about poverty status and has four categories: less than \$20,000, \$20,999-49,999, \$50,000-74,999, and more than \$75,000. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	24.4%	23%	34%	27%	44.4%
No	75.6%	77%	66%	73%	55.6%
Total	100%	100%	100%	100%	100%

Chart 5: P-value = .000 (alpha = .05). Government assistance programs. Female opioid user’s n = 1,133 total. The following percent are for the overall adult female population: 24.4% yes and 75.6% said no. This table displays the quantitative data from the participation in one or more government assistance programs variable in the NSDUH. The variable asks about participation in the government assistance programs and has two categories: “yes” and “no”. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Heroin only	0.1%	0%	2.5%	0%	2.3%
PNR only	4.6%	0%	92%	0%	91.1%
Both	0.3%	0%	5.5%	0%	6.6%
None	95%	100%	0%	100%	0%
Total	100%	100%	100%	100%	100%

Chart 6: P-value = .000 (alpha = .05). Heroin and Pain reliever misuse in the past year. Female opioid user’s n = 1,133 total. The following percent are for the overall adult female population: 0.1% heroin only, 4.6% PNR only, 0.3% both, and 95% none. This table displays the quantitative data from the heroin and pain reliever misuse (in 2016) variable in the NSDUH. The variable asks about the misuse of heroin and pain relievers in the past year and has four categories: heroin

only, pain reliever only, both, and none. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	0.3%	0.3%	1.2%	0.1%	0%
No	99.7%	99.7%	98.8%	99.9%	100%
Total	100%	100%	100%	100%	100%

Chart 7: P-value = .010 (alpha = .05). Female opioid user’s n = 1,133 total. The following percent are for the overall adult female population: Ever been told you had HIV/AIDS: 0.3% yes and 99.7% no. This table displays the quantitative data from the HIV/AIDS variable in the NSDUH. The variable asks, “Have you ever been told you had HIV/AIDS” and has two categories: “yes” and “no”. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Zero times	98.6%	99%	91.5%	99%	88.8%
1-2	0.8%	0.6%	3.8%	0.6%	4.2%
3-5	0.2%	0.1%	1.7%	0.1%	2.3%
6-9	0.1%	0.1%	1.3%	0.1%	0.5%
10 or more	0.3%	0.2%	1.7%	0.2%	4.2%
Total	100%	100%	100%	100%	100%

Chart 8: P-value = .000 (alpha = .05). The following percent are for the overall adult female population: Sold illegal drugs 98.6% zero times, 0.8% one or two times, 0.2% three to five times, 0.1% six to nine times, and 0.3% ten or more times. This table displays the quantitative data from the “ever sold illegal drugs” variable in the NSDUH. The variable asks, “have you ever sold illegal drugs” and has five categories: zero-times, 1-2 times, 3-5 times, 6-9 times, and 10 or more times. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Full time	45.2%	45.7%	49.1%	42.1%	41.5%
Part-time	19%	19%	19%	18%	15.4%
Unemployment	5.0%	5.2%	7%	4.4%	11.3%
Other	30.8%	30.1%	24.9%	35.5%	31.8%
Total	100%	100%	100%	100%	100%

Chart 9: P-value = .000 (alpha = .05). The following percent are for the overall adult female population: Employment status 45.2% full-time, 19.0% part-time, 5.0% unemployment, and 30.8% for the other category. This table displays the quantitative data from the employment variable in the NSDUH. The variable asks about employment status and has four categories: full-time, part-time, unemployment, and the other category. The "all females" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	5.4%	4.1%	21.1%	5.4%	21.5%
No	94.6%	95.9%	78.9%	94.6%	78.5%
Total	100%	100%	100%	100%	100%

Chart 10: P-value = .000 (alpha = .05). The following percent are for the overall adult female population: Ever received alcohol or drug treatment is 5.4%, yes and 94.6% said no. This table displays the quantitative data from the alcohol and or drug treatment variable in the NSDUH. The variable asks, “Have you ever received alcohol or drug treatment” and has two categories: “yes” and “no”. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
> 14	9%	8%	28%	8%	32%
15-17	18.4%	18%	31.4%	17%	35%
18+	20.0%	20.3%	20%	19.1%	18%
Non-user	52.6%	53.7%	20.6%	55.9%	15%
Total	100%	100%	100%	100%	100%

Chart 11: Age of first marijuana use P-value = .000 (alpha = .05). The following percent are for the overall adult female population: Age of first marijuana use for all females is 9% less than 14 years old, 18.4% for between ages 15-17 years old, 20% for the 18 and older group, and 52.6% for the non-user group. This table displays the quantitative data from the alcohol and or drug treatment variable in the NSDUH. The variable asks, “Age of first marijuana use” and has four categories. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Easy	64.8%	64%	84%	64%	85.9%
Not easy	35.2%	36%	16%	36%	14.1%
Total	100%	100%	100%	100%	100%

Chart 12: Difficulty to obtain marijuana. P-value = .000 (alpha = .05). The following percent are for the overall adult female population: “How difficult is it to obtain marijuana” for all females, 64.8% said it was easy to obtain and 35.2% said it was difficult to obtain. This table displays the quantitative data from the “how difficult is it to obtain marijuana” variable in the NSDUH and has two categories or answer options. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Easy	21%	20%	27%	22%	31%
Not easy	79%	80%	73%	78%	69%
Total	100%	100%	100%	100%	100%

Chart 13: Difficulty to obtain crack... Difficulty to obtain crack-cocaine. P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “How difficult is it to obtain crack” for all females, 21% said it was easy to obtain and 79% said it was difficult to obtain. This table displays the quantitative data from the “how difficult is it to obtain crack” variable in the NSDUH and has two categories or answer options. The “all females” column

represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Easy	25%	25%	40.8%	23%	39%
Not easy	75%	75%	59.2%	77%	61%
Total	100%	100%	100%	100%	100%

Chart 14: Difficulty to obtain cocaine... Difficulty to obtain cocaine. P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “How difficult is it to obtain cocaine” for all females, 25% said it was easy to obtain and 75% said it was difficult to obtain. This table displays the quantitative data from the “how difficult is it to obtain cocaine” variable in the NSDUH and has two categories or answer options. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	0.04%	0%	1%	0%	2%
No	99.96%	100%	99%	100%	98%
Total	100%	100%	100%	100%	100%

Chart 15: Any Demerol past year misuse... Any Demerol use in the past year (2016). P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Any Demerol use in the past year (2016)” for all females, 0.04% said “yes” and 99.6% said “no”. This table displays the quantitative data from the “Any Demerol use in the past year (2016)” variable in the NSDUH and has two categories or answer options. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	0.1%	0%	1.5%	0%	4%
No	99.9%	100%	98.5%	100%	96%
Total	100%	100%	100%	100%	100%

