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People, Places and Stigma Management: A Qualitative Study Exploring the Overdose Risk Environment in Rural Kentucky

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An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
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ABSTRACT

Background: The opioid epidemic has become a significant public health crisis, as opioid-related mortality rates have increased over the last two decades. Kentucky, a predominately rural state, has been dramatically affected by the epidemic. Rural environments differ from urban environments in multiple ways, including differences in infrastructure, attitudes, norms, social networks and characteristics of the places where drug-related behaviors and potential harms take place. Therefore, in order to improve understanding of opioid use in rural contexts, the "Risk Environment Framework" by Tim Rhodes was used to investigate the places where people use opioids and how features of those places affect vulnerability to an overdose occurring or an overdose becoming fatal. Additionally, Erving Goffman's ideas related to stigma management were incorporated into the discussion to further understanding of the phenomena.

Methods: Young adult opioid users, between 18 and 35 years old, were recruited using multiple strategies, including through recruitment by stakeholders, cookouts, flyers, walkabouts, and peer recruitment (Respondent-Driven Sampling [RDS]). Nineteen 1-on-1 semi-structured interviews were performed with the target population in order to develop an emic understanding of people who use opioids (PWUO) and the contexts in which they use drugs. The current investigation used a subset of the data collected, focusing on domains related to overdose and the overdose risk environment. Data were analyzed using grounded theory methods outlined by Strauss & Corbin (1998).

Results: The most salient settings that emerged, as places where people use opioids were homes, public bathrooms, cars or vehicles, outdoor spaces and places of drug dealing. Among the 19 participants, nine had either overdosed themselves (N=3) or knew someone who had overdosed.

Strategies discussed by participants that decreased vulnerability to overdose included using small amounts of opioids, avoiding polysubstance use, and not rushing the injection process. Vulnerability to dying from an overdose was related to receiving delayed medical attention, which occurred when a PWUO was not identified as overdosing or when they were identified, but medical attention was delayed or denied. Lack of identification occurred most often in examples where PWUO were using alone or were hidden behind a barrier that prevented others from recognizing that they were overdosing.

Conclusions: Stigmatization of drug use, particularly injection drug use, frequently arose across all participants. In order to mitigate feelings of shame and stigma, PWUO engaged in concealment strategies to manage their different selves or social roles. While these strategies decreased stigma and managed identity, they were at odds with safe injection practices meant to protect PWUO from an overdose.

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Chapter 1

Introduction and Rationale

The Opioid Epidemic: A Public Health Crisis

The opioid epidemic has become a major public health crisis, as opioid-related mortality rates have increased over the last two decades (Mack et. al., 2017; Rigg et. al., 2018; Webster, 2017). From 2001 to 2017, the cost of the epidemic is estimated to have exceeded $1 trillion and is projected to cost an additional $500 billion by 2020 (Altarum, 2018). Misuse of opioids is associated with many problems, including the risk of opioid-related overdose (Dunn et. al, 2016) and the most recent statistics estimate that 130 people die every day because of an opiate overdose (CDC/NCHS, 2018). Due to the high mortality, morbidity and economic cost of lives lost due to opioids, research has been focused to understand the issue.

Overdose Deaths in Kentucky

Kentucky (KY), a predominately rural state, has been greatly impacted by the opioid epidemic. Kentucky has an opioid overdose rate of 23.6 deaths per 100,000 making it one of the top states for opiate overdoses. Further, its opioid overdose rate is double that of the national rate of 13.3 per 100,000 (NIDA, 2018). This rate has increased over time from 1.3 per 100,000 in 1999 to 14.1 in 100,000 in 2010 and finally 23.6 per 100,000 in 2016 (NIDA, 2018). In 2017, autopsied and toxicology reports from coroners showed a decrease in deaths involving heroin, from 34 percent in 2016 to 22 percent in 2017 (KY OD data, 2017). This is in contrast to a six percent increase from 2015 to 2016, from 28 percent to 34 percent (KY OD data, 2016). Fentanyl, however, was involved in 763 overdose deaths, accounting for 52 percent of all deaths

(KY OD data, 2017), a 5 percent increase from 2016 and an 18 percent increase from 2015 (47 percent and 34 percent respectively) (KY OD data, 2016).

Factors unique to rural areas contribute to the higher prevalence of opioid-related mortality (Rigg et. al., 2018). Much of the research has been focused on urban areas, and therefore while much is known about urban-rural differences, less is known about the rural risk environment, specifically surrounding overdose. There is a dire need to explore the rural risk environment and tailor interventions for these areas to slow the increasing rates of mortality.

Formal Statement of Problem

The purpose of this qualitative study is to identify features of the rural risk environment surrounding overdose, and understand how these features impact people who use opioids' (PWUOs') ability to employ strategies to reduce the risk of an overdose occurring as well as the risk of an overdose becoming fatal in the following five counties in eastern Kentucky: Rowan, Bath, Menifee, Morgan, and Elliot.

Specifically, the study aims to discern which features of the risk environment confer the greatest vulnerabilities and, using grounded theory methodology, inductively discover a unifying grounded theory that begins to explain and predict these outcomes.

Theoretical framework

The Risk Environment Framework (REF)

The risk environment framework (REF) is a theoretical framework proposed by Tim Rhodes that seeks to explain how contexts influence drug-related harms (Rhodes 2002). This framework is useful for understanding and reducing drug-related harms while de-emphasizing

individual-level blame and individual behavior (Rhodes 2002; Rhodes 2009; Cooper et. al., 2014) and realizing that societal conditions beyond individuals' control can affect their health, including sociocultural, political, and environmental influences on health (Rhodes 2002; Sun 2014; Link 1995). This allows researchers to understand the contexts and upstream influences in which the behaviors are occurring and analyze how those contexts shape health behaviors and relative harm (Rhodes 2002; Sun 2014).

There are two key dimensions to consider when discussing the risk environment framework. One is the ***type*** of environmental influence and the other is the ***level*** of environmental influence. There are three levels to the risk environment: the micro, meso- and macro- level and REF conceptualizes the environment as having five types or influences: physical, social, economic, policy, and healthcare/criminal justice interventions (Rhodes 2002). These various environments also interact within and across micro-, meso-, and macro-levels to increase or decrease the likelihood of harm and injury (Rhodes 2002; Rhodes 2009).

Erving Goffman and Management of Stigma and Identity

As the qualitative analysis progressed and the theory of the study was developed, it became clear that the theory that arose was related to work done by sociologists such as Erving Goffman around identify management, specifically around stigma, and the various ways that individuals attempt to manage their stigmas and stigma symbols (Goffman, 1963). Thus, Goffman's ideas about stigma management were incorporated into the analysis and discussion to further understanding of the phenomena and place the findings in a complementary context that gave insight into why and how the rural risk environments augmented vulnerability to overdose and dying from an overdose as well as why PWUO sought out certain settings, physical and social.

Purpose statement

The purpose of this qualitative was to analyze 1-on-1 interviews with young adult opioid users from rural eastern Kentucky using a grounded theory methodology. The grounded theory approach is an iterative process involving multiple revisions and recoding. These systematic inductive methods are aimed toward theory development in order to understand a phenomenon (Strauss & Corbin, 1998), for the present study the phenomenon in question is the rural risk environment and how it influences overdose risk and the risk of dying from an overdose.

Research question

Therefore the research question is, "What are the features of the risk environment that affect vulnerability to an overdose (OD) and/or dying of an OD among people who use opioids (PWUO) in rural areas, like Kentucky?"

Significance statement

The opioid epidemic has become a major public health crisis as opioid-related mortality rates have increased over the last two decades (Mack et. al., 2017; Rigg et. al., 2018; Schranz et. al, N.D). Kentucky (KY), a predominately rural state, has been greatly impacted by the opioid epidemic and ranks within the top five states for accidental drug overdose (NCHS). There is research that details the differences between rural and urban drug-taking behaviors, however, no investigations go beyond network level factors to examine what the actual risk environment in rural areas are and how these in turn impact drug-related harms and outcomes. To date, no qualitative or quantitative studies have attempted to elucidate the rural risk environment for overdose and how the various levels and types of environment interact to affect vulnerability to overdose and/or dying of an overdose.

There are substantial differences in the contexts, demographics, drug-taking behaviors and infrastructure between urban and rural areas. These differences make it reckless and impossible to generalize findings from urban areas to rural settings. Thus, research must look squarely at rural contexts in order to elucidate and further understand the behaviors but more importantly the nature of the risk environment in rural areas.

Due to the gap in the literature, this study will significantly add to rural risk environment literature by giving greater insight into (1) the places where people who use opioids (PWUO) go to inject drugs in rural areas; (2) the features of these places and (3) and finally how they influence vulnerability to an overdose and/or vulnerability of an overdose becoming fatal. This data can be used to better understand rural versus urban differences in opioid use and overdose and these findings can be used tailor education and interventions to be more effective for rural areas.

Chapter 2

Literature Review

Rise of the Opioid Epidemic: Misrepresented Data and Pharmaceutical Marketing

In 1980, the *New England Journal of Medicine* published a brief, five-sentence letter to the editor discussing the incidence of narcotic addiction among hospitalized patients from Boston University Medical Center. Based on tens of thousands of hospitalized patients that were given narcotics, only four were found to have "reasonably well documented addiction" (Porter & Jick, 1980; Quinones, 2015). The letter concluded by asserting that addiction was rare in medical patients with no prior history of addiction (Porter & Jick, 1980). This letter received little attention until 1986, when Dr. Russell Portenoy and Kathy Foley cited it in their paper, "Chronic use of opioid analgesics in non-malignant pain: report of 38 cases" published in the Journal of the International Association for the Study of Pain (Quinones, 2015; Kolodny et. al., 2015). In their paper they reviewed the treatment of 38 chronic pain patients who used opioids, and concluded patients with no history of substance use disorder could safely be prescribed opioid pain relievers (OPRs) on a long-term basis (Portenoy & Foley 1986). These papers were later used to justify and suggest that opioids had a low abuse potential when prescribed for medical purposes such as in cases of chronic non-cancer pain (Quinones, 2015; Kolodny et. al., 2015). These and future studies failed to taken into account crucial methodological and situational details, for example, that the patients analyzed were only administered small doses of narcotics (Quinones, 2015; Hawkins 2017).

The 1980 letter to the editor and 1986 study lead to a shift in opioid prescribing practices among physicians that was perpetuated by pharmaceutical companies' reassurance of their safety

and successful marketing campaigns (Kolodny et. al., 2015; Quinones, 2015). Pain was pushed to be viewed as "the 5th vital sign" that required measurement during routine physician visits (Quinones, 2015; Kolodny et. al., 2015). Manufacturer Purdue Pharma spent $200 million on marketing in one year promoting OxyCotin as a drug that was less likely to be abused or cause dependence than other opioid analgesics; included in this marketing was the targeting of primary care physicians who were less likely to be trained in pain management or addiction (Van Zee, 2009). As a result of these shifts in practice, opinion, and strong marketing, prescribing practices increased, so much so that from 1999 to 2011, consumption of hydrocodone more than doubled and consumption of oxycodone increased by nearly 500% (Jones 2013; Quinones, 2015; Kolodny et. al., 2015).

Table 1. Definitions of important terms

Term	**Definition**
Drugs of Abuse and related treatments	
Buprenorphine	Derivative of the opioid alkaloid thebaine, opioid used to treat opioid use disorder, acute and chronic pain.
Fentanyl	A synthetic opioid that is 80-100 times stronger than morphine.
Heroin	An opioid drug processed from morphine and extracted from certain poppy plants. Heroin comes in a white or brownish powder or a black sticky substance known as "black tar heroin".
Hydrocodone	The generic name for a synthetic opioid used to treat severe pain. Sold under the brand names Norco, Hycet, and Vicodin.
Methadone	Synthetic opioid used for detoxification and maintenance of opioid use disorder and as a pain reliever for moderate to severe pain.

Methamphetamine	A stimulant that speeds up the body's system that comes as a pill or powder. Also available in prescription as Desoxyn to treat obesity and ADHD.
Morphine	Generic name for a drug used to relive moderate to severe pain.
Narcotic	Refers to opium, opium derivatives and their semi-synthetic substitutes. Different term for opioids.
Opioid	A class of drugs that are chemically related and interact with opioid receptors on nerve cells in the body and brain. Includes natural, synthetic and semi-synthetic drugs.
Oxycodone	Generic name for a drug used to relieve moderate to severe pain. Sold under the brand names Roxicodone, Oxycontin, and Xtampza ER.
Xanax	Brand name for Alprazolam, a short-acting benzodiazepine used to treat or provide short-term relief of symptoms of anxiety and anxiety disorders.
Other Terms	
Addiction, Substance Use Disorder	Addiction is characterized by inability to consistently abstain from drug use, impairment in behavioral control, and craving, diminished recognition of significant problems with ones behaviors and interpersonal relationships, and a dysfunctional emotional response. Like other chronic diseases, addiction often involves cycles of relapse and remission.
Agonist	A chemical that binds to specific receptors in the brain and activates that receptor. Chemicals can be full or partial agonists.
Analgesic	(of a drug) Acting to relieve pain.
Antagonist	A chemical that binds to certain receptors and blocks the activity of that receptor; the opposite of an agonist.
Cardiopulmonary Resuscitation (CPR)	A medical procedure involving repeated compression of a patient's chest, performed in an attempt to restore the blood circulation and breathing of a person who has suffered cardiac arrest.

Conditioned Place Preference	Also known as place conditioning; CPP occurs when a subject comes to prefer one place more than others because the preferred location has been paired previously with rewarding events. The CPP paradigm is widely used to explore the reinforcing effects of natural and pharmacological stimuli, including drugs of addiction. In humans, it has been suggested that CPP can act as an environmental cue, aiding in tolerance to certain substances such as opioids.
High Intensity Drug Trafficking Area (HIDTA)	The High Intensity Drug Trafficking Areas (HIDTA) program, created by Congress with the Anti-Drug Abuse Act of 1988, provides assistance to Federal, state, local, and tribal law enforcement agencies operating in areas determined to be critical drug-trafficking regions of the United States.
Hypoxia	Deficiency in the amount of oxygen reaching the tissues of the body.
Medical (9-1-1) amnesty	A law that grants immunity from prosecution for certain drug-related offenses when an individual requests medical assistance for him/her self or someone else due to overdose or acts along with another person in requesting emergency medical assistance.
Medication assisted therapy (MAT)	Medication assisted treatment (MAT) is the use of medications in combination with counseling and behavioral therapies for the treatment of substance use disorders.
Naloxone, Narcan	Naloxone is a medication approved by the Food and Drug Administration (FDA) to prevent overdose by opioids such as heroin, morphine, and oxycodone. It blocks opioid receptor sites, reversing the toxic effects of the overdose. Naloxone is administered when a patient is showing signs of opioid overdose.
Overdose	Overdose (OD) happens when a toxic amount of a drug, or combination of drugs overwhelms the body.
Poly substance drug use	Broadly describes the consumption of more than one drug over a defined period, simultaneously or at different times for either therapeutic or recreational purposes.

Receptor	A chemical group or molecule (such as a protein) on the cell surface or in the cell interior that has an affinity for a specific chemical group, molecule, or virus
Route of administration	The path by which a drug is introduced into the body. Can be through oral, intravenous, transdermal, sublingual, rectal or other routes.
Speedball	A mixture usually consisting of cocaine and heroin, but can be broadly thought of as a combination of a stimulant and an opioid.
Tolerance	Diminished response or effectiveness to a drug, which occurs when the drug is used repeatedly and the body adapts to its presence.

Basic Pharmacology of Opioids

Opioids (*See Table 1*) belong to a class of drugs called narcotic analgesics (*See Table 1*) that mimic endogenous opioids and include all compounds that bind to opiate receptors in the body (Pergolizzi, LeQuang, Berger & Raffa 2017; Rosenblum, Marsch & Portenoy, 2008). Opioids are agonists (*See Table 1*) at opioid receptors, which can be found throughout the body and brain in places like the gastrointestinal (GI) tract, immune cells, pituitary gland and skin (Trescot, Datta, Lee &Hansen 2008). These receptors are important for expressing pain transmission, regulating emotional responses and modulating pathways to various parts of the brain (Meyer & Quenzer, 2013). There are three different types of opioid receptors, however, most opioid medications have the highest affinity for mu-opioid receptors (Meyer & Quenzer, 2013; Pergolizzi, LeQuang, Berger & Raffa 2017) and bind to these receptors turning off inhibition of dopamine. This disinhibition allows for dopamine to flood the synapse in various areas of the brain related to pain and breathing (Meyer & Quenzer, 2013). When dopamine binds to these receptors, it leads to feelings of sedation, decrease in pain perception and physiologically decreases respiration (Meyer & Quenzer, 2013; Martin 1983; Pergolizzi, LeQuang, Berger &

Raffa 2017). Since mu-opioid receptors are implicated in the regulation of breathing, large doses of opioids can severely depress breathing leading to respiratory arrest, coma and in extreme cases death (Meyer & Quenzer, 2013; White & Irvine, 1999).