Chart 16: Any Hydromorphone past year misuse... Any Hydromorphone past year misuse... Any Hydromorphone use in the past year (2016). P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Any Hydromorphone use in the past year (2016)” for all females, 0.1% said “yes” and 99.9% said “no”. This table displays the quantitative data from the “Any Hydromorphone use in the past year (2016)” variable in the NSDUH and has two categories or answer options. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
> 14	15%	13.5%	36.3%	15.3%	40.2%
15-17	31%	30%	38.5%	32%	40%
18-20	22%	23%	13.1%	22%	11%
21+	17%	18%	8.3%	16%	5.1%

Non-user	15%	15.5%	3.8%	14.7%	3.7%
Total	100%	100%	100%	100%	100%

Chart 17: Age of first Alcohol use... Age of first Alcohol use. P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Age of first Alcohol use in the past year (2016)" for all females, age 14 years old and younger, 15% responded to this age group, 31% of all females responded to the age group 15-17 years old, 22% of all the females responded to the age group 18-20, and 17% of all females responded to being 21 years old or older when they had their first alcohol beverage. This table displays the quantitative data from the "Age of first alcohol use" variable in the NSDUH and has five categories or answer options. The "all females" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	0.2%	0%	3.2%	0%	5%
No	99.8%	100%	96.8%	100%	95%
Total	100%	100%	100%	100%	100%

Chart 18: Any Methadone past year misuse (2016)... Any Methadone use in the past year (2016). P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Any Methadone use in the past year (2016)" for all females, 0.2% said "yes" and 99.8% said "no". This table displays the quantitative data from the "Any Methadone use in the past year (2016)" variable in the NSDUH and has two categories or answer options. The "all females" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	10.3%	0%	21.5%	0%	16.4%
No	89.7%	100%	78.5%	100%	83.6%
Total	100%	100%	100%	100%	100%

Chart 19: Any Codeine past year misuse... Any Codeine use in the past year (2016). P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Any Codeine use in the past year (2016)" for all females, 10.3% said "yes" and 89.7% said "no". This table displays the quantitative data from the "Any Codeine use in the past year (2016)" variable in the NSDUH and has two categories or answer options. The "all females" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	0.3%	0%	4.5%	0%	9.3%
No	99.7%	100%	95.5%	100%	90.7%
Total	100%	100%	100%	100%	100%

Chart 20: Any Morphine products past year misuse... Any Morphine products use in the past year (2016). P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Any Morphine use in the past year (2016)" for all females, 0.3% said "yes" and 99.7% said "no". This table displays the quantitative data from the "Any Morphine use in the past year (2016)" variable in the NSDUH and has two categories or answer options. The "all females" column represents all the adult females (22,772) in the survey. NRNO is the urban and

non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	0.1%	0%	2.1%	0%	4.2%
No	99.9%	100%	97.9%	100%	95.8%
Total	100%	100%	100%	100%	100%

Chart 21: Any Fentanyl past year misuse... Any Fentanyl use in the past year (2016). P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Any Fentanyl use in the past year (2016)” for all females, 0.1% said “yes” and 99.9% said “no”. This table displays the quantitative data from the “Any Fentanyl use in the past year (2016)” variable in the NSDUH and has two categories or answer options. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	0.3%	0%	5%	0%	9.3%
No	99.7%	100%	95%	100%	90.7%
Total	100%	100%	100%	100%	100%

Chart 22: Any Buprenorphine past year misuse... Any Buprenorphine use in the past year (2016). P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Any Buprenorphine use in the past year (2016)” for all females, 0.3% said “yes” and 99.7% said “no”. This table displays the quantitative data from the “Any Buprenorphine use in the past year (2016)” variable in the NSDUH and has two categories or answer options. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	0.2%	0%	3%	0%	5.1%
No	99.8%	100%	97%	100%	94.9%
Total	100%	100%	100%	100%	100%

Chart 23: Any Oxymorphone past year misuse... Any Oxymorphone use in the past year (2016). P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Any Oxymorphone use in the past year (2016)” for all females, 0.2% said “yes” and 99.8% said “no”. This table displays the quantitative data from the “Any Oxymorphone use in the past year (2016)” variable in the NSDUH and has two categories or answer options. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	0.6%	0%	11.5%	0%	16.3%
No	99.4%	100%	88.5%	100%	83.7%
Total	100%	100%	100%	100%	100%

Chart 24: Any OxyContin past year misuse... Any OxyContin use in the past year (2016). P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Any OxyContin use in the past year (2016)” for all females, 0.6% said “yes” and 99.4% said

“no”. This table displays the quantitative data from the “Any OxyContin use in the past year (2016)” variable in the NSDUH and has two categories or answer options. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. $P < 0.05$.

	All females	NRNO	NRO	RNO	RO
Yes	3%	0%	55%	0%	59.3%
No	97%	100%	45%	100%	40.7%
Total	100%	100%	100%	100%	100%

Chart 25: Any Hydrocodone past year misuse... Any Hydrocodone use in the past year (2016). P -value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Any Hydrocodone use in the past year (2016)” for all females, 3% said “yes” and 97% said “no”. This table displays the quantitative data from the “Any Hydrocodone use in the past year (2016)” variable in the NSDUH and has two categories or answer options. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. $P < 0.05$.

	All females	NRNO	NRO	RNO	RO
Yes	0.3%	0%	35%	0%	36.4%
No	99.7%	100%	65%	100%	63.6%
Total	100%	100%	100%	100%	100%

Chart 26: Any Oxycodone products past year misuse... Any Oxycodone use in the past year (2016). P -value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Any Oxycodone use in the past year (2016)” for all females, 0.3% said “yes” and 99.7% said “no”. This table displays the quantitative data from the “Any Oxycodone use in the past year (2016)” variable in the NSDUH and has two categories or answer options. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. $P < 0.05$.

	All females	NRNO	NRO	RNO	RO
Yes	1%	0%	17%	0%	20%
No	99%	100%	83%	100%	80%
Total	100%	100%	100%	100%	100%

Chart 27: Any Tramadol past year misuse... Any Tramadol use in the past year (2016). P -value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Any Tramadol use in the past year (2016)” for all females, 1% said “yes” and 99% said “no”. This table displays the quantitative data from the “Any Tramadol use in the past year (2016)” variable in the NSDUH and has two categories or answer options. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. $P < 0.05$.

	All females	NRNO	NRO	RNO	RO
Straight	%	92.4%	78%	94%	76.2%
Gay	%	2%	4%	1.2%	1.4%
Bisexual	%	5.6%	18%	4.8%	22.4%

Total	100%	100%	100%	100%	100%
-------	------	------	------	------	------

Chart 28: Sexual identity... The sexual identity (2016). P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "The sexual identity for all females, 0.2% said "yes" and 99.8% said "no". This table displays the quantitative data from the "Any Hydromorphone use in the past year (2016)" variable in the NSDUH and has three categories or answer options. The "all females" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	37%	37%	46.3%	34.1%	42%
No	63%	63%	53.7%	65.9%	58%
Total	100%	100%	100%	100%	100%

Chart 29: Ever told had asthma... Ever told you had asthma. P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Ever told you had asthma" for all females, 37% said "yes" and 63% said "no". This table displays the quantitative data from the "Ever told you had asthma" variable in the NSDUH and has two categories or answer options. The "all females" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	11%	10%	12.2%	13%	17%
No	89%	90%	87.8%	87%	83%
Total	100%	100%	100%	100%	100%

Chart 30: Ever told had chronic bronchitis... Ever told you had chronic bronchitis. P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Ever told you had chronic bronchitis" for all females, 11% said "yes" and 89% said "no". This table displays the quantitative data from the "Ever told you had chronic bronchitis" variable in the NSDUH and has two categories or answer options. The "all females" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	4%	4%	4%	4%	0%
No	96%	96%	96%	96%	100%
Total	100%	100%	100%	100%	100%

Chart 31: Ever told had kidney disease... Ever told you had kidney disease. P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Ever told you had kidney disease" for all females, 4% said "yes" and 96% said "no". This table displays the quantitative data from the "Ever told you had kidney disease" variable in the NSDUH and has two categories or answer options. The "all females" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	2.4%	2%	10%	2%	8%
No	97.6%	98%	90%	98%	92%

Total	100%	100%	100%	100%	100%
-------	------	------	------	------	------

Chart 32: Ever told had Hepatitis... Ever told you had Hepatitis. P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Ever told you had Hepatitis" for all females, 2.4% said "yes" and 97.6% said "no". This table displays the quantitative data from the "Ever told you had Hepatitis" variable in the NSDUH and has two categories or answer options. The "all females" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	0.5%	0.5%	1.2%	1%	1.3%
No	99.5%	99.5%	98.8%	99%	98.7%
Total	100%	100%	100%	100%	100%

Chart 33: Ever told had cirrhosis of the liver... Ever told you had cirrhosis of liver. P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Ever told you had cirrhosis of the liver" for all females, 0.5% said "yes" and 99.5% said "no". This table displays the quantitative data from the "Ever told you had cirrhosis of the liver". variable in the NSDUH and has two categories or answer options. The "all females" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	12.4%	13%	9%	12.5%	6.6%
No	87.6%	87%	91%	87.5%	93.4%
Total	100%	100%	100%	100%	100%

Chart 34: Ever told had cancer... Ever told you had cancer. P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Ever told you had cancer" for all females, 12.4% said "yes" and 89% said "no". This table displays the quantitative data from the "Ever told you had cancer" variable in the NSDUH and has two categories or answer options. The "all females" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
SD	17%	16.4%	26%	16%	27.5%
D	13.3%	13.4%	18%	12%	17.1%
A	33.3%	33.4%	33.4%	33%	32.2%
SA	36.4%	36.8%	22.6%	39%	23.3%
Total	100%	100%	100%	100%	100%

Chart 35: Are religious beliefs important... Are religious beliefs important? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Are religious beliefs important?" for all females, 17% said "strongly disagree" and 13.3% said "disagree", 33.3% said they agree, and 36.4% said they strongly agree. This table displays the quantitative data from the "Ever told you had chronic bronchitis" variable in the NSDUH and has four categories or answer options. The "all females" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRO	RO
1. Rel. pain	3%	60%	64%
2. Get high	0.4%	21%	20%
3. Experiment	0.1%	3%	1%
4. Cope with stressors	0.5%	10%	11%
5. Poly-drug use	0.2%	1%	1%
6. Other	0.2%	2%	1%
7. Did not misuse	0.1%	3%	2%
Total	100%	100%	100%

Chart 36: Reason for using pain reliever... The reason for using the pain reliever. P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Ever told you had chronic bronchitis" for all females, 3% said "to relieve pain" and 0.4% said to get high", 0.1% said "to experiment", 0.5% said "to cope with stressors", 0.2% said "because of poly-drug use", 0.2% said "for other reasons not listed in the survey", and 0.1% said "they did not misuse". This table displays the quantitative data from the "Reason for using pain reliever" variable in the NSDUH and has seven categories or answer options. The "all females" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	3.5%	3.4%	6%	4%	5%
No	96.5%	96.6%	94%	96%	95%
Total	100%	100%	100%	100%	100%

Chart 37: Family received welfare/job placement/childcare in past year... Has your family ever received welfare/job placement/childcare in the past year (2016)? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Family received welfare/job placement/childcare in past year" for all females, 3.5% said "yes" and 96.5% said "no". This table displays the quantitative data from the "Family received welfare/job placement/childcare in past year?" variable in the NSDUH and has two categories or answer options. The "all females" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	6%	5%	23%	4.4%	25.7%
No	94%	95%	77%	95.6%	74.3%
Total	100%	100%	100%	100%	100%

Chart 38: Approached by someone selling drugs... Have you been approached by someone selling drugs in the past year (2016)? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Have you been approached by someone selling drugs in the past year (2016)" for all females, 6% said "yes" and 94% said "no". This table displays the quantitative data from the "Have you been approached by someone selling drugs in the past year (2016)?" variable in the NSDUH and has two categories or answer options. The "all females" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	11.4%	11%	15%	12.3%	17.3%
No	88.6%	89%	85%	87.7%	82.7%
Total	100%	100%	100%	100%	100%

Chart 39: Stayed overnight as an inpatient in the hospital in the past year... Have you stayed in a hospital overnight as an inpatient in the past year (2016)? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Have you stayed in a hospital overnight as an inpatient in the past year (2016)” for all females, 11.4% said “yes” and 88.6% said “no”. This table displays the quantitative data from the “Have you stayed in a hospital overnight as an inpatient in the past year (2016)?” variable in the NSDUH and has two categories or answer options. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	11.2%	10%	26%	12.3%	34%
No	88.8%	90%	74%	87.7%	66%
Total	100%	100%	100%	100%	100%

Chart 40: Ever arrested and booked for breaking the law...Ever been arrested and booked for breaking the law? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Ever arrested and booked for breaking the law in the past year (2016)” for all females, 11.2% said “yes” and 88.8% said “no”. This table displays the quantitative data from the “Ever arrested and booked for breaking the law” in the past year (2016)?” variable in the NSDUH and has two categories or answer options. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	0.3%	0.3%	1.5%	0.2%	3%
No	99.7%	99.7%	98.5%	99.8%	97%
Total	100%	100%	100%	100%	100%

Chart 41: Was on parole in the past year... Have you been on parole in the past year? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Have you been on parole in the past year (2016)” for all females, 0.3% said “yes” and 99.7% said “no”. This table displays the quantitative data from the “Have you been on parole” in the past year (2016)?” variable in the NSDUH and has two categories or answer options. The “all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	41%	36%	45%	39%	64%
No	59%	64%	55%	61%	36%
Total	100%	100%	100%	100%	100%