The effects of opioids are dose-dependent, meaning that at low to moderate doses, pain is relieved, respiration is slightly depressed, and pupils are constricted. At low doses, individuals report drowsiness, decreased sensitivity to the environment, inability to concentrate, and a dreamy sleep (Meyer & Quenzer, 2013). At higher doses, especially if the drug is inhaled or injected, individuals can experience an abnormal state of euphoria, and overall sedative effects, including those on respiration, become stronger and may lead to unconsciousness (Meyer & Quenzer, 2013). Thus, higher doses are associated with a higher likelihood of overdose, since breathing stops or slows dangerously and the heart rate is reduced. Also, a dose that might make an individual feel "high" or "high enough" might be too high for the respiratory system.

Opioid Overdose

An opioid overdose occurs when too much of an opioid like Vicodin, OxyContin or heroin (*See Table 1*) is taken, causing depressed or slowed breathing, sedation and unconsciousness (Warner-Smith, Darke & Hall, 2001; Meyer & Quenzer, 2013). When breathing is slowed or stopped and unconsciousness occurs, it can lead to serious consequences such as hypoxia, coma or even death (*See Table 1*). Depending on the route of administration and substance taken, the onset of overdose symptoms can occur quickly, within seconds or minutes, (intravenous injection) or over the course a half hour to hours (oral) (Saxen, 2016).

It is not always obvious when an individual is overdosing, as some of the symptoms are similar to the effects of drug taken (Boyer 2012; Fareed et. al. 2011). Initial visible symptoms of

an overdose can include confusion, delirium or "acting drunk"; frequent vomiting; cold, clammy skin or bluish skin around the lips or under the fingernails; pinpoint pupils; breathing problems and/or respiratory arrest; intermittent or complete loss of consciousness; and extreme sleepiness or the inability to wake the individual up (Boyer 2012; Fareed et. al. 2011). It is rare for someone to immediately die from an opioid overdose; however, the amount of time until death is dependent on a multitude of factors such as the exact substance taken, amount of substance taken, the individuals' tolerance (*See Table 1*), whether Cardiopulmonary Resuscitation (CPR) (*See Table 1*) is performed, and duration of repressed breathing or respiratory arrest (Boyer 2012). Therefore, immediate action or timely response is imperative, not only to save the individuals life but also prevent other complications such as brain damage from hypoxia, which can become more severe the longer the brain is deprived of oxygen (Warner-Smith, Darke & Hall, 2001; Fareed et. al. 2011).

Naloxone

There is, however, an effective antidote to opioid overdoses that has been approved by the FDA for treating opiate overdoses since 1971 (FDA, 2016). Naloxone, which is also known as Narcan, is a medication that can be used to reverse overdoses. As a strong "opioid antagonist," it effectively displaces opioids off opioid receptors in the brain and body and does not allow them to bind again for a certain period of time (Handal, Schauben & Salamone 1983). Physiologically, the person will begin breathing again and may become conscious. This also means that any pain or other affects that the opioid was providing would be completely reversed, which can cause an individual with an opiate use disorder to go into withdrawal immediately (Van Dorp, Yassen & Dahan 2007; O'Brien, Greenstein, Ternes &Woody 1978). Narcan comes in different forms; it can be injected into the muscle or vein or sprayed in the nose (Sporer 2003;

FDA, 2016). Although emergency response personnel typically administer it, lay people can be trained to administer doses, with the easiest form to administer typically being the nasal spray.

The medication has no adverse effects if the individual has not consumed any opioids, however it is a temporary drug and wears off in 20-90 minutes (Boyer 2012; FDA, 2016). Since antagonistic activity is transient additional administrations are necessary because the body metabolizes Naloxone more quickly than opioids (Boyer 2012; Handal, Schauben & Salamone 1983; Van Dorp, Yassen & Dahan 2007). Without additional administrations, the physiological affects of opioids will return and the individual can go into respiratory arrest once again (Boyer 2012; FDA, 2016).

Individual-level Determinants of Overdose

The risk of dying from overdose includes factors leading to the state of overdosing as well as the action taken once an overdose is occurring. A number of studies have identified individual-level behaviors and biological factors that lead to overdose such as injecting alone, poly substance use, demographic factors, changes in tolerance, the amount of heroin used and injection as the route of administration (Warner-Smith, Darke & Hall, 2001; Coffin et al., 2003; Darke and Hall, 2003; Dietze et al., 2005; Green et. al., 2009). Additionally, there are different types of opioids, such as morphine, heroin, fentanyl, and methadone (*See Table 1*). Each has a slightly different chemistry, which alters their potency and action (Meyer & Quenzer, 2013). Although they act on similar physiologic and neurologic pathways, some are more potent than others and thus have a higher overdose potential. One such opioid is fentanyl. Fentanyl is a synthetic opioid that is 50 to 100 times more potent than morphine, and 25 to 50 times stronger than heroin (CDC), contributing to a higher risk of overdose if consumed, especially if unknowingly present in heroin or other drugs of abuse. Only 0.002 g of fentanyl within 0.1 g

heroin is potentially fatal and such tiny amounts make it almost impossible to affect a controlled dose (McGowan 2017).

Injection as a route of administration (*See Table 1*) has one of the quickest onsets of effects. This is because the drug bypasses many forms of metabolism that result in slower onsets and an improved ability to regulate the amount of a substance taken. When administered intravenously, drugs circulate directly to the brain, and onset of effects occurs between 20 to 40 seconds (Saxen, 2016). As a result, one can easily administer too high of a dose before recognizing an overdose is occurring. If this occurs while an individual is injecting alone, they may become unconscious and not be able to receive timely medical attention.

In the case of poly drug use, the overwhelming majority of overdoses, both fatal and nonfatal typically involve the simultaneous use of heroin with other drugs like alcohol, Xanax, methamphetamine, or cocaine (*See Table 1*) (Warner-Smith, Darke, Lynskey, & Hall, 2001; Dark and Hall 2003). Drugs like alcohol and Xanax are especially dangerous due to their sedative effects. Different depressants work through different mechanisms to create sedation (Warner-Smith, Darke, Lynskey, & Hall, 2001). When taken in conjunction with an opioid, they have a synergistic effect that leads to more euphoria but also a higher risk of respiratory depression and death since various sedation mechanisms are being activated simultaneously (Rubio, 2004; Warner-Smith, Darke, Lynskey, & Hall, 2001; Green et. al., 2009). When other depressants, like alcohol, Xanax or Valium are present in an individual's system, it takes less of an opioid to overdose (Pates & Riley 2012). Additionally, consuming other depressants can impair judgment and memory, increasing the likelihood that an individual will not remember how much they've taken.

Combining stimulants with opioids, known as speedballing (*See Table 1*), is also dangerous. Stimulants increase heart rate and cause the body to use more oxygen, while opioids reduce the breathing rate (Pates & Riley 2012). Speedballing also masks the typical negative side effects that arise from taking either drug individually (Pates & Riley 2012). This suppression of side effects can falsely convince the person consuming the drugs that their tolerance is higher and affect their perception of how intoxicated they are leading to increased use of both substances (Pates & Riley 2012). Additionally, the effects of stimulants wear off more quickly than the effects of opioids, so a potentially fatal dose of opioids can be administered without immediately causing an overdose (Pates & Riley 2012). Once the stimulants are metabolized the risk of respiratory depression increases and an individual may not be aware that they are overdosing.

Other significant individual risk factors for overdose fatality are related to demographic factors such as being male or being unemployed (Warner-Smith, Darke, Lynskey, & Hall, 2001). Also, long-term, dependent heroin users are at greater risk for overdose than novice users, which may be because they may be less aware of changes in their tolerance (Dark & Hall, 2003). Changes in tolerance are a major risk factor for overdose, especially when an individual has gone through detoxification or has been released from jail (Warner-Smith, Darke, Lynskey, & Hall, 2001; Strang et al., 2003). This is because although tolerance develops with prolonged opioid use, once an individual is detoxed their tolerance significantly decreases as their brain and body adjust to no longer having the opioids in their system (Kumar, 2016); what previously was a tolerated dose by the body, could now be fatal.

Finally, research has been done examining the consequences of Pavlovian conditioned place preference and its consequences for increasing overdose risk (Siegel & Hinson, et. al.,

1982; Siegel 1984; Gerevich et. al., 2005). Pavlovian conditioned place preference refers to situation-specific or place specific tolerance, where outside of the specific situation or place a similar dose of opioids can cause an individual overdose (Siegel & Hinson, et. al., 1982; Siegel 1984; Gerevich et. al., 2005). It is hypothesized that this is due to cues in the environment that "prepare" the body for the substance since in that environment or situation a dose of opioids is "expected" (Siegel & Hinson, et. al., 1982; Siegel 1984; Gerevich et. al., 2005). This occurs because preparation and anticipation for taking a substance triggers responses contrary to the drugs effect in an individual already showing drug tolerance (Gerevich et. al., 2005). These responses act as conditioned stimulus reducing the action of a substance and contributing to the development of a mechanism corresponding to tolerance (O'Brien, Childress et. al., 1992). Therefore, when an opioid is taken in a new environment these responses are not activated and the developed tolerance isn't present, leading to an increased risk of overdose.

Environmental Determinants Contributing to Increased Risk of Death

An effective and timely response to an overdose once it is occurring is critical in order to ensure the best outcomes for the individual. Policies surrounding Naloxone distribution and possession can be critical to that person's survival. Furthermore, knowing when and how to administer Naloxone or having a person around who knows CPR can augment the likelihood of dying from an overdose. Also, state laws can also make it more or less likely that individuals near the scene, if present, will call 9-1-1. For example, the presence or absence of 9-1-1 amnesty laws (*See Table 1*) have been put in place to protect those at the scene of an overdose from criminal prosecution, which in theory should increase willingness to call 9-1-1. One study found that in neighborhoods with a higher concentration of misdemeanor arrests, individuals who witness an overdose while using drugs might be less likely to call 911 because they fear being

arrested on a misdemeanor charge for drug possession (Bohnert et. al., 2011). Further highlighting the importance of enforced 9-1-1 amnesty laws.

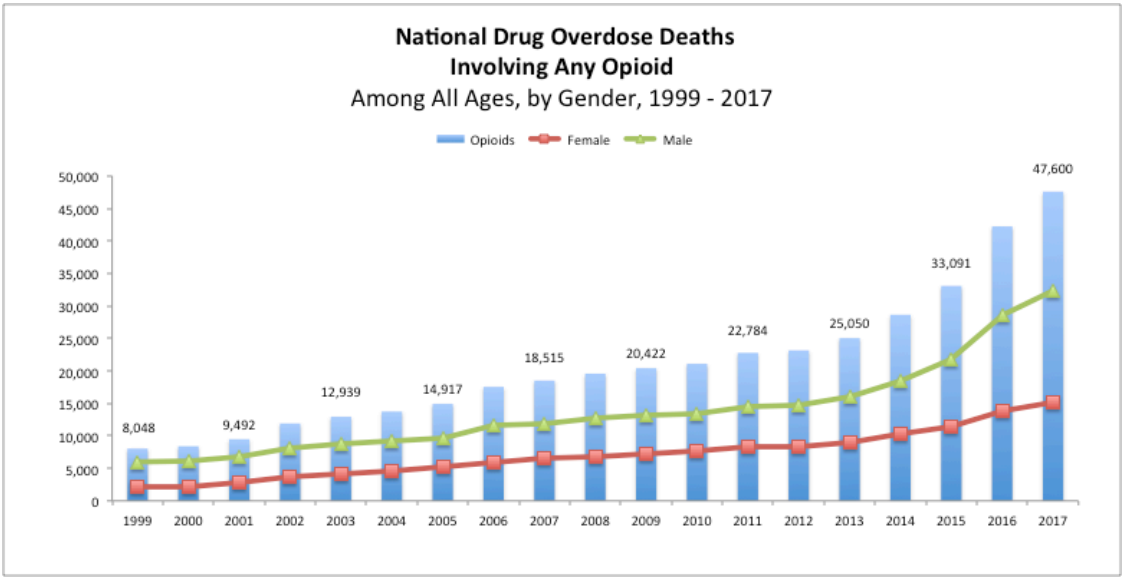
Overdose Trends

The opioid epidemic has become a major public health crisis, as opioid-related mortality rates have increased over the last two decades (Mack et. al., 2017; Rigg et. al., 2018; Webster, 2017). From 2001 to 2017, the cost of the opioid epidemic is estimated to have exceeded $1 trillion and is projected to cost an additional $500 billion by 2020 (Altarum, 2018). Misuse of opioids is associated with myriad problems, including the risk of opioid-related overdose (Dunn et. al, 2016). Data from hospital billings indicates that in 2014 approximately 92,000 ED visits occurred due to unintentional, nonfatal opioid overdoses (Vivolo-Kantor et. al., 2018). In all parts of the United States, non-fatal Emergency Department visits for suspected opioid overdose increased by 30% from July 2016 to September of 2017 (CDC, 2018). Data from the CDC illustrates that opioid overdoses have been increasing in cities and towns of all types, however, non-metro, rural areas have seen a 21 – 24% increase in non-fatal overdose and small metro areas have seen a 34% increase (CDC, 2018). All regions of the United States experienced increases in prevalence of ED opioid overdose visits with the largest increases seen in the Midwest (69.7%), followed by the West (40.3%), Northeast (21.3%), Southwest (20.2%), and Southeast (14.0%) (CDC, 2018). Rates for men increased by 30%, and woman by 24%; additionally rates of non-fatal overdose increased for various ages groups, specifically 31% for those aged 25-34, 36% for those aged 35-54 and 32% for those aged 55 and over (CDC, 2018).

Fatal opioid overdoses are also on the rise; from 1999 to 2017 opioid-related overdose deaths have increased nearly 6-fold (*See Figure 1*) (NIDA, 2019). The most recent statistics from the CDC estimate that 130 people die every day because of an opiate overdose (NIDA 2018). In

2017 alone, about 47,600 Americans died from an opioid overdose due to prescription or illicit opioids (*See Figure 1*) (CDC, 2018). In the United States, drug overdoses resulted in 702,568 deaths during 1999–2017, with 399,230 (56.8%) involving opioids (Scholl et. al., 2018). More recently from 2016 to 2017, deaths due to synthetic opioids have increased across all demographic categories with the highest death rate in males aged 25–44 years (27.0 per 100,000) (Scholl et. al., 2018).

Figure 1. National Drug Overdose Deaths Involving Any Opioid



Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999 – 2017 on CDC WONDER Online Database, released December 2018

Overdose Deaths in Kentucky

Kentucky (KY), a predominately rural state, has been greatly impacted by the opioid epidemic. Kentucky has an opioid overdose rate of 23.6 deaths per 100,000 making it one of the top states for opiate overdoses. Further, its opioid overdose rate is double that of the national rate of 13.3 per 100,000 (CDC, NCHS brief). This rate has increased over time from 1.3 per 100,000 in 1999 to 14.1 in 100,000 in 2010 and finally 23.6 per 100,000 in 2016 (NIDA 2018; CDC Drug Overdose Death Data). In 2017, autopsied and toxicology reports from coroners showed a

decrease in deaths involving heroin, from 34 percent in 2016 to 22 percent in 2017 (KY OD data, 2017). This is in contrast to a six percent increase from 2015 to 2016, from 28 percent to 34 percent (KY OD data, 2016). Fentanyl, however, was involved in 763 overdose deaths, accounting for 52 percent of all deaths (KY OD data, 2017), a 5 percent increase from 2016 and an 18 percent increase from 2015 (47 percent and 34 percent respectively) (KY OD data, 2016).

Contributions to High Overdoses Death Rates in Kentucky and Appalachia

A variety of factors contribute to the high rates of overdoses and death in Appalachia and Kentucky. Marketing of prescription opioids like OxyContin was more aggressive in rural communities especially those surrounding Appalachia. The area already had an established history of painkiller use, linked to its heavy labor occupations like mining which made it more receptive to Perdue Pharma's OxyCotin messaging (Wininger, 2004). As previously mentioned, representatives alleged that OxyContin was safer and had a lower addiction potential because it would not create intense, euphoric highs like other opioids (Quinones, 2015; Keyes, 2014). Due to these perceptions opioids were prescribed liberally and patients readily accepted them. In fact, counties with the highest prescribing rates are disproportionately found in Appalachia and in southern and western states (McDonald et. al. 2012). One study found that the estimated the mean milligrams of opioids dispensed per resident was 893 mg for Kentucky patients (McDonald et. al. 2012). This amount is 346 mg or 163% higher relative to all other states, placing them 4th behind Nevada, Delaware and Florida (McDonald et. al. 2012). Federal data also shows that the region has received the greatest per capita share of OxyCotin in the nation in fact; in 2000 over 9.7 million pills were sold in Kentucky alone (Wininger, 2004).