Chart 42: Received treatment from a mental health center in the past year... Have you received treatment from mental health center in the past year? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Have you received treatment from mental health center in the past year (2016)” for all females, 41% said “yes” and 59% said “no”. This

table displays the quantitative data from the “” in the past year (2016)?” variable in the NSDUH and has two categories or answer options. The “Have you received treatment from mental health center all females” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	27%	23%	30%	20%	59%
No	73%	77%	70%	80%	41%
Total	100%	100%	100%	100%	100%

Chart 43: Received treatment from a rehab center in the past year...Have you received treatment from a rehab center in the past year? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Have you received treatment from a rehab center in the past year (2016)” for all females, 27% said “yes” and 73% said “no”. This table displays the quantitative data from the “Have you received treatment from a rehab center in the past year (2016)?” variable in the NSDUH and has two categories or answer options. “The Received treatment from a rehab center in the past year” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	23%	18%	27%	23%	41%
No	77%	82%	73%	77%	59%
Total	100%	100%	100%	100%	100%

Chart 44: Received treatment in a hospital in the past year... Have you received treatment in a hospital in in the past year? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Have you received treatment in a hospital in the past year (2016)” for all females, 23% said “yes” and 77% said “no”. This table displays the quantitative data from the “Have you received treatment in a hospital in the past year (2016)?” variable in the NSDUH and has two categories or answer options. “The Received treatment in a hospital in the past year” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	18%	16%	24%	14%	23%
No	82%	84%	76%	86%	77%
Total	100%	100%	100%	100%	100%

Chart 45: Received treatment in an emergency room in the past year...Have you received treatment in an emergency room in the past year? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Have you received treatment in an emergency room in the past year (2016)” for all females, 18% said “yes” and 82% said “no”. This table displays the quantitative data from the “Have you received treatment in an emergency room in the past year (2016)?” variable in the NSDUH and has two categories or answer options. “The Received treatment in an emergency room in the past year” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
--	-------------	------	-----	-----	----

Yes	1.4%	1.3%	1.6%	1.7%	3%
No	98.6%	98.7%	98.4%	98.3%	97%
Total	100%	100%	100%	100%	100%

Chart 46: Ever been in the US armed forces... Ever been in the US armed forces? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Have you ever been in the US armed forces? For all females, 1.4% said “yes” and 98.6% said “no”. This table displays the quantitative data from the “Have you ever been in the US armed forces?” variable in the NSDUH and has two categories or answer options. “The ever been in US armed forces” columns represent all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
Yes	90.5%	91%	89.4%	90.4%	91.5%
No	9.5%	9%	10.6%	9.6%	8.5%
Total	100%	100%	100%	100%	100%

Chart 47: Overall health insurance... Your overall health insurance P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “The overall health insurance coverage in the past year (2016)” for all females, 90.5% said “yes” and 9.5% said “no”. This table displays the quantitative data from the “Overall health insurance coverage in the past year (2016)?” variable in the NSDUH and has two categories or answer options. “The overall health insurance coverage in the past year” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	All females	NRNO	NRO	RNO	RO
1	67.3%	68%	60.5%	67.4%	59%
2	23.3%	23%	25%	24%	27%
3	6.4%	6.3%	10%	6.1%	11%
4+	3%	2.7%	4.5%	2.5%	3%
Total	100%	100%	100%	100%	100%

Chart 48: Number of employees in the past year... The number of employees in the past year? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “The number of employers in the past year (2016)” for all females, 67.3% said “one” and 23.3% said “two”, 6.4% said “three”, 3% said they had “four or more jobs” in the past year. This table displays the quantitative data from the “The number of employees in the past year (2016)?” variable in the NSDUH and has four categories or answer options. “The number of employees in the past year” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRO	RO
1. Did not misuse	95%	90%
2. Misused	5%	10%
Total	100%	100%

Chart 49: Ever smoked heroin... Have you ever smoked heroin? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Have you ever smoked heroin” for all females, 5% said “yes” and 95% said “no”. This table displays the quantitative

data from the “Have you ever smoked heroin?” variable in the NSDUH and has two categories or answer options. “The ever smoked heroin” columns represent all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. This table only displays the two test groups’ urban female opioid users and rural female opioid users. P<0.05.

	NRO	RO
1.No	98%	85%
2. Yes	2%	15%
Total	100%	100%

Chart 50: Ever sniffed heroin... Ever sniffed heroin... Have you ever sniffed heroin? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Have you ever smoked heroin” for all urban female opioid users, 2% said “yes” and 98% said “no”. Whereas the rural female users reported 85% “no” and 15% said “yes”. This table displays the quantitative data from the “Have you ever sniffed heroin?” variable in the NSDUH and has two categories or answer options. “The ever sniffed heroin” columns represent all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. This table only displays the two test groups’ urban female opioid users and rural female opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	97%	83%	97%	87%
Yes	3%	17%	3%	13%
Total	100%	100%	100%	100%

Chart 51: Used marijuana with last alcohol drink... Used marijuana with last alcohol drink in the past year? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Used marijuana with last alcohol drink in the past year (2016)” for all urban female users, 3% said “yes” and 97% said “no “For rural female users 87% said “no” and 13% said “yes”. This table displays the quantitative data from the “Used marijuana with last alcohol drink in the past year (2016)?” variable in the NSDUH and has two categories or answer options. “Used marijuana with last alcohol drink in the past year” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
Not easy	81%	70%	80%	64%
Easy	19%	30%	20%	36%
Total	100%	100%	100%	100%

Chart 52: Difficult to obtain heroin... How difficult is it to obtain heroin? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “How difficult is it to obtain heroin” for all urban female users, 19% said “easy” and 81% said “not easy”. For rural female users 64% said “not easy” and 36% said “easy”. This table displays the quantitative data from the “How difficult is it to obtain heroin?” variable in the NSDUH and has two categories or answer options. “How difficult is it to obtain heroin” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
--	------	-----	-----	----

No	95%	92%	96%	100%
Yes	5%	8%	4%	0%
Total	100%	100%	100%	100%

Chart 53: Received treatment in prison or jail... Received treatment in prison or jail in the past year? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Received treatment in prison or jail in the past year (2016)" for all urban female users, 5% said "yes" and 95% said "no" "For rural female users 0% said "yes" and 100% said "no". This table displays the quantitative data from the "Received treatment in prison or jail in the past year (2016)?" variable in the NSDUH and has two categories or answer options. "Received treatment in prison or jail in the past year" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	73%	69%	72%	59%
Yes	27%	31%	28%	41%
Total	100%	100%	100%	100%

Chart 54: Received treatment in private doctor's office... Received treatment in private doctor's office in the past year? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Received treatment in private doctor's office in the past year (2016)" for all urban female users, 27% said "yes" and 73% said "no" "For rural female users 41% said "yes" and 59% said "no". This table displays the quantitative data from the "Received treatment in private doctor's office in the past year (2016)?" variable in the NSDUH and has two categories or answer options. "Received treatment in private doctor's office in the past year" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	82%	84%	80%	80%
Yes	18%	16%	20%	20%
Total	100%	100%	100%	100%

Chart 55: Ever told you had heart condition... Ever told you had heart condition? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Ever told you had heart condition" for all urban female users, 18% said "yes" and 82% said "no" "For rural female users 20% said "yes" and 80% said "no". This table displays the quantitative data from the "Ever told you had heart condition" variable in the NSDUH and has two categories or answer options. "Ever told you had heart condition" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	79%	85%	77%	76%
Yes	21%	15%	23%	24%
Total	100%	100%	100%	100%

Chart 56: Ever told you had sugar diabetes... Ever told you had sugar diabetes? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Ever told you had sugar diabetes" for all urban female users, 21% said "yes" and 79% said "no" "For rural female users 24% said "yes" and 76% said "no". This table displays the quantitative data from

the “Ever told you had sugar diabetes” variable in the NSDUH and has two categories or answer options. “Ever told you had sugar diabetes” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	34%	12%	29%	0%
Yes	66%	88%	71%	100%
Total	100%	100%	100%	100%

Chart 57: Emotional problems kept you from leaving the house... Emotional problems kept you from leaving the house? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Emotional problems kept you from leaving the house” for all urban female users, 66% said “yes” and 34% said “no “For rural female users 100% said “yes” and 0% said “no”. This table displays the quantitative data from the “Emotional problems kept you from leaving the house” variable in the NSDUH and has two categories or answer options. “Emotional problems kept you from leaving the house” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	79%	71%	77%	58%
Yes	21%	29%	23%	42%
Total	100%	100%	100%	100%

Chart 58: Medicaid coverage...Do you have Medicaid health insurance coverage? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Do you have Medicaid health insurance coverage” for all urban female users, 21% said “yes” and 79% said “no “For rural female users 42% said “yes” and 58% said “no”. This table displays the quantitative data from the “Do you have Medicaid health insurance coverage” variable in the NSDUH and has two categories or answer options. “Do you have Medicaid health insurance coverage” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	36%	43%	39%	57%
Yes	64%	57%	61%	43%
Total	100%	100%	100%	100%

Chart 59: Private health insurance Do you have Private health insurance coverage? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Do you have Private health insurance coverage” for all urban female users, 64% said “yes” and 36% said “no “For rural female users 43% said “yes” and 57% said “no”. This table displays the quantitative data from the “Do you have Private health insurance coverage” variable in the NSDUH and has two categories or answer options. “Do you have Private health insurance coverage” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
18-25	31%	41%	29%	45%
26-34	20%	27%	19%	22%

35-49	28%	22%	26%	25%
50-64	12%	8%	14%	5%
65+	9%	2%	12%	3%
Total	100%	100%	100%	100%

Chart 60: Age of adult female respondents... Age of adult female respondents? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Age of adult female respondents" for all urban female users, 31% said "18-25 years old", 20% said "26-34 years old", 28% said "35-49 years old", 12% said "50-64 years old" and 9% said "65 years or older". For rural female users 45% said "18-25 years old", 22% said "26-34 years old", 25% said "35-49 years old", 5% said "50-64 years old", and 3% said "65 years or older". This table displays the quantitative data from the "Age of adult female respondents" variable in the NSDUH and has five categories or answer options. "Age of adult female respondents" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	99%	98%	100%	98%
Yes	1%	2%	0%	2%
Total	100%	100%	100%	100%

Chart 61: Cocaine with last alcohol drink... Did you have Cocaine with your last alcohol drink? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Did you have Cocaine with your last alcohol drink" for all urban female users, 1% said "yes" and 99% said "no" "For rural female users 2% said "yes" and 98% said "no". This table displays the quantitative data from the "Did you have Cocaine with your last alcohol drink" variable in the NSDUH and has two categories or answer options. "Did you have Cocaine with your last alcohol drink" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRO	RO
No	98%	99%
Yes	2%	1%
Total	100%	100%

Chart 62: Heroin with last alcohol drink... Heroin with last alcohol drink? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Heroin with last alcohol drink" for all urban female users, 2% said "yes" and 98% said "no" "For rural female users 1% said "yes" and 99% said "no". This table displays the quantitative data from the "Heroin with last alcohol drink" variable in the NSDUH and has two categories or answer options. "Heroin with last alcohol drink" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
Not easy	80%	73%	78%	69%
Easy	20%	27%	22%	31%
Total	100%	100%	100%	100%

Chart 63: How difficult is it to obtain crack... How difficult is it to obtain crack? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "How difficult

is it to obtain crack” for all urban female users, 20% said “it’s easy” and 80% said “not easy”. For rural female users 31% said “easy” and 69% said “not easy”. This table displays the quantitative data from the “How difficult is it to obtain crack” variable in the NSDUH and has two categories or answer options. “How difficult is it to obtain crack” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	98%	94%	98%	91%
Yes	2%	6%	2%	9%
Total	100%	100%	100%	100%

Chart 64: Probation...Are you on probation during this year (2016)? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Are you on probation during this year (2016)” for all urban female users, 2% said “yes” and 98% said “no” For rural female users 9% said “yes” and 91% said “no”. This table displays the quantitative data from the “Are you on probation during this year (2016)” variable in the NSDUH and has two categories or answer options. “Are you on probation during this year (2016)” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	62%	69%	58%	68%
Yes	38%	31%	42%	32%
Total	100%	100%	100%	100%

Chart 65: Ever told you had high blood pressure... Ever told you had high blood pressure? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Ever told you had high blood pressure” for all urban female users, 38% said “yes” and 62% said “no” For rural female users 32% said “yes” and 68% said “no”. This table displays the quantitative data from the “Ever told you had high blood pressure” variable in the NSDUH and has two categories or answer options. “Ever told you had high blood pressure” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	86%	79%	86%	74%
Yes	14%	21%	14%	26%
Total	100%	100%	100%	100%

Chart 66: Ever tried to kill yourself in the past year... Ever tried to kill yourself in the past year (2016)? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Ever tried to kill yourself in the past year (2016)” for all urban female users, 14% said “yes” and 86% said “no” For rural female users 26% said “yes” and 74% said “no”. This table displays the quantitative data from the “Ever tried to kill yourself in the past year (2016)” variable in the NSDUH and has two categories or answer options. “Ever tried to kill yourself in the past year (2016)” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	97%	97%	96%	96%
Yes	3%	3%	4%	4%
Total	100%	100%	100%	100%