Qualitative research also indicates that prescription drug use in rural areas such as Appalachian Kentucky is part of the culture of the area, with prescription narcotics often prescribed to maintain workflow in mines and other heavy labor occupations (Keyes 2014). Kentucky as a state is known for industries such as coal mining, manufacturing and agriculture. These industries are dangerous and also have high rates of injury and disability, which are associated with pain management using opioids. For example, compared to other industries employees in coal mining are more likely to be killed or to incur a non-fatal injury or illness, and their injuries are more likely to be severe (Bureau of Labor and Statistics, 2010; Keyes 2014). The high rates of injury and chronic pain from labor intensive industries contributed to a higher density of available opioids creating more opportunities for misuse, illegal markets and overdose (Keyes, 2014). With injury, also comes disability and disability programs with benefits to cover prescriptions like OxyCotin. Disability and opioid use intersect strongly in Kentucky; counties with the highest rates of opioid use are also the counties with the highest participation rates in federal disability programs (McCoy, 2017). Furthermore, between 2000 and 2015, annual opioid use among adult recipients of Supplemental Security Income (SSI) more than tripled in Kentucky from 48 pills per capita to 147 (McCoy, 2017). Among Kentucky's general population, over approximately the same period, it rose from 30 pills to 72 and from 2000 to 2015, prescriptions of opioids to Kentucky's adult SSI population increased 210% from 47.58 to 147.29 doses per capita (Social Security Disability).

Kentucky's connectivity via I-71 and I-75 to other cities such as Cincinnati, Louisville, Lexington and Detroit brought it economic prosperity and opportunity since its construction in 1957 (Tenkotte 2015; Johnson 2018). However it also connected Appalachia to other areas of the country that were being heavily impacted by the opioid epidemic and that were involved in drug

trafficking (Johnson 2018). So much so that in October 2016, Northern Kentucky was designated as a High Intensity Drug Trafficking Area (HIDTA) by the Department of Justice, officially labeling it a known center for illegal drugs and drug-related activities (Johnson 2018).

In addition to historical, geographical and economic influences on opioid use, there are factors unique to rural areas that contribute to the higher prevalence of opioid-related mortality (Rigg et. al., 2018). Rural areas are home to many at-risk groups such as American-Indians, military veterans and older adults. Many rural areas have also suffered economic downturns, and unstable labor markets are associated with higher prevalence of substance use (Rigg et. al., 2018). Furthermore, poverty is persistently high in areas like rural Appalachia, which is also associated with higher rates of substance use as well (Riggs et. al. 2018). The extensiveness and proximity of the social network in rural areas may allow faster diffusion of prescription drugs to potential nonmedical users; families are common sources of prescription opioids, which may allow them to be more accessible in rural areas (Keyes 2014).

Rural settings also have fewer resources and access to treatment centers and modalities for opioid use disorder, which could serve as a protective factor against overdose (Hirchak & Murphy, 2016; Rosenblum et al., 2011; Stein et al., 2015; Keyes 2014). One such treatment modality is buprenorphine. Buprenorphine is a medication-assisted treatment that can help individuals recover from an opioid use disorder (Knudsen, Abraham & Roman, 2011). For example, 90.4% of physicians who are authorized to prescribe buprenorphine (*See Table 1*) reside in urban areas versus 1.3% who reside in rural areas, and 82.5% of rural counties have no buprenorphine-authorized physician (Rosenblatt et. al., 2015). When treatment availability is low, individuals seeking opioid maintenance treatment are placed on extended waiting lists that can take years to finally be admitted (Keyes 2014). In fact, one study reported that patients

waited an average of two years to begin opioid maintenance treatment in Virginia (Sigmon, 2014). Another limitation in treatment access is that administration and availability of naloxone, a fast-acting opioid antagonist that is used by first responders to reverse opioid overdose (Keyes 2014). It is less accessible in rural areas due to lack of naloxone training and supplies for first responders (Faul et al., 2015). These differences may partially underlie the dramatic difference in overdose death rates that are evident in rural versus urban settings.

Theoretical Framework

The Risk Environment Framework (REF)

The risk environment framework (REF) is a theoretical framework proposed by Tim Rhodes that seeks to explain how contexts influence drug-related harms (Rhodes 2002). The risk environment can be defined as "the space where a variety of factors interact to increase or decrease the chance of harm occurring" (Rhodes 2009, pp.193). This framework moves away from individualistic explanations and theories, which have dominated public health discourses surrounding behavior, harm and harm reduction particularly around PWID (Rhodes 2002; Link 1995; Sun 2014). While these individual-level theories and explanations are insightful, they fail to adequately explain or sustain changes that successfully minimize harm (Rhodes 2002; Rhodes 2009).

This framework is useful for understanding and reducing drug-related harms while de-emphasizing individual-level blame and individual behavior (Rhodes 2002; Rhodes 2009; Cooper et. al., 2014) and realizing that societal conditions beyond individuals' control can affect their health, including sociocultural, political, and environmental influences on health (Rhodes 2002; Link 1995). This allows researchers to understand the contexts and upstream influences in

which the behaviors are occurring and analyze how those contexts shape health behaviors and relative harm (Rhodes 2002).

There are two key dimensions to consider when discussing the risk environment framework. One is the ***type*** of environmental influence and the other is the ***level*** of environmental influence (*See Table 2*).

Table 2. Risk Environment Framework example

		Levels of influence		
		Micro	Meso	Macro
Types of environment	Economic	Low or no income	Strained local social services/closure of services	Economic context of rural Appalachia. High unemployment, etc.
	Physical	Space in which PWUO is injecting e.g. public bathroom, home, trap house	Density of public restrooms or single stalls	Heroin potency/availability
	Social	Who is present when injecting	Social and peer group risk norms: engaging in polysubstance use	Stigmatization of drug use and drug users
	Policy	Availability of drug testing supplies	Low threshold access to opioid substitution therapy	9-1-1 amnesty laws
	Healthcare	Personal possession of Narcan	Narcan access and/or availability	Policies surrounding insurance coverage of Narcan
	Criminal Justice	Individual's arrest/conviction record	Policing practices surround opioid overdose	Criminalization of Overdose

Levels of the Risk Environment

Research has recognized three levels of environmental influence; the micro, meso and macro level. The micro risk environment operates on the level of individuals and individual-level factors, and includes personal values, norms, and self-efficacy and interpersonal relationships (*See Table 2*) (Rhodes 2002; Rhodes 2009).

The meso risk environment is situated between the micro and macro level, and can be conceptualized as lower level social arrangements or units, such as institutions, institutional structures, and networks (*See Table 2*) (Latkin et. al. 2003; Rhodes et. al. 2005; Ricter &

Dragano 2017). Examples of meso-level social and group interactions include how perceived group 'norms' influence what is considered acceptable injecting behavior (Latkin, Forman, Knowlton, & Sherman, 2003), or institutional or organizational responses, for example local policing initiatives (Rhodes, 2005; Rhodes, Judd, & Mikhailova, 2003a; Blumenthal, Kral, Lorvick, & Watters, 1997; Burris et al., 2005; Wood et al., 2004). Within the risk environment framework, the meso-level is the most volatile: some papers include it, but many simply conceptualize the environment as having two levels, the macro and the micro.

Finally, the macro risk environment can be conceptualized as larger societal influences such as policies, laws and even societal norms (*See Table 2*). Furthermore, the macro risk environment includes discussions of economic, gender and ethnic inequalities associated with risk production and reproduction (Rhodes 2002; Rhodes 2009; Ricter&Dragano, 2017; Cooper et. al. 2016).

Additionally, it is important to note that a central assumption of the framework is that one environmental level has the ability to influence a subsequent level, and in reality they interact in ways that can compound and ameliorate risk (Rhodes 2002; Rhodes 2009). In the risk environment framework, this is referred to as interplay and also emphasizes the inseparability of micro-, meso-, and macro-level factors (Rhodes et. al., 2005; Singer, 1997). For example, macro level factors such as welfare and economic policies can shape meso and micro level environments, and as a result shape risk within them (Rhodes 2002; Rhodes 2009; Ricter&Dragano, 2017).

Types of Environments

REF conceptualizes the environment as having five types or influences: physical, social, economic, policy, and healthcare/criminal justice interventions (Rhodes 2002). These various environments also interact within and across micro-, meso-, and macro-levels to increase or decrease the likelihood of harm and injury (Rhodes 2002; Rhodes 2009; National Research Council 2013).

Physical environment

The physical environment is the spatial context that includes the built environment or infrastructure; effectively, it is the structural or tangible context that surrounds each individual (Rhodes 2002; Rhodes 2009). An example of a micro level physical risk environment would be a public restroom (*See Table 2*) (Rhodes 2009). A meso-level physical risk environment would be a feature of the environments for example, density of alcohol outlets in a particular neighborhood (*See Table 2*). Finally a macro level physical risk environment encompasses drug trafficking and distribution routes, the weather in a particular community or area (*See Table 2*) (Rhodes, 2009).

Social environment

The social environment encompasses relationships, networks, and cultural contexts where groups of individuals function and interact (Pathak & Casper, 2001). An example of a micro social risk environment would include the nature of an individual's sexual relationships or who is present in a setting when an individual is injecting (*See Table 2*) (Rhodes, 2009; Rhodes et. a., 2005). A meso level social risk environment would include institutional structures like the social networks one is engaged in or the "risk" norms within a particular network (*See Table 2*) (Rhodes, 2009; Rhodes et. al., 2005). Finally a macro level social risk environment encompasses

gender inequalities and gendered risk or stigmatization and marginalization of groups such as people who inject drugs (PWID) (*See Table 2*) (Rhodes, 2009).

Economic Environment

The economic environment concerns economic institutions that produce and perpetuate social and economic conditions, which shape inequalities in health and access to services (Rhodes, 2009). An example of micro level economic risk would include an individual's lack of employment or lack of income (*See Table 2*) (Rhodes, 2009). A meso level economic risk environment would include cost of attending a drug treatment center or the economic resources within one's network or within an institution or organization. Finally, a macro level economic risk environment would include the onset of a recession or uncertain economic times (Rhodes, 2009).

Policy environment

The policy environment encompasses the laws, procedures and policies put forth and enforced by governments, whether they are local, state or federal (Rhodes, 2009). Examples of policy risk environment at the micro level would include the availability and coverage of clean needles and syringes (Rhodes, 2009). A meso level policy risk environment might include local advocacy groups or think tanks that attempt to influence policies as well as the organizational policies themselves. Finally, macro level policy risk environments include the laws governing access to medication-assisted treatment (MAT). For example, Medicaid policy indicates that all states reimburse for some form of MAT treatments i/e buprenorphine, buprenorphine-naloxone, oral naltrexone, and extended-release naltrexone (SAMHA 2018).

Healthcare/Criminal Justice Intervention Environment

The final type of environment within the REM is the healthcare/criminal justice environment. The healthcare environment refers to the availability and access to prevention services, healthcare or other relevant services for different types of clinical conditions. A micro level healthcare risk environment would include the insurance status of an individual (*See Table 2*); the meso level would include the availability and access of syringe exchange programs or safe injection sites. Finally, the macro level healthcare risk environment might include policies surrounding who is eligible for different types of insurance like Medicare or Medicaid.

The criminal justice environment encompasses experiences and exposure to aspects of the criminal justice system as well as their consequences for behavior and health. At the micro level, the criminal justice risk environment might include the individual's arrest and conviction history (*See Table 2*); the meso level would include local policing practices or crackdowns (*See Table 2*) and finally the macro level would include the practices or policies surrounding probation and parole.

Intersection of the Risk Environment Framework and Overdose

As mentioned previously, the risk environment can be defined as "the space where a variety of levels (micro, meso-, macro) and types of environment (physical, social, economic and political) interact to increase or decrease the chance of drug-related harm occurring" (Rhodes 2009, pp. 193).

This model proposes that features of the risk environment shape overdose risk and overdose outcomes. The risk environment framework has been used to understand drug-related morbidity and mortality, for example, how the presence of Good Samaritan laws affect overdose

mortality by increasing the likelihood that EMS will be called in the event of an overdose (McLean 2016). Many studies have applied this framework to overdose risk (Hunter et. al., 2018; McLean, 2016; Paquette et. al., 2018; Koester et. al., 2017; Latimore et. al., 2017), however, it is important to note that most of this work has been done in urban areas. Nevertheless, these studies are useful to conceptually understand how the risk environment and vulnerability to overdose intersect.

At the micro-environmental level, intrapersonal factors such as changes in physiological tolerance and personal behaviors related to poly substance use influence risk (Unick 2014). Studies have also explored how injecting in public combined with fear of arrest or detection can cause injectors to rush and not have time to "taste" their drugs before injecting, increasing potential for accidental overdose as well as other negative health outcomes (Bohnert et. al. 2011; Cooper 2005; Rhodes et. al. 2005; Kerr et. al., 2005). McLean found that participants in her study discussed the dangers of private injection settings, specifically that although they enabled clean, unhurried use their secluded nature could hide an overdosing individual (McLean 2016).

Meso-level factors include the group norms surrounding the reaction and response to an overdose. For example, the willingness of a witness to stay and assist, call 9-1-1, and administer CPR and Naloxone, if available (McLean 2016). Studies have identified the reluctance of medical professionals to respond effectively to overdose, and the unwillingness of overdose witnesses to call emergency service providers (Bennet et. al. 2011; Green et. al. 2009). Community or organizational social stigmatization of injection drug use can impact injection behaviors, leading to social isolation and users injecting alone in order to hide their use (Simmonds & Coomber, 2009; Rivera et. al., 2014).

At the macro level, fear of police due to criminalization of overdose coupled with a lack of amnesty laws discourage witnesses from calling for medical assistance, leading to increased mortality (Bohnert et. al. 2011). This macro-level influence directly contributes to fear and compounds social stigma (Bohner et. al., 2001). The implementation or passage of 9-1-1 amnesty and naloxone access laws, or their absence, shape overdose risk and outcomes as well and intersect and influence the meso- and micro- levels of the risk environment. Research has also explored how changes in the US illicit drug market have augmented overdose risk and how different characteristics of brown, black and white heroin dictate how it can be used, as well as how it can or cannot be adulterated (Ciccarone 2008; Quinones, 2015). Conversely, the laws allowing the presence of safe injection facilities (SIF) in Vancouver are protective against overdose (Kerr et. al., 2007).

Impacts of Increased Opioid Prescribing - Healthcare environment

Another important underlying characteristic of the epidemic is the association between increased rates of opioid prescribing and increased opioid-related morbidity and mortality (Compton et. al., 2016; Jones et. al., 2010; Paulozzi 2012; Manchikanti et. al., 2012). Specifically, that the risk of opioid overdose increases and is related to the maximum daily dose a patient is prescribed (Dunn et. al., 2010; Bohnert et. al., 2011). The most at risk patients are those who are prescribed 100mg morphine equivalents or higher. These patients account for 20% of all patients prescribed opioids and of the 20%, 10% receive a prescription from a single doctor and account for an estimated 40% of prescription opioid overdoses (Dunn et. al., 2010; Bohnert et. al., 2011). The other 10% are especially concerning because they seek care from multiple doctors and are prescribed high daily doses, and account for another 40% of opioid overdoses (Hall et. al., 2008). The maximum daily dose prescribed for patients increased due to a variety of

factors, but the most important were the push by many for pain to be viewed as a "the 5th vital sign", a shift in practice and opinions surrounding opioids as well aggressive marketing of drugs like OxyCotin by manufacturer Purdue Pharma (Quinones, 2015; Kolodny et. al., 2015;Van Zee, 2009; Jones 2013). While empirical research has not explored causal linkages between rate of opioid prescribing and increased opioid-related morbidity and mortality, recently policymakers and litigants have been focusing on manufacturers like Purdue Pharma as an antecedent to negligent prescribing (Dineen & DuBois 2016; Edersheim & Stern, 2009).

To add to this, a pathway has been established between prescription opioid abuse to heroin use (NIDA, 2018). An estimated 4 to 6 percent of people who abuse prescription opioids are likely to transition to heroin use. The link is even stronger between illicit prescription opioid use and heroin initiation. This relationship has been found in numerous qualitative and quantitative studies across various regions of the country (Siegal et al., 2003; Peavy et. al., 2012; Lankenau et al., 2012; Mars et al., 2014), and describe a trend of illicit prescription opioid users becoming opioid dependent and then transitioning to heroin. An NSDUH-based study found that the incidence rate of heroin initiation was about 19 times greater among those who took illicit prescription opioids compared to those who did not (Muhuri et al., 2013). Moreover, about 80 percent of people who use heroin mention that they first misused prescription opioids prior to heroin initiation (Muhuri et. al., 2013; NIDA, 2018). There are various reasons for this, some studies point out that prescription opioid dependence becomes costly over time, especially as access has become more restricted (Carlson et. al., 2016; Siegal et al., 2003). Heroin is typically cheaper and easily accessible and thus becomes an attractive alternative; also users report that it also provides a better high (Carlson et. al., 2016; Siegal et al., 2003; Cicero et. al., 2014; NIDA, Prescription opioids and heroin). This transition from opioid pills to heroin has also been cited

as more fluid due to initially smoking or snorting the drug, rather than injecting (Mars et. al., 2014). Although many report that eventually they transition to injection (Mars et. al., 2014) for reasons related to the drug experience as well as injection being a more economic and cost effective (Young et. al., 2010; Sherman et. al., 2002; Strang et. al., 1992).

The Risk Environment in the Rural Context: How does it differ?