Chart 67: Serious difficulty hearing... Serious difficulty hearing? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Serious difficulty hearing" for all urban female users, 3% said "yes" and 97% said "no" "For rural female users 4% said "yes" and 96% said "no". This table displays the quantitative data from the "Serious difficulty hearing" variable in the NSDUH and has two categories or answer options. "Serious difficulty hearing" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	96%	93%	95%	93%
Yes	4%	7%	5%	7%
Total	100%	100%	100%	100%

Chart 68: Serious difficulty seeing... Serious difficulty seeing? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Serious difficulty seeing" for all urban female users, 4% said "yes" and 96% said "no" "For rural female users 7% said "yes" and 93% said "no". This table displays the quantitative data from the "Serious difficulty seeing" variable in the NSDUH and has two categories or answer options. "Serious difficulty seeing" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	92%	77%	90%	76%
Yes	8%	23%	10%	24%
Total	100%	100%	100%	100%

Chart 69: Serious difficulty remembering or concentrating... Serious difficulty remembering or concentrating? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: Serious difficulty remembering or concentrating "" for all urban female users, 8% said "yes" and 92% said "no" "For rural female users 24% said "yes" and 76% said "no". This table displays the quantitative data from the "Serious difficulty remembering or concentrating" variable in the NSDUH and has two categories or answer options. "Serious difficulty remembering or concentrating" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	92%	77%	90%	76%
Yes	8%	23%	10%	24%
Total	100%	100%	100%	100%

Chart 70: Serious difficulty walking or climbing... Serious difficulty walking or climbing? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Serious difficulty walking or climbing" for all urban female users, 8% said "yes" and 92% said "no" "For rural female users 24% said "yes" and 76% said "no". This table displays the quantitative data from the "Serious difficulty walking or climbing" variable in the NSDUH and

has two categories or answer options. “Serious difficulty walking or climbing” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	98%	97%	98%	96%
Yes	2%	3%	2%	4%
Total	100%	100%	100%	100%

Chart 71: Serious difficulty dressing or bathing... Serious difficulty dressing or bathing? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Serious difficulty dressing or bathing” for all urban female users, 2% said “yes” and 98% said “no” “For rural female users 4% said “yes” and 96% said “no”. This table displays the quantitative data from the “Serious difficulty dressing or bathing” variable in the NSDUH and has two categories or answer options. “Serious difficulty dressing or bathing” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	95%	88%	93%	87%
Yes	5%	12%	7%	13%
Total	100%	100%	100%	100%

Chart 72: Serious difficulty doing errands alone...Serious difficulty doing errands alone? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “: Serious difficulty doing errands alone” for all urban female users, 5% said “yes” and 95% said “no” “For rural female users 13% said “yes” and 87% said “no”. This table displays the quantitative data from the “Serious difficulty doing errands alone” variable in the NSDUH and has two categories or answer options. “Serious difficulty doing errands alone” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
One	11%	9%	11%	9%
Two	27%	30%	30%	29%
Three	21%	21%	22%	21%
Four	21%	19%	19%	19%
Five	11%	12%	10%	12%
Six+	9%	9%	8%	10%
Total	100%	100%	100%	100%

Chart 73: Number of persons in HH... Number of persons in the household? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Number of persons in the household” for all urban female users, 11% said “one”, 27% said “two”, 21% said “three”, 21% said “four”, 11% said “five”, and 9% said “six or more”. For rural female users 9% said “one”, 29% said “two”, 21% said “three”, 19% said “four”, 12% said “five”, and 10% said “six or more”. This table displays the quantitative data from the “Number of persons in the household” variable in the NSDUH and has six categories or answer options. “Number of persons in the household” column represents all the adult females (22,772) in the survey. NRNO

is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
Zero	52%	55%	54%	51%
One	21%	18%	19%	20%
Two	17%	16%	15%	15%
Three+	11%	11%	12%	14%
Total	100%	100%	100%	100%

Chart 74: Number of children in HH under 18 years old... “Number of children in the household” for all urban female users, 52% said “zero”, 21% said “one”, 17% said “two”, 11% said “three or more”. For rural female users 51% said “zero”, 20% said “one”, 15% said “two”, 14% said “three or more”. This table displays the quantitative data from the “Number of children in the household” variable in the NSDUH and has four categories or answer options. “Number of persons in the household” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
Zero	84%	92%	83%	89%
One	10%	7%	11%	7%
Two+	6%	1%	6%	4%
Total	100%	100%	100%	100%

Chart 75: Number of persons in HH over 65 years old... Number of persons in HH over 65 years old? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Number of persons in HH over 65 years old” for all urban female users, 84% said “zero”, 10% said “one”, and 6% said “two or more”. For rural female users 89% said “zero”, 7% said “one”, and 4% said “two or more”. This table displays the quantitative data from the “Number of persons in HH over 65 years old” variable in the NSDUH and has three categories or answer options. “Number of persons in HH over 65 years old” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	93%	91%	94%	91%
Yes	7%	9%	6%	9%
Total	100%	100%	100%	100%

Chart 76: Was the interview too long... Was the interview too long? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Was the interview too long” for all urban female users, 7% said “yes” and 93% said “no” “For rural female users 9% said “yes” and 91% said “no”. This table displays the quantitative data from the “Was the interview too long” variable in the NSDUH and has two categories or answer options. “Was the interview too long” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	95%	96%	95%	99%

Yes	5%	4%	5%	1%
Total	100%	100%	100%	100%

Chart 77: Was the interview hard to understand... Was the interview hard to understand? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Was the interview hard to understand" for all urban female users, 5% said "yes" and 95% said "no" For rural female users 1% said "yes" and 99% said "no". This table displays the quantitative data from the "Was the interview hard to understand" variable in the NSDUH and has two categories or answer options. "Was the interview hard to understand" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
Never	59%	29%	59%	30%
Sometimes	39%	64%	40%	67%
Always	2%	7%	1%	3%
Total	100%	100%	100%	100%

Chart 78: Do you enjoy engaging in risky behaviors... Do you enjoy engaging in risky behaviors? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Do you enjoy engaging in risky behaviors" for all urban female users, 59% said "never", 39% said "sometimes", and 2% said "always". For rural female users 30% said "never", 67% said "sometimes", and 3% said "always". This table displays the quantitative data from the "Do you enjoy engaging in risky behaviors" variable in the NSDUH and has three categories or answer options. "Do you enjoy engaging in risky behaviors" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	89%	95%	85%	93%
Yes	11%	5%	15%	7%
Total	100%	100%	100%	100%

Chart 79: Are you covered by Medicare... Are you covered by Medicare? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Are you covered by Medicare" for all urban female users, 11% said "yes" and 89% said "no" For rural female users 7% said "yes" and 93% said "no". This table displays the quantitative data from the "Are you covered by Medicare" variable in the NSDUH and has two categories or answer options. "Are you covered by Medicare" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
No	20%	24%	18%	21%
Yes	80%	76%	82%	79%
Total	100%	100%	100%	100%

Chart 80: Does your job have a written drug policy... Does your job have a written drug policy? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Does your job have a written drug policy" for all urban female users, 80% said "yes" and 20% said "no" For rural female users 79% said "yes" and 21% said "no". This table displays the

quantitative data from the “Does your job have a written drug policy” variable in the NSDUH and has two categories or answer options. “Does your job have a written drug policy” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. $P < 0.05$.