Crucial to understanding the rural risk environment is understanding how and where people are using opioids in rural areas. Rural risk environments differ from urban risk environments in multiple ways, including differences in infrastructure, attitudes, norms, social networks and characteristics of the places where drug-related behaviors and potential harms take place.

Micro level: Individual-level factors

Several studies have investigated the differences between urban and rural opioid use (Palombi et. al., 2018; Keyes 2014; Paulozzi 2012). A scoping review by Palombi et. al. (2018) found that rural drug users had significantly higher odds of lifetime opioid use and also had earlier onset of use. Routes of drug administration also differed in rural communities (Palombi et. al., 2018). Snorting was the most frequent route of administration for hydrocodone, methadone, OxyContin and oxycodone, while injection was most common for hydromorphone and morphine (Young et. al., 2010). Specifically, 67% of hydromorphone users and 63% of morphine users had administered the drugs by injection (Palombi et. al., 2018). Injection drug use is associated with a higher risk of overdose, precisely because of its fast-acting onset. When administered intravenously, drugs circulate directly to the brain, and onset of effects occurs between 20 to 40 seconds (Saxen, 2016). In a study that recruited PWUD from two Kentucky

counties, compared to zero reported use in urban participants, 51% of rural participants reported buprenorphine use and 37% reported fentanyl use, both of which were most commonly administered by swallowing; although, 15% of rural participants reported injecting fentanyl patch contents (Young, Havens & Leukefeld, 2010). Fentanyl use is a major risk factor for overdose; since it is 50 to 100 more potent than heroin (CDC, Fentanyl) and injecting it poses an even greater risk for overdose. Additionally a study by Wunsch et. al. (2009), found that deaths from prescription overdoses were higher among older rural individuals and other drugs were often found in their systems such as antidepressants or benzodiazepines, highlighting potential differences in norms of polysubstance use.

Meso level: Norms, social networks

Broadly, studies have identified differences in social norms and networks in Appalachia. Hansen and Resick (1990) described rural Appalachians as a "self-contained culture" with distinct ways of life and belief systems. Appalachian culture is collectivist in nature, oriented around people rather than tasks (Russ 2010). In collectivist communities, a person's identity is dependent on their community and kinship ties (Russ 2010). Differences in social networks, specifically their close proximity, that is greater social connectedness, are protective in some ways but also may allow for faster spread of prescription drugs to nonmedical users, as sources of prescription opioids through families may be more accessible in rural areas (Keyes 2014). Since those who are socially connected are likely to live in close geographic proximity to one another (Rothenberg et. al., 2005), "risk behaviors may cluster among individuals within networks because of their shared physical and/or social environment, network norms/relationships, or both" (Rudolph, Young & Havens, 2017).

Studies by April Young and colleagues have studied how social networks in Appalachia impact health behaviors and outcomes (Rudolph, Young & Havens, 2019; Rudolph, Young & Havens, 2017; Young & Havens, 2012). In a study looking at networks and overdose, they found that those living closer to the town center were more likely to have personally overdosed in the past and have relationships with others who had previously overdosed (Rudolph, Young & Havens, 2019). Additionally, on average, those who had previously enrolled in an alcohol detoxification program had significantly more first-degree network members with an overdose history (Rudolph, Young & Havens, 2019).

Another study examined the connection between drug use and individual social capital within social networks of drug users from rural Appalachian Kentucky (Jonas et. al., 2012). After adjusting for gender, income, and education, daily OxyContin® use was found to be significantly associated with greater social capital, suggesting that OxyContin® may act as a form of currency among drug users, especially in regions with marked economic disparities such as rural Appalachia (Jonas et. al., 2012).

Macro level: Infrastructure, places

The healthcare infrastructure in rural areas varies considerably compared to urban centers. Rural areas are known to face healthcare provider shortages, have higher levels of uninsured and underinsured individuals and lack of sufficiently trained and accessible health care providers (Chisholm-Burns et. al., 2010; Hartley 2004). Moreover, health care providers may not receive sufficient training in evidence-based treatments, further increasing barriers to treatment access. A lack of training availability can result in outdated treatment modalities that are minimally effective or even detrimental to recovery. Physicians in rural settings are also less likely to be authorized to prescribe buprenorphine to patients, requiring that those seeking

treatment be placed on long waiting lists (Stein et. al. 2015). A further limitation in treatment is access to naloxone, a fast-acting opioid antagonist used by first responders to reverse opioid overdose (Faul et. al. 2015). Naloxone has been found to be less accessible in rural areas due to scarcity of the drug as well as lack of training and supplies for first responders (Faul et. al., 2015).

Furthermore, the places where users go to inject or take drugs is likely different than their urban counterparts. Little is known about the physical spaces that rural drug users go, however, this is a critical component in understanding the rural risk environment as previous studies have highlighted how place characteristics impact overdose risk.

Summary of current problem and study relevance

The opioid epidemic has become a major public health crisis as opioid-related mortality rates have increased over the last two decades (Mack et. al., 2017; Rigg et. al., 2018; Johnson 2018). Kentucky (KY), a predominately rural state, has been greatly impacted by the opioid epidemic and ranks within the top five states for accidental drug overdose (NCHS). Kentucky has an overdose death rate of 33.5 in 100,000 making it one of the top states for opiate overdoses, with a 12% increase from 2015-2016 (CDC, NCHS brief). A variety of unique factors contribute to the high rates of opiate use and death in Appalachia and Kentucky that set it apart from urban areas.

Justification of project

As the literature review has highlighted and recent reviews have emphasized, there are substantial differences in the contexts, demographics, drug-taking behaviors and infrastructure between urban and rural areas (Rudolph, Young & Havens, 2019; Rudolph, Young & Havens,

2017; Young & Havens, 2012; Chisholm-Burns et. al., 2010; Hartley 2004; Palombi et. al., 2018; Keyes 2014; Paulozzi 2012; Young, Havens & Leukefeld, 2010). These differences make it impossible to generalize findings from urban areas to rural settings. Furthermore, there is a gap in the literature, in that to date there have been no qualitative or quantitative studies that have examined how different types and levels of the rural risk environment interact to either increase or decrease vulnerability to overdose and dying from an overdose Thus, research must look squarely at rural contexts in order to elucidate and further understand the behaviors but more importantly the nature of the risk environment in rural areas.

Chapter 3: Methodology

Introduction

The R21 study is a collaboration between Emory University researchers and researchers at the University of Kentucky with funding from the National Institute of Drug Abuse (NIDA). One of the purposes of the study is to examine the risk environment surrounding drug use among young adults who use opioids. Specifically, it is designed to explore how risk environments influence non-medical prescription opioid (NMPO) and heroin use, injecting transitions, HIV, HCV, and overdose among young adults in multiple rural counties in Kentucky. The study is led by two Principal Investigators (PI), Drs. Hannah Cooper and April Young, in an effort to launch a new generation of theoretically informed, rigorous, reproducible, high-impact multilevel research and interventions that reduce drug-related harms among young adults in rural areas.

Population and sample

For the present qualitative study, participants were included if they resided in Rowan, Bath, Morgan, Menifee, or Elliott County (*See Figure 3*); these five counties constitute the Gateway Health District. To be eligible to take part in the qualitative study, an individual had to be between the ages of 18 and 35; currently reside in Rowan, Bath, Morgan, Menifee, or Elliott County; and to have used prescription pain relievers and/or heroin to get high in the past 30 days; and finally be able to read English.

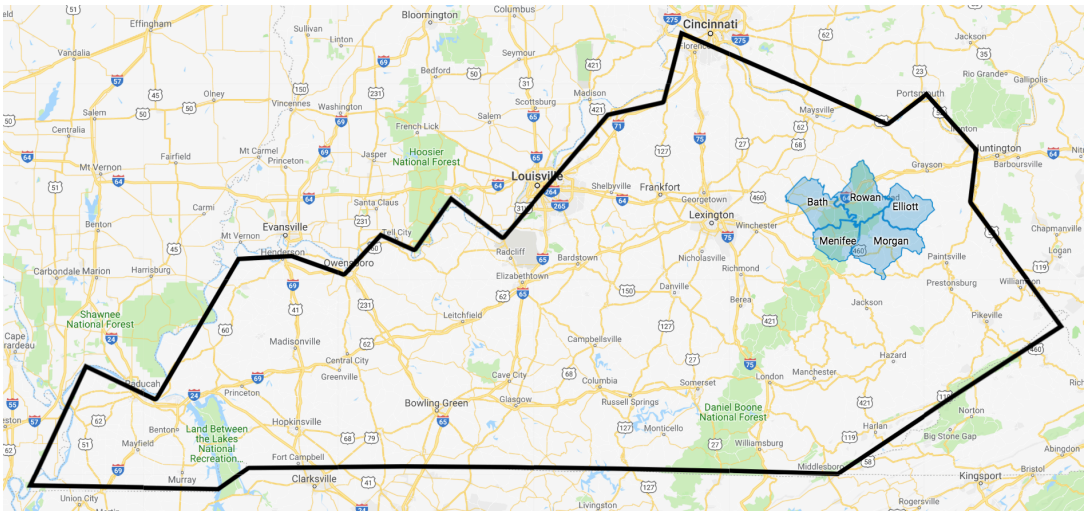


Figure 3. Map of Kentucky (outlined in black) with counties included in the R21 study shaded in blue.

Research Design

Recruitment Methods

Young adult opioid users were recruited using multiple strategies, including through recruitment by stakeholders, cookouts, flyers, walkabouts, and peer recruitment (Respondent-Driven Sampling [RDS]). First, 1-on-1 semi-structure "Interactor" interviews were conducted with staff members who delivered services to young adult opioid users. These interviews were used to recruit participants and ask for insights into features of places that might make it hard for young adult opioid users to protect themselves from injection related harms like HIV, HCV, and overdose. These insights were later compared to lists that study participants created.

Flyers and study cards with study information were also used to recruit participants and were placed in high traffic areas where opioid users were most likely to frequent, such as health departments, drug treatment facilities and social service agencies. Recruitment information was shared in person by doing "walkabouts" in communities where there was a high prevalence of

opioid misuse. The study staff also took part in community events in addition to planning their own events. Cookouts were one method used to create an approachable and friendly environment so that people could get to know study staff and staff could share information about the study. Interested individuals contacted study staff to learn more about the study and volunteer to participate. They were then screened for eligibility, and if eligible, invited to take part in a 1-on-1 semi-structured interviews.

Once initial participants were identified and agreed to take part in the study, Respondent-drive sampling (RDS) was used to recruit subsequent participants. RDS is a network-based purposive sampling technique where initially recruited participants, called "seeds", are provided with a limited number of coupons, which they can use to refer other new participants into the study. Participants received a $10 monetary incentive for recruiting their peers. The newly recruited participants, or "seeds" had the same incentivized opportunity and thus that cycle of recruitment was repeated until the desired sample size was reached.

Informed Consent Process

For the qualitative interviews, participants received and signed a hard copy of the IRB-approved consent form. The informed consent explained the Certificate of Confidentiality that was obtained from the National Institute of Health, which, under federal law, prohibits all data collected during the course of a study protocol from being used in any legal or criminal proceedings. It was also explicitly stated that participation was voluntary and there were no penalties or prejudice for not participating in the study. Data collection only began if the participant agreed to participate in the study.

1-on-1 Qualitative Interviews

Nineteen 1-on-1 semi-structured interviews were performed with the target population in order to develop an emic understanding of local young adult opioid users and contexts in which they use drugs. Participants were compensated $30 for completion of the interview. Each interview took place in the community, in an area that allowed privacy and safety, including cars near cookouts, and offices within local community-based organizations.

Measures

Open-ended questions based in a semi-structured (*see Appendix A*) allowed for flexibility and depth when exploring salient topics. The interviews covered the places in the community where people used drugs and features of those places that might affect HIV/HCV and overdose risk. Some questions that were asked included, "Can you tell me generally where young adults around here are going to inject opioids?", "What are some of the worst places to inject, or places that people try to avoid if they can?", and "What do young adults around here do to protect themselves from having an overdose, or to prevent an overdose from becoming fatal?" The interviewers created a written list generated by each participants' responses to these questions, shared a list informed by Interactor interviews with the participant and asked if the participant wished to add anything to the list they were asked to create. These qualitative interviews served as the data that were analyzed using a grounded theory approach. Interviews were audiotaped.

Interview transcription and quality checks

Audiotaped interviews were transcribed verbatim. All transcripts were quality checked for errors.

Data analysis methodology

Grounded theory approach

Grounded theory methods were used to analyze the 1-on-1 interviews with young adult opioid users. The grounded theory approach is an iterative process involving multiple revisions and recoding. These systematic inductive methods are aimed toward theory development in order to understand a phenomenon (Strauss & Corbin, 1998) for the present study the phenomenon in question was the rural risk environment and how it influenced overdose risk and the risk of an overdose becoming fatal.

Researchers do their best to allow theory to emerge from the data, however, it now is recognized that individuals enter the field and data analysis with assumptions, theories and a framework. In this instance, we entered the field with the Risk Environment Framework, a commitment to harm reduction principals, and previous knowledge of opioid use disorder and drug use; each of these sets of pre-existing knowledge helped inform the analysis process. Reflexivity and memos were used in order to examine and consciously acknowledge the assumptions and preconceptions that were brought into the research. This allowed for a measured and effective analysis because disciplinary and research experiences were self-consciously brought into the analysis to enhance it, but not drive it (Strauss & Corbin, 1998).

Open Coding

The present analysis is a continuation of the original research project surrounding the rural risk environment. The original analysis required the creation of a codebook, which was incorporated into the current analysis.

The codebook (*see Appendix B*) was modified using methods outlined by Strauss and Corbin. A coding framework was created using both deductive and inductive coding methods. First, the researcher studied the existing codebook to understand its scope. Next, open coding was performed to identify concepts within a subset of the interviews. Once concepts were identified, the researcher created a set of codes related to overdose and compared these codes to the existing codebook. Codes that were not relevant were excluded, others were modified and finally codes relevant to the current study added and refined. These codes were informed by previous research and organized by the various types and levels of the risk environment and then further broken down into their features. The process was iterative; codes were applied and refined and the main codebook was developed (*see Appendix B*). Once the final codebook was reviewed and approved the codes were applied to all the interviews, based on their definitions. An example of some codes that were developed and applied were "parties", which was defined as a social gathering of people inside a residence or any outside location where many or most attendees are engaging in drug use; "public bathrooms", which was defined as any restroom in any location that is accessible to members of the public; and "experiencing death of friend or loved one related to drug use", which was defined as any mention of personally experiencing the death of a close friend or loved one related to drug use. All interviews were coded and organized using NVivo 12 (QSR International, Cambridge, MA).

The final codebook was studied and applied to the nineteen uncoded transcripts line by line to allow new themes and ideas to emerge from the data (Strauss & Corbin, 1998). To improve consistency and inter-coder reliability, the Principal Investigator reviewed the coding of every fifth transcript and provided feedback on codes, code applications and discrepancies. Discrepancies were discussed and resolved and codes were reapplied or modified as necessary.

The researchers coded transcripts were also compared to the to previously coded transcripts where relevant, for example for coding related to the physical risk environments like settings where participants discussed opioid use and features of these settings. Any discrepancies were addressed and coding refined.

Formation of Categories

Memos were used to explore the data as well as document the analytic process illustrating how the understanding of the rural risk environment and overdose risk evolved over the course of the analysis. As codes were examined in depth, categories began to develop as concepts were grouped under more abstract, higher order concepts and themes (Strauss & Corbin, 1998). These categories were influenced and organized by the different types of risk environments in the Risk Environment Framework i.e. the physical, social, economic, policy, healthcare and criminal justice environments. Aggregating and organizing the data in this way allowed for units to be reduced and analytic power to accumulate, giving the researcher the ability to begin to explain and predict the phenomena. Constant comparisons were used to refine and understand the categories being built. The final stage of open coding resulted in many categories that were internally coherent and externally distinct, and defined by properties and/or dimensions (Strauss & Corbin, 1998). Some examples of categories that emerged included rushing, social proximity, fear of the police, and level of privacy.

Axial coding

Axial coding was performed to form a more precise and complete explanation of how the rural risk environment influenced overdose risk and risk of an overdose becoming fatal. The categories that were built during open coding were compared to each other to see how different

concepts intersected and how they were potentially related to one another (Strauss & Corbin, 1998). Memos were used to explore intersections and relationships between different categories and codes. At this junction of the analysis, the theory began to take shape as a narrative began to form elucidating the phenomena.

Selective Coding

Selective coding was used to integrate major categories and form a larger theoretical scheme or theory (Strauss & Corbin, 1998) that could explain how various aspects of the rural risk environment influence overdose risk and the risk of an overdose becoming fatal. Memos were used to develop the main narrative and theory by identifying a central category that was the unifying thread that related to all other categories including causes, consequences and context.

Finally, any negative cases were examined and categories were either expanded to encompass the case or in instances where the variation could not be explained, the negative case was discussed in the discussion section. Most of the variation could be explained once categories were expanded, the one case regarding willingness to call 911 during an overdose regardless of the situation or consequences was discussed.

Erving Goffman and Management of Stigma

As the analysis progressed and the theory of the study began to develop, it became clear that the theory was related to work done by sociologists such as Erving Goffman surrounding identify management and stigma. Particularly the various ways that individuals attempt to manage their stigmas and stigma symbols (Goffman, 1963). Thus, Goffman's ideas about stigma management were incorporated into the discussion to further understanding of the phenomena and place the findings in a complementary context that gave insight into why and how the rural

risk environments augmented vulnerability to overdose and dying from an overdose as well as why PWUO sought out certain settings, physical and social.

Ethics and Confidentiality

The Emory Institutional Review Board approved the study, under IRB # 00089775. For the 1-on-1 interviews, a Certificate of Confidentiality was obtained from the National Institute of Health, which, under federal law, prohibits all data collected during the course of a study protocol from being used in any legal or criminal proceedings. However, the consent document did contain a statement informing participants that their name and contact information may be released without their consent to appropriate state authorities in instances that are required by state law.

All study staff were trained in Human Subjects protocols and have passed the appropriate Collaborative Institutional Training Initiative (CITI) exams on human subjects research, as required by the University of Kentucky and Emory IRBs. Interviewers underwent additional training on issues of confidentiality and sensitivity. Transcribers signed a confidentiality agreement to assure the privacy of interview respondents and any identifying information. Each participant's audio file was uploaded to a secure encrypted website owned by Transcript Divas

The data from the qualitative phase of research was collected in the form of audio recordings of the interviews, personal lists created by each participant, and notes taken by the interviewers. All research data was kept on a HIPAA-compliant server at the University of Kentucky Center on Drug and Alcohol Research, which could be accessed by Emory-based team members via HIPAA-protected VPN. All data will be destroyed within 5 years. Finally, although

all precautions are being taken there is the possibility of loss of privacy or confidentiality for our participants.

Chapter 4: Results

Introduction

This chapter highlights the qualitative results that emerged using a constructivist grounded theory approach. For the present study the phenomenon in question was the rural risk environment and how it influenced overdose risk and the risk of dying from an overdose. Included in the analysis are the demographics of the sample and key findings surrounding participants experiences with overdose, strategies discussed by participants that increase or decrease vulnerability to overdose and/or an overdose becoming fatal, and finally the settings e.g. micro physical risk environments, where participants use opioids and how specific features of these risk environments influence vulnerability to overdose and/or an overdose becoming fatal. In the results, the occurrence of overdose was presented separately from overdose death.

Key Findings

Table 3. Demographic information, overdose experience and settings where participants used opioids

Demographics	% (N) or Mean (S.D.)
Age	26.3 years (s.d = 4.2)
Lived in County	10.7 years (s.d = 10.3)
Gender	
Female	53% (10)
Male	47% (9)
Race/Ethnicity	
White	100% (19)
Non-Hispanic	100% (19)
Experiences with overdose	
No/Not mentioned	53% (10)
Yes/ Mentioned	47% (9)
Friend	26% (5)
Stranger/Other	26% (5)
Personal/Self	16% (3)
Relative/Partner	11% (2)
Opioid Use Settings	
Homes	95% (18)
Outdoors	84% (16)
Public Bathroom	84% (16)
Cars/Vehicles	68% (13)
Places of Drug Dealing	42% (8)

Demographics

The sample consisted of nineteen participants, nine men and ten women who ranged in age from eighteen to thirty-four with an average age of 26.3 (s.d=4.2) years old *(See Table 3).* All participants identified as White, Non-Hispanic, which is typical for Appalachia as the region has been predominantly white (Pollard 2004). The average length of time a participant lived in that county was 10.7 (s.d=10.3) years with a range of 6 months to 20 years.

Experiences with overdose

Overdose experiences resulting in survival

Among the 19 participants, nine had either overdosed themselves (N=3) or knew someone who had overdosed. The majority of participants experienced overdoses that did not result in death. Among the participants who knew of someone who had overdosed; five had experienced a friend who overdosed; two had experienced a family or partner overdose, and five participants discussed unnamed individuals in the community who had overdosed. These individuals were considered in a separate category because it was unclear how they were related to or known by the participant. Participant 1 gave an example of an overdose involving a family member as well as a personal account of a time he overdosed. He described how his brother immediately would overdose after injecting opioids and removing his tourniquet. This scenario had occurred six times during one two month period. He explained,

> Every time he OD'd…it's 20 seconds after he does it. He does it. Takes the belt off. Boom. Out. Have to call 911. All the times I said he ever overdosed, like 6 times in the 2 months…them are just the times that 911 got called, actually. He has a lot more than that. He says he's even woken up like in the bathroom and didn't even know what happened *(Participant 1, Male, 18).*

In addition to discussing PWUO who had overdosed, some participants generally described overdose trends in the area, listing stories or incidents that they had heard or read about. For example, participant 1 discussed how, down the street six people had overdosed in a single home in the same evening. Overall, participants indicated that overdose was an inevitable part of opioid use. Participant 3 explained, "…most people…they chase after that kind of high to where

they are nodding out. And when you start nodding out you overdosing. So they just don't care" (*Female, 27*). One participant, specifically mentioned that she avoided mixing and using certain substances because she was, "…scared that I am going to drop dead.." however indicated that "most people around here don't really care. Which is sad…" (*Participant 10, female, 25*). Thus, it seemed that most PWUO were not fearful of overdose itself, rather the concern was regarding detection during injection or detection because an overdose rendered them vulnerable to detection.

Of the three participants who had personally overdosed, participant 5 discussed his experience in the greatest detail. He explained that he has overdosed three times and each time it occurred, he was unaware due to the quick onset of the overdose. In his own words he said,

> I have overdosed three times. [One time] I was in a trap house and… I don't know… you just get caught up in the party when you're around people and everybody is wanting to try and get high… and I don't know how to explain it other than I am fine one minute and then the next minute I don't know anything. I wake up in the hospital with tubes down my throat. I did not even know what happened *(Participant 5, Male, 24)*.

Participant 1 and 7 also had similar experiences, describing a quick onset, although participant 7 said in his experience he was present and aware that he was nodding off. However, he was clear that he did not enjoy the experience and he said he felt like he was going to die. He expressed that his experience taught him to not let others prepare his shots, and that it was important personally determine how much to take, which he suggested turning to the internet for guidance. In participant 1's experience, he remembered using heroin but that his next recollection was waking up in a shower unaware of what had happened or what was going on. He indicated that

currently he does not do drugs that are going to cause an overdose, indicating that he, "stick[s] just to Suboxone. Just because I don't want to die".

Overdose experiences resulting in death

Among the nine participants who had a personal or close experience with overdose, three participants explicitly mentioned one or more instances of overdose that resulted in the death of a person they knew. Participant 1 mentioned that their brother's girlfriend had passed away as a result of injecting a mix of opioids and an unknown chemical that deposited in her spoon because she was hiding her equipment in a light fixture. Additionally, participant 1 had an uncle who passed away at a party because he mixed Xanax and heroin. Participant 3 mentioned over the past few months many of her high school classmates had died from overdoses and just as recently as a few weeks before her interview she lost another friend because she "didn't know her limits". Finally, participant 16 mentioned in passing that a friend of his had died from an overdose, but not give more information beyond acknowledging it.

When discussing the increase in overdose deaths over the past few months involving people she had gone to school with, participant 3 said, "Most of them's [people she went to high school with] dead now, because of overdose. We have actually had a lot of overdoses here the past few months from people that I went to school with. It's pretty sad". For participant 3, these experiences seemed to enforce the idea of "knowing her limit" and knowing when to stop, which for her was when if she began to vomit.

Strategies discussed by participants that affect vulnerability to an overdose

Participants discussed various strategies that increased or decreased vulnerability to an overdose. These strategies were discussed when participants were directly asked how PWUO

protect themselves from an overdose. Strategies discussed that decreased participants vulnerability to overdose included using small amounts of opioids, not mixing difference substances, and not rushing the injection process to allow for testing their drugs in order to get a sense of their purity and potency.

Eight participants mentioned using small amounts as a way to prevent overdose. This strategy was useful for decreasing vulnerability to an overdose because it ensured that the individual didn't take more than their biology could tolerate or didn't misjudge their tolerance, which was mentioned as a factor contributing to overdose. Specifically, five participants mentioned that PWUO were overdosing because they didn't know their limits or misjudged their tolerance. Participants explained that PWUO in the community were taking too much at one time or were continuing to consume opioids despite potential warning signs like becoming nauseous.

Another strategy that was discussed was avoiding polysubstance use, or mixing different drugs. Polysubstance use was discussed by 12 participants and mentioned explicitly during one discussion where a participant's family member overdosed. Participant 1 explained how their uncle consumed Xanax and Heroin at a party, which resulted in his uncle passing out and overdosing on the couch. When explaining what had happened he said, "You are not supposed to mix Xanax with anything, because you will die in your sleep. That's what I have heard. That how my uncle died…mixing Xanax and Heroin…and just fell asleep and never woke up".

Participants also discussed that rushing the injection process could increase one's risk of experiencing an overdose. While this was discussed generally, it was frequently associated with not being able to test the strength or purity of one's drugs because of using in public spaces where PWUO feared being detected by others. Overall, sixteen participants mentioned or responded to a question about testing drugs and of the sixteen, six explicitly mentioned rushing

did not allow PWUO time to test their drugs and increased vulnerability to overdose. Testing the strength and/or purity of one's drugs was important despite many participants not using this strategy or reporting others readily using it. Ten participants discussed the dangers of laced heroin or other drugs. Specifically, that Fentanyl was present in the heroin supply and that other adulterants seemed to be contributing to higher incidence of overdose in the area.

Twelve participants mentioned testing their drugs as a strategy to decrease vulnerability to an overdose. While twelve named testing as a strategy, only six described engaging in this strategy personally. Three participants mentioned snorting or tasting the drug before injecting, indicating that doing so gave the participants a sense of its potency and purity. If the heroin or substance tingled, tasted or "felt" right then they went ahead and either purchased the substance or went ahead and injected it. The other three participants generally mentioned testing their substances before purchasing or using them. Finally, four participants indicated that they didn't hear or know about PWUO testing their drugs before doing them.

Strategies discussed by participants that affect vulnerability to dying from an overdose

Participants discussed strategies that increased or decreased vulnerability to dying from an overdose. These strategies were discussed when participants were asked how PWUO respond to an overdose, as well as indirectly when asked about their ideal micro social environments when they use opioids. Vulnerability to dying from an overdose was related to not receiving timely medical attention, which occurred when a PWUO was not identified as overdosing or when they were identified but received delayed medical action. Not being identified as overdosing most often occurred in examples where PWUO were using alone or were hidden behind a barrier that prevented others from recognizing that they were overdosing. For example participant 14 explained, "If you're using a local bathroom, the door's locked, and it's one

bathroom…which a bunch of places are- it's just one bathroom…you walk in…and you've got the door locked and you OD, you know, no one's really probably going to be able to help you. That would be a big risk there". Delayed medical attention most often occurred when PWUO were in the presence of others due to fear of law enforcement or legal consequences.

While some participants preferred to use alone, others indicated that PWUO used with others as a strategy to decrease vulnerability of an overdose becoming fatal, however, many PWUO also used with others for purely social reasons. For example, participant 6 explained that some PWUO enjoy, "chilling with their high, and they like chilling with other people" (*Male, 19*). For other PWUO, using with others was a conscious choice to protect themselves from overdose, for example, Participant 2 said in instances where someone was getting heroin from a new source or was unsure of its strength, it was important to use with others. Specifically she said, "If you're trying or getting it from somewhere new…you've never tried it before, you never want to do it alone...You do it alone, nobody is there to bring you back. You just pass out and that's it…" (*Female, 29*). Other participants also discussed being fearful of using alone and always having someone present as a protective measure in case an overdose should happen.

Using with others was a strategy to protect oneself from an overdose becoming fatal, however, in the event of an overdose, there was no guarantee that the people present would call 911 leading some participants to state that injecting with others was dangerous. This was closely related to the nature of those present and PWUOs fear of law enforcement. When a PWUO begins to overdose those present may not call 911 or provide the proper medical attention due to fear of law enforcement and legal consequences. Therefore, a best friend might be trustworthy enough to call for help, but others who are not as close to the overdosing PWUO are more likely to leave or give minimal help, if any.

Another strategy known to decrease mortality from an overdose is the possession and use of Naloxone. However, in the current sample of PWUO this strategy was not readily utilized. Ten out of 16 participants indicated that PWUO do not carry Naloxone and many did not know what Naloxone was or where to purchase it. When asked who in the community carries Naloxone, EMS and police were mentioned but rarely community members. Participant 16, also mentioned that the syringe exchange program at the health department was distributing Naloxone. In the two instances community members did have Narcan it was due to a previous experience with overdose in which emergency personnel gave the individual a dose to take home should they overdose again. For example, participant 1 explained that EMS in Lexington gave his brother Narcan because he was overdosing frequently, and now his brother carries it with him. Participant 1 also indicated that he carried Naloxone in case one of his friends overdosed.

The overall lack of Narcan directly impacted the risk of an overdose becoming fatal in each environment. This is an important key finding that has implications for each micro physical environment, but especially those where there was more uncertainty about 911 being called and/or effective medical response being taken.

Physical Risk Environment

The physical risk environment was identified by asking participants about the settings where they used opioids as well as features of those settings. Participants listed various places, however, not every location discussed presented the same level of vulnerability to an overdose or dying from an overdose. While all locations were examined, five categories emerged as the most salient. These categories were public bathrooms, homes, cars or vehicles, outdoor spaces and places of drug dealing. Public bathrooms, homes and cars or vehicles included any instance where a participant described using in one of those specific settings. Outdoor spaces and places

of drug dealing were broader categories that encompassed many different locations with similar features and risks. The results are presented setting by setting in the order listed above. Within each setting vulnerability to an overdose and dying from an overdose is discussed in terms of the features discussed by participants.

Settings and Features of Settings

Public Bathrooms

Public and residential bathrooms were frequently discussed as a setting where PWUO would use opioids. Many of the participants said one of the main reason why PWUO used bathrooms was because they had a locking door, which provided privacy from non-PWUO and law enforcement. Public bathrooms were described as being in restaurants, stores, gas stations, or homeless shelters; they could contain a single stall or have multiple stalls. Various examples of public bathrooms were described, for example, single bathrooms at fast food locations such as the "self-bathrooms at Sonic"; porta-potty stalls; gas station stalls like those at the local BP, which were described as having an outdoor stall for men and an indoor stall for women and finally multi-stall bathrooms at fast food establishments.

Another set of reasons given for using opioids in public restrooms were related to an inability to use at home because of family or others present in the home unaware of the individuals use. An example arose when Participant 6 was asked if PWUO make it home after they buy opioids. They explained, "I know most people around here, if they do it…somebody living with them that don't mess with it…they've got to leave their house to do it…" *(Male, 19)*. Additionally, being in a state of withdrawal would influence which setting PWUO injected in. When PWUOs became "dope sick" they were motivated to use opioids as soon as possible to

decrease the uncomfortable symptoms of withdrawal. Participant 5 explained how it felt to be in a state of withdrawal from one opioid, heroin. They explained that an individual feels like they are dying and that their focus is relieving the feeling as soon as possible. They described the situation the following way, "…If you start coming off something like heroin or coke…it feels like you're dying. So it doesn't matter where you gotta go to do it [use opioids], you just need to feel better…" (*Male, 24*). As a result, a public bathroom were the ideal setting given the situation, however, they were not the most preferred environment due to their public nature.

Bathrooms offered PWUO privacy compared to other public settings due to their locking doors. This was important because participants frequently discussed being fearful of detection by strangers and the police and their potential consequences, like arrest**.** Some bathrooms provided more privacy than others, for example Participant 13 explained that certain bathrooms, like those at gas stations, were not an ideal place because PWUO were at risk of being walked in on by a stranger, but other types of bathrooms, such as porta-potties, could offer more protection. Participant 13 explained, "…Anybody can just walk in on you [in a gas station bathroom] and there you are. What are you gonna say? What if it's a little kid? You know?" *(Male, 27).* While porta-potties were only mentioned once, their discussion highlighted an important finding; the most ideal bathrooms, were those that concealed the PWUO the most, and provided the most privacy and security available.

Features that affect vulnerability to an overdose in public bathrooms

While public bathrooms were frequently discussed, there were many features that negatively impacted vulnerability to an overdose. One such feature was the fear of detection by others such as non-PWUO, especially law enforcement, because of the potential legal consequences of being seen engaging in opioid use, especially injection drug use. This was

contrasted to settings such as personal homes, which were seen as more protective from a legal standpoint. Additionally, participant 8 mentioned that law enforcement patrolled around gas stations like the local BP because of drug related activities like drug dealing.

Participants described that features of public spaces, like the presence of other people and fear of detection, were common concerns that could lead to rushed injections, along with the inability to test their drug(s). Participant 1 also discussed how public places allow for less injection time and additionally that PWUO, "…don't want to carry the stuff [drugs] around" because they could get in trouble for drug possession. Thus, PWUO are more likely to not only rush their ion in public places such as restrooms, but also inject or take the entire amount of drugs purchased. Taken together these factors increase vulnerability to an overdose. Participant 1 explained, "…like all of the public places…in a bathroom, you are gonna rush as quickly as you can, and that's probably going to cause…might cause an overdose" (*Participant 1, Male, 18*).