	NRNO	NRO	RNO	RO
No	93%	91%	91%	90%
Yes	7%	9%	9%	10%
Total	100%	100%	100%	100%

Chart 81: Family or respondent receives SSI... Family or respondent receives SSI? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Family or respondent receives SSI” for all urban female users, 7% said “yes” and 93% said “no” “For rural female users 10% said “yes” and 90% said “no”. This table displays the quantitative data from the “Family or respondent receives SSI” variable in the NSDUH and has two categories or answer options. “Family or respondent receives SSI” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. $P < 0.05$.

	NRNO	NRO	RNO	RO
No	80%	70%	78%	59%
Yes	20%	30%	22%	41%
Total	100%	100%	100%	100%

Chart 82: Family or respondent receives food stamps... Family or respondent receives food stamps? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Family or respondent receives food stamps” for all urban female users, 20% said “yes” and 80% said “no” “For rural female users 41% said “yes” and 59% said “no”. This table displays the quantitative data from the “Family or respondent receives food stamps” variable in the NSDUH and has two categories or answer options. “Family or respondent receives food stamps” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. $P < 0.05$.

	NRNO	NRO	RNO	RO
SD	30%	43%	29%	39%
D	40%	37%	38%	43%
A	20%	14%	23%	14%
SA	10%	6%	10%	4%
Total	100%	100%	100%	100%

Chart 83: Friends share religious beliefs is important... Friends share religious beliefs is important? P-value = .000 (alpha = .05). The following percent’s are for the overall adult female population: “Friends share religious beliefs is important” for all urban female users, 30% said “strongly disagree” and 40% said “disagree”, 20% said “agree”, and 10% said “strongly agree”. For rural female users 39% said “strongly disagree”, 43% said “disagree”, 14% said “agree”, and 4% said “strongly agree”. This table displays the quantitative data from the “Friends share religious beliefs is important” variable in the NSDUH and has four categories or answer options. “Friends share religious beliefs is important” column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. $P < 0.05$.

	NRNO	NRO	RNO	RO
SD	16%	27%	16%	29%
D	17%	22%	14%	18%
A	35%	33%	36%	36%
SA	32%	18%	34%	17%
Total	100%	100%	100%	100%

Chart 84: Religion influences your decisions... Religion influences your decision? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Religion influences your decision" for all urban female users, 16% said "strongly disagree" and 17% said "disagree", 35% said "agree", and 32% said "strongly agree". For rural female users 29% said "strongly disagree", 18% said "disagree", 36% said "agree", and 17% said "strongly agree". This table displays the quantitative data from the "Religion influences your decision" variable in the NSDUH and has four categories or answer options. "Religion influences your decision" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

	NRNO	NRO	RNO	RO
Married	41%	27%	45%	27%
Widowed	4%	2%	5%	1%
Divorced	13%	14%	14%	20%
Never married/single	42%	57%	36%	52%
Total	100%	100%	100%	100%

Chart 85: Marital status... Marital status? P-value = .000 (alpha = .05). The following percent's are for the overall adult female population: "Marital status" for all urban female users, 41% said "married" and 4% said "widowed", 13% said "divorced", and 42% said "single". For rural female users 27% said "married" and 1% said "widowed", 20% said "divorced", and 52% said "single". This table displays the quantitative data from the "Marital status" variable in the NSDUH and has four categories or answer options. "Marital status" column represents all the adult females (22,772) in the survey. NRNO is the urban and non-opioid group (control group), NRO is the urban opioid users, RNO is the rural non-opioid group, and RO is the rural opioid users. P<0.05.

Works Cited

- Bateman, B. T., Cole, N. M., Madea, A., Burns, S. M., Houle, T. T., Huybrechts, K. F., & Landau, R. (2017). Patterns of Opioid Prescription and Use After Cesarean Delivery. *Obstetrics and Gynecology*, *130*(1), 29-35.
- Bateman, B. T., Cole, N. M., Maeda, A., Burns, S. M., Houle, T. T., Huybrechts, K. F., . . . Landau, R. (2017, July). Patterns of Opioid Prescription and Use After Cesarean Delivery. *Obstetrics and Gynecology*, *130*(1), 29-35.
- Bostock, J., Plumpton, M., & Pratt, R. (2009). Domestic Violence Against Women: Understanding Social Processes and Women's Experiences. *Journal of Community & Applied Social Psychology*, *19*, 95-110.
- Bruneau, J., Ahamad, K., Goyer, M. E., Poulin, G., Selby, P., Fischer, B., & Wood, E. (2018). Management of opioid use disorders: a national clinical practice guideline. *Vulnerable Population*, *190*(5), 47-57.
- Centers for Disease Control and Prevention. (2013, July). *Prescription Painkiller Overdoses*. Retrieved from CDC Vital Signs: <http://www.cdc.gov/vitalsigns/prescriptionpainkilleroverdoses/index.html>
- Centers for Disease Control and Prevention. (2014). *CDC*. Retrieved from WONDER: <http://www.cdc.gov/drugoverdose/data/overdose.html>
- Centers for Disease Control and Prevention. (2016, March). *CDC*. Retrieved from Opioid Overdose: <https://www.cdc.gov/drugoverdose/opioids/index.html>
- Cicero, T., Ellis, M., & Surratt, H. (2014). The changing face of heroin use in the United States. *JAMA*, 821-826.
- Cooper, H. L., Clark, C. D., Barham, T., Embry, V., Caruso, B., & Comfrot, M. (2014). "He Was the Story of My Drug Use Life": A Longitudinal Qualitative Study of the Impact of Partner Incarceration on Substance Misuse Patterns Among African American Women. *Substance Use & Misuse*(49), 176-188.
- Cooper, H. L., Clark, C. D., Barham, T., Embry, V., Caruso, B., & Comfrot, M. (49). "He Was the Story of My Drug Use Life": A Longitudinal Qualitative Study of the Impact of Partner Incarceration on Substance Misuse Patterns Among African American Women. *Substance Use & Misuse*, 176-188.
- Drugs and Morphine Text. (2018, December 4). *Opium, Morphine and Heroin*. Retrieved from [ch.ic.ac.uk](https://www.ch.ic.ac.uk/rzepa/mim/drugs/html/morphine_text.htm): https://www.ch.ic.ac.uk/rzepa/mim/drugs/html/morphine_text.htm
- Frank, J. W., Susan, C. L., Ingrid, B. A., Brenner, L. A., & Levy, C. (2015). Non-medical use of prescription pain medications and increased emergency department utilization. *Drug and Alcohol Dependence*.
- Havens, J. R., & Young, A. M. (2011). Transition from First Illicit Drug Use to First Injection Drug Use Among Rural Appalachian Drug Users: A Cross-sectional Comparison and Retrospective Survival Analysis. *Society for the Study of Addiction*, *107*, 587-596.
- Hiroi, N., & Agatsuma, S. (2004). Genetic susceptibility to substance dependence. *Molecular Psychiatry*.
- Hiroi, N., & Agatsuma, S. (2004). Genetic susceptibility to substance dependence. *Molecular Psychiatry*.
- Jones, M. (2014). The paradox of Decreasing Nonmedical Opioid Analgesic use and Increasing Abuse or Dependence. *MMWR*.
- Jones, M. (2015). Demographic and Substance Use Trends Among Heroin Users. *MMWR*, *64*, 26.