Alternatively, fear of detection and the presence of others could act as a protective factor. Participant 9 discussed that while the fear of detection and presence of other people might cause an individual to rush, they may also use less because they have less time. Participant 9 said, "Bathrooms…probably somebody else right behind you, or you know, close, came in there, saw you know-they would be in a hurry…They wouldn't get to do as much as they probably normally would if they had more time" *(Male, 34)*. Participant 13 also added that people might use less because they don't want to get in trouble or overdose in public. Participant 13 explained that people might, "Do less dope because…you're afraid of the law or somebody seen you and call the law on you" (*Participant 13, Male, 27*). By using smaller doses, PWUO decreased their risk of overdose while avoiding detection by strangers and law enforcement.

Features that affect vulnerability to dying from an overdose in public bathrooms

A feature that was frequently discussed as both desirable but dangerous was a locking door. Locking doors provided privacy away from the gaze of others, however, because PWUO are hidden, non-PWUO or others present would not be aware that the individual is overdosing, increasing the chances of the overdose becoming fatal. Participant 13 highlighted how a single stall bathroom with a door impeded visibility and negatively impacted vulnerability to dying from an overdose. They explained, "I was in Florida there was this guy he walked in. I knew he was goin in there to get high and he stayed in there forever and this man come and beat on the door says. They went in there and he was spread…" *(Participant 13, Male, 27)*. In this situation, action was taken to investigate why the man wasn't leaving the bathroom, however in other instances others may not be present to assist or investigate, delaying critical medical intervention. Participant 1 discussed the consequences of privacy through the use of locking doors; someone they knew had died because a locked door prevented others from identifying that she was in need of medical attention. They said, "My brother's girlfriend…she overdosed [and died in a bathroom] at the homeless shelter…that's what she did. She locked the door" (*Participant 1, Male, 18*). Participant 8 explained it the following way, "…you lock that door and nobody can get into to you. And at the bar, nobody is going to really care, because they are going to be right there with you. Nobody is going to bother you…they ain't going to know if you overdosed or not…" (*Female, 33*).

While generally public bathrooms could be risky, multi-stall bathrooms offered more protection from an overdose becoming fatal compared to a single stall bathrooms if others were present in the setting. Multi-stall bathrooms provided privacy from non-PWUO, however, non-PWUO were able to notice the person using opioids, even if they didn't suspect they were using

opioids. In this scenario, a non- PWUO could intervene if an overdose were to occur because they would be more likely to notice the PWUO in medical distress. Participant 10 expressed that is would be scary to overdose in a public bathroom because of the bystanders present, however, they recognized that the presence of others could be a protective factor. They reasoned that, "…I mean I guess somebody could find'em at least in a public place…" despite their presence during injection being distressful (*Female, 25*). Participant 10 also thought that non-PWUO would be likely to call 911 in the instance a PWUO was overdosing because they are removed from the situation. Therefore, a multi-stall bathroom can provide more protection, since the PWUO is not entirely hidden from view and in the instance an overdose occurred a bystander could call 911. It is an interesting balance, because PWUO do not want non-PWUO to see or detect them, therefore they hide their use, however, other people could be protective against dying because they could call for help.

Homes

Personal homes and the homes of those in a PWUOs social network such as friends and family were another frequently discussed setting. Personal homes are distinct from trap houses because they are more private in nature and are not necessarily an active place of drug dealing. Homes are also likely less open to socialization by individuals or groups of individuals that are not well known by the homeowner. Injecting or using drugs in a residential home, whether a personal home or a friend's residence, was described as one of the most ideal places to use. Individuals in these settings are likely to have a close social proximity, because a home is a private and intimate space, therefore the owner is going to exert more control over who can enter and allow those who they know or trust. Those that are present are therefore more likely to be close with the homeowner or related to them and risk of visibility by non-PWUO or

apprehension by law enforcement was discussed as low. Included in the definition of homes are single or multi-level homes.

Important features of homes that made them ideal settings were the privacy that they offered compared to other settings such as public bathrooms, cars, or outdoor areas. Homeowners could dictate who was allowed to enter and remain on the premises and except in instances where law enforcement had a warrant or conducted a raid, non-PWUO were not likely to be present during times of injection and drug use. Therefore, risk of detection or unwanted consequences was lowest in this micro-physical environment. Privacy was especially important for those who had been to jail previously or had a prior arrest record. For example, participant 13 discussed how he had recently gotten out of prison and therefore was especially careful about where he injected so as not to draw attention and get arrested again. Participant 7 also explained that they preferred to inject at home because they knew they wouldn't be interrupted and could concentrate better on the process of injecting.

Other participants explained that homes provided safety, privacy, relaxation, and control over the environment. For example, Participant 4 described their reasoning behind why they preferred to be at home, "…now if I do something I try to do it at home to where I can just relax. I don't have to worry about being out in public and talking to the cops. And, I don't have any of that worry. I don't' have to look over my shoulder. I sit at home and I am comfortable. Nobody can bother me" *(Female, 27).* Participant 11 also described their preference for using in their home in the following way, "Because it's my business, and I don't – I just feel like it's me doing it and not nobody else, and nobody else should see me doing it" *(Female, 25).*

Mobile homes were excluded due to indications that law enforcement policed the trailer parks more frequently, conferring a different meso-level law enforcement risk environment.

Participant 15 explained that police would patrol the trailer parks fairly regularly and interact with residents, likely as a community policing strategy but also to ascertain if any illegal activity was occurring. Apartments and apartment homes were not discussed by participants and therefore not explicitly included.

Features that affect vulnerability to an overdose at home

One feature of homes discussed by participants that increased vulnerability to an overdose was the presence of other drugs. Participant 9 discussed how at the home of a PWUOs, they may have more drugs present compared to other settings like a car or out in a public space. This feature increased the likelihood of mixing drugs or polysubstance use, which is a risk factor for overdose. Participant 9 explained that at a friend's house, "That'd probably be, like the highest…to where you mix it because…they might have more than – more drugs [present]" *(Male, 34)*.

Additionally, because there was a greater sense of security at home compared to being in a public space, PWUO might use greater amounts at home compared to other settings. This is because outside of the home there was a greater risk of being detected by strangers and law enforcement. In order to avoid negative consequences, PWUO may not have used as much or carried as much opioids, also decreasing their risk of overdose. Whereas at home, PWUO feel more comfortable and may not have any obligations, leading them to use greater amounts of opioids or use opioids more frequently, placing them at an increased risk of overdose. Participant 13 explained how this atmosphere lead to increased consumption. They said,

> At home…cause I'm going to sit here and get fucked up today. I'm at home, I ain't going nowhere. I've heard it too many times. They just sit there and keep snorting and shooting.

> Snorting and shooting. All through the day. And the next things you know you come back a couple hours later and there he is. On the floor dead or OD *(Male, 27)*.

Features that affect vulnerability to dying from an overdose at home

Locking doors were also brought up in the context of home settings; privacy was important to many participants even among PWUO they knew well. Participants noted that they don't want to inject in front of their other friends, even those who also use opioids. For example Participant 13 explained "I don't even like doing it around my best friends" *(Male, 27)*. Therefore, even at home PWUO might go into a bathroom or bedroom and lock the door. Similar to single stall bathrooms in public spaces, if a PWUO began to overdose, the door became a dangerous barrier preventing others from recognizing their friend needed assistance. This increased the chances of an overdose becoming fatal.

When participants discussed substance use, a few individuals mentioned using alone but more frequently participants mention using with a friend or family member at someone's home. While using with others was theorized as a potential way to protect oneself from an overdose becoming fatal, the situation was more nuanced when other PWUO were implicated. In the event of an overdose, there was no guarantee that the people present would call 911 leading some participants to state that injecting at home, but more generally, with others was one of the most difficult settings to protect oneself from dying of an overdose. This was closely related to the nature of those present and PWUOs fear of law enforcement. When a PWUO begins to overdose in the presence of other people, many participants explained that the first reaction is fear, in part for the person's life but also due to the legal consequences of the situation. Drugs are likely to be present in the home and any friends or family with the overdosing individual may be high and therefore paranoid and fearful of arrest. These consequences discouraged those present from

calling 911 or increased the time it took for 911 to be called; in the instance that 911 was called, those present were likely to leave before law enforcement arrived, leaving the overdosing person by themself. Regardless, both situations increased the likelihood of the overdose becoming fatal.

These concerns were compounded when taking into account past conviction history because those with past arrest records could be even less likely to call. When describing a situation like this, Participant 3 said, "…the people that's getting high with a friend at their house, or at their friend's house…when they start…when they start overdosing…the friend gets scared and they will not call an ambulance. They will not call the police. They just leave them there…" (*Female, 27*).

Additionally, the homeowner could influence whether or not they allow 911 to be called because of the criminalization of overdose. Some participants discussed that those present, especially the homeowner, were at risk of being charged with murder if the person dies. Participant 10 explained, "…some people would try and hold you back from calling 911. Some people would like literally beat the crap out of you if you tried to do something like that while someone is OD-ing, especially if it is not your home and its theirs because you know people can get in trouble for it…" (*Participant 10, female, 25*). While participants had not seen this occur, they were aware of police threatening homeowners with charges related to murder. One participant also mentioned that those present were fearful of arrest because police could question those present about the source of the opioids and if someone present had supplied the opioids they could be arrested and charged. Participant 7 explained, "Some people won't [call 911] cause they are afraid they will get into trouble because the drug's come from them…" (*Male, 26*) further discouraging others from calling 911. This is more important if the owner of the home or anyone present had a criminal record, warrants or was on parole.

These discussions highlighted an important finding: that the nature, quality and strength of one's relationship with another individual predicts the likelihood they will call 911. Participant 3 cautioned that, "unless you have a really good friend that is just there and will save your life…" (*Female, 27*) using with others could be dangerous. A best friend might be trustworthy enough to call for help if their friend was overdosing, but if an individual who was overdosing wasn't socially proximate to anyone present, they were likely to be left or given minimal help if any; highlighting the role of the social micro environment in overdose survival. Specifically, that friends and acquaintances may not be reliable to call 911, however, a best friend, close relative or partner would be most likely to. In the examples given where participants called 911 or knew that 911 was called, those present were close to the overdosing individual and were less concerned about the potential consequences. Therefore those who were more social proximity to a PWUO or had a moral imperative to save someone was less concerned with the legal or personal consequences and called 911 regardless.

Although criminalization of overdose was a concern for homeowners and others present, compared to other micro physical environments with people present, personal homes were one of the better settings to experience an overdose in because the nature of the setting was more intimate and therefore those present more socially proximate, compared other settings such as a places of drug dealing.

Cars or Vehicles

Cars/vehicles were another setting discussed by many participants. Cars were viewed as semi-private spaces that provided more protection from detection than an outdoor space, but less than a bathroom or a home. Cars also gave participants the ability to drive to various locations like parking lots, secluded roads or to the side of the road. Participant 14 explained, "…you're

concealed really, and you can do it anywhere…well concealed is like, you know, hypothetically, if you wanted…to shoot, put a needle right now, not many people's going to see it…because they can't see in the car" *(Male, 25).* A couple participants also discussed the ability of those in the car to inject while driving. Participant 1 described one example in which a passenger could inject in the car, "But I know people that will do it… you know if you're driving down the road in the passenger's seat. They just do it. That's when you're a really bad addict. You don't care. But then when you're not there yet, you kind of have morals" *(Male, 18).*

While a car offered more privacy than an open public space, participants were still fearful of detection by law enforcement since they could be stopped or questioned by police. Also, being pulled over in certain places such as the side of the road or in the back of a parking lot could look suspect, and police or non-PWUO could, "come up on you" or pull up behind you. In those situations, PWUO could be detected leading to negative consequences such as arrest or apprehension. Participant 13 explained, "…It's easy for a cop to just pull in behind you. And then there you are with all your stuff out and you're in trouble" *(Male, 27).*

Similar to use in public restrooms, PWUO discussed injecting in cars or vehicles because they were in withdrawal and needed alleviate their "dope sickness" soon after purchasing opioids or in situations where they could not use at home. For example, participant 13, explained that they would buy drugs, drive a short distance from the place of drug dealing and inject or use heroin on the site of the road, shortly after purchasing it.

Features that affect vulnerability to an overdose in a car or vehicle

Due to the fear of detection by strangers or police, PWUO may rush injection and not test their drugs, leading to an increased risk of overdose in this micro physical environment. This is

similar to other public spaces like public restrooms, where there is less perceived time to inject. Participant 1 explained, "…like all of the public places…you are gonna rush as quickly as you can, and that's probably going to cause…might cause an overdose" *(Male, 18).*

Features that affect vulnerability to dying from an overdose in a car or vehicle

While being able to travel to various locations was an ideal feature, the setting a PWUO traveled to inject could influence vulnerability to dying from an overdose. For example, in more secluded settings if a PWUO overdosed they were less likely to receive medical attention, especially if they were injecting alone. Participant 14 gave an example of three possible outcomes of a scenario in which a person overdoses in a car. In the first scenario, if the PWUO in the vehicle was injecting alone and overdosed, the only person who might be able to help is a passerby. However, if the setting is secluded a bystander may not pass the vehicle for hours, and even if they do they may not notice that the person inside the vehicle requires medical attention, increasing the likelihood that the overdose will become fatal.

In a second scenario, if the PWUO was injecting with a friend, family member or associate they could serve as a protective factor if the person was willing and able to help. However, even if the friend was willing to help, cell service may be an issue, which could prohibit the person from calling 911 or alternatively EMS may be slow to arrive to the location. The last resort for saving the overdosing PWUO would be for the friend present to drive them to the hospital. The third and final scenario was similar to the second, except that instead of helping, the associate "freak[ed] out" and provided no assistance, in which case the person overdosing would be more likely to die. As previously mentioned, the nature, quality and strength of one's relationship with another individual predicts the likelihood they will call 911. In instances where a PWUO was with a close friend, partner or relative, the likelihood of calling

911 was higher; however, if the PWUO was with a friend or acquaintance then the outcome was more uncertain.

Outdoors

Outdoor environments were another setting that was discussed by participants. Outdoor environments where PWUO might go included parks, wooded areas, Cave Run Lake and Lockegee Rock. These outdoor spaces shared similar features of being open, public spaces. While some of these settings are more secluded than others, for example wooded areas, Cave Run Lake or Lockegee Rock, non-PWUO could still come in contact with a person using opioids since those present in the space had little control over who passed through. Local parks were considered an outdoor setting but are slightly different in that, there might be more people present in a park than in the woods or at Lockegee Rock.

Features that affect vulnerability to an overdose in outdoor spaces

Similar to other public spaces, fear of detection could cause PWUO to rush and not test the strength of their drugs. Parks were described as public spaces where children play, making them a bad place to inject. Due to their public nature, participant 19 agreed that people would be in a rush and not have time to test the strength of their drugs, placing them at an increased vulnerability to overdose. Time of day could also impact overdose risk in these types of settings due to the absence of good lighting, which would be most relevant at night. If someone were to inject in the park while it's dark they would not be able to see what they were doing and might measure too much drug out and not realize it. If the amount taken was too much, the mixture could lead to an overdose. While the other outdoor spaces were not associated with children as

much, they had similar vulnerabilities that could lead to overdose; the need to rush, and poor visibility at night.

Features that affect vulnerability to dying from an overdose in outdoor spaces

A major feature of the woods, Lockegee Rock and the lake was their remote nature, which provided more privacy compared to other public spaces. This was a desirable trait however, it also increased vulnerability to dying from an overdose. For example participant 6, listed outdoor settings as one of the worst places to overdose due to their remoteness. When PWUO inject in outdoor environments alone, they had similar vulnerabilities as other environments that were secluded or private; in the event of an overdose an intervention would be less likely or occur at an undetermined time due to the variability of bystanders passing and noticing. Similar sentiment was shared about Lockegee rock; participant 15 explained, "…You can overdose up on Lockegee, there's so many different spots on the top of the rock that you can go. It could take people days, you know, days to weeks to realize you haven't come home or you know even to go to, think to go there and look" *(Female, 26)*.

In instances where PWUO used with others in these settings, issues regarding the nature, quality and strength of one's relationship with other individual(s) present predicted whether they assisted or left the scene. Participant 6 expressed that if a person were to overdose in the woods, anyone they were with would likely leave them there, "Their reaction was tied to the idea that the person present wouldn't want to get in trouble over someone overdosing and "rat themselves out over you OD-ing", expressing fears regarding criminalization of overdose. This conversation echoes many others where people indicated that they were fearful of getting in trouble with the police. While it was unclear if this was a personal view or that of others participant 6 encountered, based on what other participants have discussed, action is more likely if PWUO

was with a close friend, partner or relative and less likely if the PWUO was with a friend or acquaintance.

Participant 11 discussed how at Cave Run Lake or at a park there could be a greater chance people present, and therefore in the event of an overdose they might be willing to call 911. However, cell service may be an issue in some areas, especially "up on the ridge". So even in the event that someone was willing to call 911, there may be barriers to calling due to cell service. Participant 11 and participant 14 also discussed that this setting was difficult for EMS to access, which would delay critical medical attention. When discussing the park, one participant mentioned its proximity to a hospital and hypothesized in the event of an overdose, EMS would arrive quickly. When talking about City Park participant 14 said, "City Park – EMS would get there fair enough, quickly. I mean, that's not five minutes from the hospital and three minutes from the police station. [Interviewer: So…if someone OD'd at a city park and someone was around…] Someone would call…EMS would show up" *(Male, 25).*

Places of drug dealing

Trap Houses and Drug Dealers' Homes

Participants discussed two settings where drug dealing occurred, these micro physical environments were trap houses and homes of drug dealers. While these settings shared similar features like the presence of drugs and certain vulnerabilities to overdose and to an overdose becoming fatal, trap houses had distinct features that precluded it from being grouped with drug dealers' homes.

Trap houses were likened to "shooting galleries" and "crack houses" and described as a house or trailer where individuals could congregate, party and openly inject or use drugs. Some

participants said that trap houses were the worst places to inject while others said it was an ideal setting. Trap houses were described as laid back since everyone present was likely using drugs and there was less fear of judgment or stigma. Participant 6 described them the following way, "…trap houses are…it's usually the most laid back place. Like, I mean, you walk up into the trap house. You already know everybody, and the trap house is cool… and you usually already know who you're dealing with...Like, there ain't nobody in there, like, in a trap house, that ain't cool; because – that's the reason why they call it trap house, because the drugs and stuff" *(Male, 19)*. They were also described as being busy and full of activity. When Participant 4 was asked what happens in Trap Houses, they replied, "…What's not happening there? There's people in an out all of the time. And nobody really respects privacy in a trap house. Knocking on doors is a thing of that past, if there is a door" *(Female, 27)*.

The main distinction made between trap houses and drug dealers' homes, was trap houses were more socially open; they allowed more individuals to pass through the space and thus may have a dozen individuals present during one time. The homes of drug dealers were described as more intimate settings, where social flow was more controlled since it was likely their personal home. Also, not all places of drug dealing allow their clients to inject in their setting or to stay and "hang out". Whether a drug dealer allowed use in their home was related to how well they knew the client. Participant 13 described how, "Some places don't care if you hang out. Some do. It depends on where you go and what your preference is…" *(Male, 27)*.

PWUO might want to use in a trap house or at their drug dealers' home if they want to socialize or "chill with their high", or if using at home was not an option or in instances where the PWUO was in withdrawal and needed to use immediately after purchasing their drugs.

Features that affect vulnerability to an overdose in a place of drug dealing

One feature of trap houses and homes of drug dealers that allowed drug use was the presence of other drugs as well as peer pressure take more drugs. Both these features increased vulnerability to an overdose because a PWUO could engage in polysubstance use or consume substances beyond their current tolerance. Participant 5 explained that trap houses are, "…Where the peer pressure is put on. Once they take that first shot and get feeling good, the dealer might say hey do you want some more?" *(Male, 24)*. Polysubstance use might also be occurring in this setting, putting those present at an increased vulnerability to overdose. When asked why this type of setting is riskier, participant 16 described a similar situation but in relation to homes of drug dealers. She explained, "I mean I feel like, being around at a drug dealers house, where they're selling it and there is more of it in your face or being around friends that have large quantities going around, I feel like, you might be more at risk somewhere like that, just because there's more of it going around, you're going to want to do more" *(Female, 25).* In situations where a drug dealer does not allow his or her clients to use at their home, these features would not be present; vulnerability would be determined by the setting where the PWUO decided to inject.

Participant 1 offered an interesting counter perspective, they mentioned that going to a place of drug dealing or generally being around other PWUO who are using from the same batch of drugs could be a protective factor. If others present are using the same drug from the same dealer, one could visually observe how much other people are taking and get an idea of the strength and purity of the drugs. The Participant explained their logic the following way, "Like I heard…down the street…over here…six people overdose in one house, in one night. I don't see how that's possible, because wouldn't you think that after the first person did it, they're like ok…we need to do a little less…" *(Male, 18).* Therefore, seeing how another person reacts to a

drug could be an indication to the next person how they should dose themselves and could serve as a protective factor by decreasing overdose risk. However, that same participant also discussed that in practice this might not be very likely. He went on to say, "…that's not how their minds work. They are like 'yeah…let's do more'. It's crazy. I don't know the answer, really. Wish I did".

Features that affect vulnerability to dying from an overdose in a place of drug dealing

Many features of a Trap Houses and homes of drug dealers, like the presence of drugs and open drug use increased a PWUOs vulnerability to dying from an overdose. Two participants were clear that overdosing in a trap house was dangerous, because of the incriminating nature of the activities going on in the micro physical environment. Due to these activities those present were likely to be fearful of calling 911 and thus could either refuse to call 911 or delay calling, increasing vulnerability of the overdose becoming fatal. While one participant discussed that the presence of other people might be somewhat protective, overall the people present in these settings were not likely to respond effectively. Participant 4 mentioned that, "if the people there [Trap House] actually care…you will be less likely to die because there will be people there" *(Female, 27)*, however, other participants such as participant 6 mentioned that the likely response would be to drive the overdosing person to the hospital or call someone else to pick them up. In this micro physical environment, the first goal would be to get the overdosing PWUO away from the Trap House, so those present do not get caught or find themselves interacting with law enforcement. Participant 6 explained, "They would get rid of you, and like, they wouldn't try helping you" *(Male, 19).* In theory however, while getting rid of the person isn't an ideal response, the act would likely produce a better outcome than if the PWUO was overdosing alone. To a certain extent the nature, quality and strength of one's

relationship with other individual in the space would likely predict the course of action, however, due to the number of individuals likely implicated in this setting, and extensive drug use, some sort of action is likely, even if it's only removing the individual from the premises to the hospital or into the hands of another individual.

Chapter 5: Discussion

Introduction

This is the first qualitative study elucidating the overall rural risk environment related to overdose, and more specifically this study has given greater insight into (1) the places where PWUO go to use opioids in rural areas; (2) the features of these places and (3) how these features may affect vulnerability to an overdose and/or vulnerability of an overdose becoming fatal. Using a constructivist grounded theory methodology, a theory surrounding the use of stigma management has been inductively and iteratively discovered through the data. The following section is a discussion of this key result, that is, the main theory derived from the data. Following discussion of the theory is a discussion about other aspects of the rural risk environment and how these findings compare to the literature.

Discussion of key results

Identity management and audience segregation through the use of "concealment strategies"

Stigma is an important component of the risk environment framework and is conceptualized in the social risk environment at the macro level. Numerous studies have shown its detrimental effects on health outcomes, especially for PWUO (Ahern, Stuber &Galea, 2007; Livingston, Milne, Lan Fang & Amari, 2012; Schomerus et. al., 2011; Buchanan & Young, 2000). Erving Goffman (1963), defined stigma as "an attribute that is deeply discrediting", that causes those in the social space without the stigma, who can be conceptualized as "normal", to think differently, i.e. negatively, about the individual who possesses the stigma. Furthermore, Goffman states that stigmatized individuals are reduced "from a whole and usual person to a tainted, discounted one" (Goffman, 1963 pp. 3). This reduction from a whole person to one that

is “less” can done through various mechanisms, in the case of drug use and injection drug use they are largely social and legal mechanisms, that result in marginalization, and further stigmatization of the individual.

Stigmatization of drug use, but especially injection drug use, arose frequently across participants in the interviews. As one participant noted, “People judge you more if they see you shooting up then if they see you smoking a joint. You constantly feel like a piece of shit, but you don’t want other people to see that too” *(Participant 5, Male 24)*. Society is socialized to despise drugs and in effect those with a substance use disorder (Barry et al., 2014; Corrigan, Kuwabara, & O’Shaughnessy, 2009; Link et al., 1999); this socialization involves equating the “badness” of a drug or the act of drug use, to the person engaging in the behavior (Conrad & Schneider, 1992). These ideas are “justified” due to the criminalization of drug use, which serves to identify and marginalize those who use drugs by “socially discrediting” (Goffman, 1963) these individuals through the use of legal consequences such as arrest and incarceration, or economic consequences such as an inability to obtain employment either due to drug screens or previous criminal record (Leis & Rosenbloom, 2009; Barry et al., 2014; Corrigan et al., 2009). Taken together, these legal and economic consequences translate into social ones whereby those without the stigma, in this case non-PWUO, do not want to associate with known PWUO (Barry et al., 2014; Corrigan et al., 2009) and will call law enforcement at any sign that an PWUO is using opioids in the same social space. If law enforcement isn’t called, there are still social consequences; if the identity of the PWUO is known, the bystander that saw the PWUO is likely to make others in the community known of their observation. So while there were not legal consequences, the individual is likely to be marginalized and socially isolated from non-PWUO further.

Due to the real consequences of one's stigma being known, individuals are motivated to try to hide their stigma, or things associated with the stigma, known as stigma symbols (Goffman, 1963). In the present study on overdose, stigma symbols include paraphernalia, the visible act of injecting opioids, and overdose. These symbols are crucial, because their visibility can signal to an otherwise unknowing bystander that the individual is "deeply discredited" (Goffman, 1963) and is a person who uses opioids. As previously mentioned, and highlighted by the findings of the study, discovery that an individual is a PWUO comes with serious consequences such arrest, incarceration, shame and further social isolation.

PWUO already feel a certain level of shame and stigma from their community, as well as their own internalized and externalized shame. These feelings could be amplified or perceived differentially by rural PWUO due to the unique sociocultural environment of Appalachia, since stigma is socially determined and influenced by social and cultural contexts (Williams & Polaha, 2014; Yang et. al., 2007; Link & Phelan, 2001). While the literature on substance use disorder has not discussed this, studies focusing on mental illness have found that while rural Appalachians experience stigma surrounding seeking mental health services for their children, "…the specific experience may be unique due to aspects of Appalachian culture…Although there is variability in culture across communities within the Appalachian region, particular cultural beliefs more common to rural Appalachia may engender stigma" (pp.4, Williams & Polaha, 2014). Since networks are closer, and people within those networks more connected, it becomes difficult to manage identity information, like opioid use disorder, and keep it from others since more information is generally known about individuals and their life histories (MacAvoy & Lippman, 2001; Willams & Polaha, 2014; Jameson & Blank, 2007).

PWUO's strategy to either conceal this knowledge or attempt to lessen its negative effects, therefore, involves managing the visibility of stigma symbols associated with opioid use and injection drug use. In this study, the primary concern is visible opioid use and overdose, which is influenced by the micro social risk environment. In order to manage stigma symbols, PWUO engage in "concealment strategies" (Goffman, 1963) in an attempt to control the physical and social environment for example, by injecting at home, or if home isn't available seeking out public spaces with locking doors, using in a car or seeking out a place of drug dealing; controlling the social environment involves using opioids alone or only using with other PWUO and not carrying or "stashing" drugs and equipment.

Stigmatization and the desire for participants to manage their stigma and shame was the common thread amongst all participants and in one way or another influenced vulnerability to an overdose and/or vulnerability of an overdose becoming fatal. The ways in which participants managed their identities and stigma manifested in the form of seeking physical and social barriers, whether that was a locking door, using in secluded places, using alone or only using with other PWUO. While these physical and social barriers were important and necessary to participants, these strategies put PWUO at a greater vulnerability of an overdose or an overdose becoming fatal. That is because while concealment is crucial to stigma management, they increase unsafe injection practices and perpetuates unsafe responses to overdose.

Concealment can come in many forms, as mentioned previously, participants sought concealment by seeking out settings that allowed for the most privacy based on their current set of circumstances. Circumstances that impacted the specific settings PWUO could choose from included whether or not they could use at home or if they were in a state of withdrawal. If none of those factors were an issue, PWUO would likely choose to inject in personal homes or

friends' homes, however, for some that was not possible; for example, if a PWUO is in withdrawal they may not be able to wait to arrive at home before using opioids. Or conversely they may be unable to use at home because of family or other non-PWUO were present. In the instance a PWUO could not use at home, they would likely go to a friend's home, a place of drug dealing, use in their car, try to find a public bathroom with a single stall and/or locking door, or go to a remote outdoor area. Then, within these settings they would engage in forms of concealment, that managed their identity and as a result their stigma, but put them at a higher vulnerability of an overdose or the overdose becoming fatal.

Stigma and Vulnerability to overdose

In the context of vulnerability to an overdose, forms of concealment to manage stigma symbols include strategies to avoid detection, such as rushing injection in public places, or using all the heroin purchased in case the PWUO stopped by law enforcement. When PWUO rush the injection process or use all the opioids they've purchased, they are unable to engage in strategies known to reduce vulnerability to an overdose, such as injecting slowly, testing their drugs, or using small amounts. While not always the case, many of the stigma management strategies discussed are at odds with safe injection practices meant to protect PWUO from overdose. This is because concealment strategies are predicated on the idea that if PWUO use quickly enough and are not seen engaging in opioid use visibly, or alternatively if they are not caught with opioids, then they have successfully hidden the symbols of their stigma, and therefore effectively managed their identity. In other words, they have avoided detection and successfully not intensified feelings of shame by being caught by non-PWUO or law enforcement, whose social and legal punishments serve to mark PWUO as deviants and further marginalize them. While the known PWUO cannot change the "known-about-ness" (Goffman, 1963) of their opioid use,

successfully concealing their stigma and stigma symbols might be a form of "legitimization" for the stigmatized; by avoiding having an arrest record, or by not adding to an existing arrest record, PWUO can differentiate themselves from other members of their group and in effect diminish their feelings of shame in small ways. One participant discussed how other drug users look down on injection drug users as "worse", which is also identified in the literature (Etesam et al., 2014; Luoma et al., 2007). Within groups of people who use drugs, hierarchies form differentiating "better" drug use from "worse" drug use or drug taking behavior (Etesam et al., 2014; Luoma et al., 2007). Within those sub-groups of people who use drugs, similar judgments and hierarchies are also likely occurring to differentiate how their use might be more "acceptable" compared to a different persons use. In the context of the current study, the ability to successfully manage ones' stigma symbols may put one in a "higher social position" within their own group, at least they may personally view themselves as a better PWUO because they don't get detected or overdose. Also, if a PWUO is able to hide their opioid use for a long enough period, they may believe that they can regain social standing within the community. This idea stems from Goffman's discussions on "audience segregation", whereby if a person is able to successfully manage the visibility of their stigma, others in the community may no longer see or think the PWUO is an opioid user; treating them differently until the PWUO reveals a stigma symbol or proves otherwise.

Engagement in polysubstance use and consumption beyond one's tolerance is most likely to occur where there are other drugs for purchase and consumption or peer pressure is present. In this present model of the rural risk environment, the settings where this is likely to occur are homes and places of drug dealing where other PWUO are present. While polysubstance use is not a primary outcome of stigma management through concealment, the desire to seek out an

environment where a PWUO doesn't feel as if they are "discredited" (Goffman, 1963), arises from the need to conceal their opioid and drug use. In order to do so, PWUO seek out micro-physical environments like homes and places of drug dealing. In these settings, stigma is managed because the risk of detection by non-PWUO is decreased, although not completely absent, however, the presence of other drugs and peer pressure are more likely to be present, increasing vulnerability to an overdose.

Stigma and Vulnerability to Overdose: Potential for overdose protection

While most participants discussed not being able to engage in safe injection practices due rushing the injection process in certain settings, participants 9 and 13 discussed how fear of detection could act as a protective factor only allowing PWUO to use a small amount of the opioids, rather than rush to consume a typical or "large" dose. These two examples highlight a negative case in the findings. Participant 9 discussed that while the fear of detection and presence of other people might cause an individual to rush, they may also use less because they have less time. Participant 9 said, "Bathrooms…probably somebody else right behind you, or you know, close, came in there, saw you know-they would be in a hurry…They wouldn't get to do as much as they probably normally would if they had more time" *(Male, 34)*. Participant 13 also added that people might use less because they don't want to get in trouble or overdose in public. Participant 13 explained that people might, "Do less dope because…you're afraid of the law or somebody seen you and call the law on you" (*Participant 13, Male, 27*). While their actions are opposite of what other participants expressed, they are still effective concealment strategies that allow PWUO to effectively manage their identities by using smaller doses to save time. However, in this example they are able to decrease their vulnerability to an overdose.

Vulnerability of an overdose becoming fatal

Concealment strategies are also implicated in vulnerability to an overdose becoming fatal. Vulnerability to dying from an overdose was related not receiving timely medical attention, which occurred when an overdosing PWUO was either not identified as overdosing or was identified but received delayed medical action. The former occurs in examples where PWUO are in secluded settings away from bystanders or hidden behind a barrier that prevents others from recognizing that they are overdosing. The latter occurs when PWUO are in the presence of others, who in the event of an overdose become fearful and either attempt to help the PWUO themselves, delay medical attention or leave the scene and assist minimally. These two differences highlight two different trajectories that arise depending on the micro social environment, e.g. using opioids alone or with others.