- Kilaru, A. S., Gadsden, S. M., Perrone, J., Paciotti, B., Barg, F. K., & Meisel, Z. F. (2014). How Do Physicians Adopt and Apply Opioid Prescription Guidelines in the Emergency Department? A Qualitative Study. *Annals of Emergency Medicine*, 64(5), 482-489.
- Kilaru, A. S., Gadsden, S. M., Perrone, J., Paciotti, B., Barg, F. K., & Meisel, Z. F. (2014). How Do Physicians Adopt and Apply Opioid Prescription Guidelines in the Emergency Department? A Qualitative Study. *Annals of Emergency Medicine*, 64(5), 482-489.
- Lander, L. R., Marshalek, P., Yitayew, M., Ford, D., Sullivan, C. R., & Gurka, K. K. (2010). Healthcare Disparities: Challenges and Solutions for the Pregnant Opioid-dependent Population. *Rural Healthcare Disparities: Challenges and Solutions*, 109, 22-27.
- Lee, C. W.-S., & Ho, I. K. (2013). Sex differences in opioid analgesia and addiction: interactions among opioid receptors and estrogen receptors. *Molecular Pain*, 35-45.
- Marsh, J. C., Park, K., Lin, Y.-A., & Bersamira, C. (2018). Gender differences in trends for heroin use and nonmedical prescription opioid use. *Journal of Substance Abuse Treatment*.
- Massey, S. H., Compton, M. T., & Kaslow, N. J. (2014). Attachment Security and Problematic Substance Use in Low-Income, Suicidal, African American Women. *The American Journal on Addictions*, 294-299.
- Mir, A. M., David, D., & Hedden, S. L. (2016). The Relationship between parental mental illness and/or substance use disorder on adolescent sud. *Addictive Behaviors*.
- Nguyen, H., & Reuter, P. (2012). How risky is Marijuana Possession? Considering the role of age, race, and gender. *Crime and Delinquency*.
- Peeler, M., Fiscella, K., Terplan, M., & Surfrin, C. (2019). Best Practices for Pregnant Incarcerated Women with Opioid Use Disorder. *Journal of Correctional Health Care*, 25(1), 4-14.
- Petrosyan, Y. (2018, December). Assessing Research Protocols: Mixed Methods Research. *Methods Workshop for the Ministry of Health and Long-Term Care*.
- Quinones, S. (2015). *Dreamland: The True Tales of America's Opiate Epidemic*. Berryville, Virginia, USA: Bloomsbury Press.
- Rudd, R. A. (2016). Increases in Drug and Opioid-Involved Overdose Deaths. *MMWR Morb Mortal Wkly Rep*, 65.
- SAMHSA. (2017, October 1). *Substance Abuse and Mental Health Service Administration*. Retrieved from National Survey of Drug Use and Health: <https://nsduhweb.rti.org/respweb/homepage.cfm>
- Siddiqi, S., Verney, C., Dargan, P., & Wood, D. M. (2015, October 28). Understanding the Availability, Prevalence of Use, Desired Effects, Acute Toxicity and Dependence Potential of the Novel Opioid MT-45. *Clinical Toxicology*, 53(1), 54-59.
- Staton, M., Ciciurkaite, G., Havens, J., Tillson, M., Leukefeld, C., Webster, M., & Peet, B. (2018). Correlates of Injection Drug Use Among Rural Appalachian Women. *The Journal of Rural Health*, 34(1), 31-41.
- Staton, M., Ciciurkaite, G., Havens, J., Tillson, M., Leukefeld, C., Webster, M., . . . Peeteet, B. (2018). Correlates of Injection Drug Use Among Rural Appalachian Women. *The Journal of Rural Health*, 34(1), 31-41.
- Strand, G. W., Skurtveit, S., Jansson, L. M., Bakstad, B., Bjarko, L., & Ravandal, E. (2013). Breastfeeding reduces the need for withdrawal treatment in opioid-exposed. *ACTA Paediatrica Nursing the Child*, 1060-1066.

- Strickland, J. C. (2017, July 11). Hepatitis C antibody reactivity among high-risk rural women: opportunities for services and treatment in the criminal justice system. *International Journal of Prisoner Health*, 14(2), 89-100.
- Strickland, J. C. (2017, July 11). Hepatitis C antibody reactivity among high-risk rural women: opportunities for services and treatment in the criminal justice system. *International Journal of Prisoner Health*, 14(2), 89-100.
- Surrat, H. L., Stanton, M., Leukefeld, C. G., Oser, C. B., & Webster, J. M. (2018, December 21). Patterns of buprenorphine use and risk for re-arrest among highly vulnerable opioid-involved women released from jails in rural Appalachia. *Journal of Addictive Diseases*.
- Surrat, H. L., Staton, M., Leukefeld, C. G., Oser, C. B., & Webster, J. M. (2018, December 21). Patterns of buprenorphine use and risk for re-arrest among highly vulnerable opioid-involved women released from jails in rural Appalachia. *Journal of Addictive Diseases*.
- Terplan, M., Longinaker, N., & Appel, L. (2015, November 1). Women-centered Drug Treatment Services and Needs in the US. *American Journal of Public Health*, 105(11), 50-54.
- U.S. Department of Health and Human Services. (2015, March 26). *HHS Takes Strong Steps to Address Opioid-Drug Related Overdose, Death and Dependence*. Retrieved from Death and Dependence: <http://www.hhs.gov/about/news/2015/03/26/hhs-takes-strong-steps-to-address-opioid-drug-relatedoverdose-death-and-dependence.html>
- Wunsch, M. J., Nakamoto, K., Behonick, G., & Massello, W. (2009). Opioid Deaths in Rural Virginia: A Description of the High Prevalence of Accidental Fatalities Involving Prescribed Medications. *The American Journal on Addictions*, 18, 5-14.