Some participants expressed preferring to use opioids alone, stating that "it was their business" and did not want others observing them. In these situations, PWUO are able to manage stigma and conceal stigma symbols, however by doing so they are at risk of an overdose becoming fatal because others cannot take action. This situation can arise if a PWUO injects alone, or in situations where they use opioids behind a barrier, such as a door. Participant 8 explained it the following way, "…you lock that door and nobody can get into to you. And at the bar, nobody is going to really care, because they are going to be right there with you. Nobody is going to bother you…they ain't going to know if you overdosed or not…" (*Female, 33*).

Participants also indicated that using opioids with others was "one of the worst things you can do"; in instances where a PWUO began to overdose, many participants expressed that those present could not be counted on taking action, or if action was taken it would either be in the form of "home remedies" such as putting the PWUO in the shower or slapping them. Reasons

given for delayed medical response or a lack of a response were linked to the criminalization of overdose, that is, those present would be at risk of arrest, questioning or other consequences.

These consequences are the type of stigma symbols, although unseen, that PWUO try to avoid, and thus a situation in which a person in the micro social environment begins to overdose directly challenges the needs and preservation strategies that PWUO present employ on a daily basis. Overdoses put the individual who is overdosing as well as those present in the most vulnerable situation. Other strategies that manage identity and conceal stigma symbols have more or less been individualistically focused, while this situation has inexplicably intertwined those present. In a sense, the overdosing PWUO is an existential threat to those present; overdosing is the physical manifestation of the fears of the other PWUO present in the micro environment and in a sense, the ultimate stigma symbol for PWUO. In that moment, they have revealed their opioid or drug use to those present, if there are others present, and furthermore they are unable to manage the situation because they are unconscious. It is a signal that "they've gone too far", "they did it to themselves" *(Participant 6, Male, 19),* "they should have known better" *(Participant 3, Female, 27)*. This idea that PWUO should "know their limit" was expressed by a few participants, and highlights the idea that PWUO should have control and proper management of their opioid use and stigma symbols. As participant 6 expressed, "…they didn't kill you. You killed yourself" *(Male, 19)*. While arrest, detection and interaction with the police are realistic fears, the additional identification by law enforcement or EMS as someone who was on the scene and also likely engaging in opioid use betrays the efforts that they've gone through to manage their identity and distance themselves from the label of a person who uses opioids, especially since it is seen as the other person's "fault" for overdosing. This was expressed by a few participants who essentially gave the opinion, "I'm not going to rat myself

out" *(Participant 6, Male, 19).* These ideas could be another way of rationalizing that one PWUO's opioid use is more "acceptable" or that they are in better control over their use.

In essence, the phenomenon follows Goffman's discussion of audience segregation, namely, "… if role and audience segregation is well managed, he can quite handily sustain different selves and can to a degree claim to be no longer something he was" (Goffman, 1963 pp. 63). In the context of this study, PWUO are using concealment strategies to conceal their stigma and stigma symbols in an attempt to hide from non-PWUO. By avoiding detection, arrest, and association with overdoses or overdosing individuals, in a sense the PWUO has effectively managed his identity and role and as Goffman states, "claim to be no longer something he was", an opioid user. An overdose is a major setback in the attempt to separate the self and manage an identity that society has deemed "discredited", which can help explain why those present during an overdose want to avoid calling EMS or decide leave the scene. This is especially for PWUO who have prior arrest records or have had many interactions with law enforcement. While additional contacts with the criminal justice system are likely to result in more severe outcomes, the additional stigma symbols of a drug-related arrest are emotionally painful and "discrediting" and thus avoided by not associating with the overdosing PWUO.

Willingness to assist in an overdose "no matter what"

A few participants voiced that they would intercede in the event of an overdose and call EMS regardless of the situation or who was overdosing. These participants viewed it as a moral obligation and were less fearful of potential consequences because, "…I wouldn't care. I would call. They can charge me or whatever. I could not live with knowing that I didn't pick up the phone. I am a junkie but I am not a bad person…" *(Participant 4, Female, 27).* These participants represented negative cases because of their disregard for worrying about stigma

symbols and being associated with the person who is overdosing. In their view, saving a life was more important than being stigmatized by law enforcement, EMS and society. These cases, could still fit into the grounded theory of stigma management. It could be that these participants' actions are explained by a desire to avoid a different stigma label that of a "bad junkie", "bad person" or other attributes society places on PWUO.

Other participants discussed that a "trusted friend" could be relied upon to call EMS in the event of an overdose. In these situations, social proximity to the PWUO overdosing seems to trump fears regarding consequences. Their reaction is likely related to the close nature of their relationship and feelings of love or care they feel for the overdosing PWUO. In these situations, the PWUO does not care about the repercussions for themselves; they want to save the life of their friend or loved one.

Other findings

Rural Risk Environment

The analysis revealed that the most salient settings that PWUO sought out were public bathrooms, homes, in cars or vehicles, outdoor areas, and places of drug dealing *(See Table 3)*. Certain settings were characterized as more ideal than others; settings such as homes, cars and even places of drug dealing offered PWUO privacy and security, which was related to how well participants could conceal their opioid use as well as how much control they had over who was present in the physical space, or micro social environment.

The desire to seek out the most private space based on the PWUO current situation is not a novel finding and common among numerous studies (Rhodes et. al., 2007; Small, Rhodes, Kerr, & Wood 2007). While some of these rural micro environments are similar to what has

been found in urban environments (homes, public restrooms), their micro social environments differ and confer different vulnerabilities due to differences in population density and the nature of networks in rural areas. For example, extensiveness and proximity of the social network in rural areas may allow faster diffusion of prescription drugs to potential nonmedical users; families are common sources of prescription opioids, which may allow them to be more accessible in rural areas (Keyes 2014). Additionally, the closer proximity of social networks may increase the feelings and effects of stigmatization in rural areas. Further, some micro environments such as cars, are more prevalent in rural areas than urban areas due to major differences in transportation infrastructure. Therefore, the car becomes a micro risk environment with its own set of vulnerabilities, which are influenced by a less dense micro- and meso- social rural risk environment.

Outdoor spaces are also vastly different in rural areas than urban centers. While urban areas do have green recreational spaces, they are not as secluded or remote as rural areas, which have additional vulnerabilities such as a lack of cellular service or more difficultly for EMS to find or even get to the overdosing individual. While they may confer similar risks surrounding rushing due to it being in a public space, the risks conferred in the event of an overdose are different. As participant 15 explained, "…You can overdose up on Lockegee, there's so many different spots on the top of the rock that you can go. It could take people days, you know, days to weeks to realize you haven't come home or you know even to go to, think to go there and look" *(Female, 26)*.

Other studies have also found that the chosen micro-physical environment can influenced by physiological states or micro-social environmental constraints has been found in other studies. For example, Rhodes (2007) found that "…injecting in public space was an outcome of

constraint or need rather than choice. While injecting in a place of privacy was preferred, public injecting was described as a situational necessity… related to craving and the need to mitigate symptoms of withdrawal" (Rhodes et. al., 2007 pp. 576 - 577). Furthermore, injecting in public spaces was associated with a fear of detection leading PWUO to rush and engage in unsafe injection behaviors (Fitzgerald et al., 2004; Small et al. 2006; Small, Rhodes, Kerr, & Wood 2007) . Other studies found that injecting in public spaces increased feelings of shame (Dovey et al., 2001, p. 324; Friedman, Curtis, Neaigus, Jose, & Des Jarlais, 1999, p. 58). In the study done by Rhodes et. al. (2007) they focused on "the potential role of place as a contextual amplifier of risk and social marginalization in the everyday lives of street injectors" (pp. 574) and found that "…place, and one's association with it, acts as a contextual amplifier of identity" (Rhodes et. al., 2007 pp. 580).

The findings of the current qualitative analysis build on this idea and further suggest that not only do place and one's association with it amplify identity; the social makeup or micro-social risk environment also give meaning and context to place as well as serve to shape the identity of the individual, based on the behavior they are performing in the micro-environment. These meanings can therefore, theoretically change not only based on the place and one's association with it, but also who is present in the space.

Strengths

There are many strengths of the current study. For one, this has been the first qualitative study elucidating the overall rural overdose risk environment, and more specifically this study has begun to give greater insight into (1) the places where people who use opioids (PWUO) go to inject drugs in rural areas; (2) the features of these places and (3) how they affected vulnerability to an overdose and/or vulnerability of an overdose becoming fatal. These data can be used to

better understand rural versus urban differences in opioid use and overdose and these findings can be used tailor education and interventions to be more effective for rural areas. Other strengths and limitations were explored using Joseph A. Maxwell's formal qualitative framework about validity.

Descriptive Validity

Descriptive validity refers to factual accuracy of the data in order to ensure that accounts are not distorted or made up (Maxwell, 1992). In order to maintain descriptive validity, interviews were audiotaped and transcribed verbatim. Once transcribed, the transcripts were quality checked using the audio tape recordings to ensure that data was transcribed accurately and captured what participants were truly expressing. Maintaining accuracy of what participants said helped ensure that the specific insights gained were accurate. Additionally, the amount or frequency of an observed phenomena was quantified by keeping track of how many participants discussed it and their participant number.

A strength of this study was the use of 1-on-1 semi-structures interviews, which allowed for rich, thick descriptions of the phenomena through the use of open-ended questions and probes when necessary. Similar insights would not be gained through the use of questionnaires alone or even focus groups, due to the sensitive nature of the subject and need for probes and follow-up questions to better understand participant's responses.

Interpretive validity

Interpretive validity refers to the researchers ability to capture and report the participants' meaning of events, objects and/or behaviors (Maxwell, 1992). Results surrounding the places and features of places were mainly driven by participants' examples and explanations. While

certain categories were constructed by the researcher (outdoors, places of drug dealing) they were constructed based on participants definitions and the features and vulnerabilities they said were conferred in these locations. In order to capture the participants' meanings as accurately as possible, the researcher made sure to consider not only the surrounding context of the quote or description, but the context of the whole interview and demeanor of the participant. During analysis, the researcher sought to know the participants by being immersed in the data and referring back to audio to capture tone and context.

Theoretical Validity

Theoretical validity refers to the validity of the researcher's concepts and the theorized relationships among the concepts in context with the phenomena (Maxwell, 1992). This type of validity is concerned with whether the researcher accurately explained the phenomena.

The theoretical validity of the study was strengthened through the use of Tim Rhode's Risk Environment Framework and Goffman's ideas about stigma. REF was helpful for conceptualizing and understanding the various factors that impact vulnerability of overdose as well as vulnerabilities related to dying from an overdose in rural areas. It allowed for an exploration of factors that impact overdose that went beyond the individual and individual behaviors. The framework acknowledged that "risk" and "harm" are influenced by social context and "embedded within socially constructed discourses" (Rhodes, 2002 pp.86; Rhodes, 2009; Lupton, 1993). This framework provided an organized way of assessing various environmental influences and conceptualizing different aspects of the environment and context, while still allowing for flexibility and inductive discovery. Through the studies use of REF, grounded theory methodology, and Goffman's ideas about stigma, the analysis was able to

identify a main theory, identity and stigma management, that comprehensively explained the drug related overdose harms that participants were describing.

Limitations

Descriptive Validity

There were several limitations to the current study. While most audio files were clear, there were a few that were harder to understand and thus there were a couple transcripts that may be less descriptively valid. However, in regards to the audio files that were of lower quality, these audio files coincided with interviews that were naturally thinner. While this still is an issue of descriptive validity, it was less salient to the study since those transcripts did not yield as much data, independent of their audio quality. Additionally, while interviews were transcribed verbatim, stress and pitch of the participants voice was not captured in the transcripts.

Further, the current study used secondary data that was collected with multiple research questions in mind, which could have impacted the accuracy of information and understanding. While overdose was inquired and discussed, it was not the only focus of the study. Had the overdose risk environment been the main focus, more detail would likely have been gathered. For example, if overdose were the main focus, additional questions like, "Based on the settings that have been listed, which settings do you or people like you, use opioids in the most?" or "How often do you use opioids among acquaintances or people that you do not know as well?" The first question would be useful in assessing if the frequency in which participants discussed certain locations correlated with how frequently they actually used in those locations. For example, while outdoor spaces and places of drug dealing were salient in the current analysis, the reality might be that those locations are seldom sought out, or sought out by a particular group of

PWUO whose networks or norms influence their vulnerability to overdose or dying from an overdose in ways that were not captured by the current investigation. The second question would clarify or give greater insight into which micro social environments the participants most commonly find themselves in. This knowledge could have strengthened understanding of how often are PWUO using with acquaintances or those who are less likely to call 9-1-1 during an overdose.

Also, since the data was already gathered before the present research question was crafted, additional probes or clarifying questions of relevance to the current investigation, could not be added to the interview guide. For example, additional probes surrounding participants' attitudes towards Narcan could more clearly ascertain barriers regarding access and knowledge. Also, questions regarding income that assessed the frequency and amount of opioids that participants or their networks could purchase at one time could have assisted in understanding consumption behaviors and if certain participants or networks were at higher risk of an overdose based on their ability to purchase larger quantities of opioids.

Further, these interviews were some of the first interviews to be done in the Gateway District with people who use opioids. Local events were used to recruit and build rapport, however, to a certain extent participants were likely distrustful and cautious of study staff, even with confidentiality measures in place. Therefore, it is likely that participants weren't as forthcoming as they might be if the study were replicated once again in the present. Also, while many of the interviews yielded rich data, there were inconsistencies in data thickness within some transcripts and between transcripts; that is, there were a couple interviews in which overall data was thin, and other interviews where some parts of the interview yielded rich data, but other parts would have been strengthened with additional probes. However, moving forward future

interview guides can incorporate these findings to better develop an even deeper understanding of the phenomena.

Interpretive Validity

Transcripts were coded by one main coder, which could influence the credibility of the findings. However, to improve consistency and coding reliability, the Principal Investigator reviewed the coding of every fifth transcript and provided feedback on codes, code applications and discrepancies. Additionally, the researcher engaged in reflexive memo writing to assess the lens, knowledge and potential biases they were bringing into the research.

While the researcher strived to understand the "emic" perspective, it is possible that ideas were misinterpreted. In order to improve the reliability of the data interpretation, the Principal Investigator reviewed the researchers analytic memos and the findings were discussed and reviewed multiple times. The researcher also referenced and reviewed transcripts and notes to make sure that interpretations were as accurate as possible.

Theoretical Validity

The main ideas presented in the current study surrounding identity management are supported by outside literature, for example the designation of certain objects as stigma symbols was discussed by Goffman and supported by other literature on stigma as well as the general findings that stigmatized groups engage in identity management. Also the literature frequently discusses the stigmatized nature of injection drug use and how PWUO desire to hide their drug use from others is tied to stigma (Ahern, Stuber & Galea, 2007; Jackson et. al., 2010). The theoretical underpinnings of the study's theory were not novel, however, their application was . For example, while previous literature has discussed the various ways stigma impacts safe

injection behaviors, they have not suggested that the behaviors of PWUO constitute concealments strategies whose purpose is to manage PWUO identity. Thus theoretical validity is an issue in the present study, however, it could be improved if future studies found similar results.

Implications and Recommendations

As previously mentioned, this is the first qualitative study to elucidate the overall rural risk environment. More specifically this study has begun to give greater insight into (1) the places where people who use opioids (PWUO) go to inject drugs in a rural setting; (2) the features of these places and (3) how they affect vulnerability to an overdose and/or vulnerability of an overdose becoming fatal. These findings can be used tailor education and interventions related safe injection practices and overdose. Specific recommendations stemming from this study are related to overdose education, 9-1-1 medical amnesty law education, Narcan access and distribution, and safe injection sites. It is important to note, that targeting one level or type of the overdose risk environment will likely not be effective, as the vulnerabilities that arose are the result of many levels and types converging and influencing one another. An effective intervention will be structural and address multiple levels and types of the overdose risk environment.

Healthcare environment: Narcan distribution and access

Priority should be given to Narcan access and distribution between PWUO as well as trusted friends, family and associates. This recommendation stems from the fact that few participants in the sample had Naloxone or were educated on what Naloxone was. Furthermore, Naloxone is an effective medicine that decreases opioid overdose mortality and allows more time

for proper medical intervention (Ambrose, Amlani, & Buxton, 2016; Bird, McAuley, Perry, & Hunter, 2016). One participant discussed how Narcan was instrumental in helping her fiancé during one overdose. She explained, "He would honestly be dead if that EMT wasn't headed home…and that EMT just happened to have Narcan on him" (*Participant 3, female, 27).* While some participants indicated that they preferred injecting alone, most indicated a social risk environment that included another person, or a group of individuals if injecting in a trap house or place of drug dealing. Other studies support this finding, for example Powis et. al. says that similar to other features of drug taking, overdoses are a "predominantly social behavior" (Powis et. al., 1999). In their study, more than three-quarters of respondents were with another individual when they overdosed, and half had been present when another PWUO overdosed (Powis et. al., 1999) and more recent studies have also found that overdoses occur in the presence of bystanders who can intervene (Martins, Sampson, Cerdá, & Galea, 2015). Therefore, equipping more friends and family members with Narcan could be an effective strategy; one study found that trained drug users could identify and respond to opioid overdose with naloxone as well as a medical professional (Green, Heimer, & Grau, 2008). This strategy is also already supported by the state of Kentucky; in 2015 KY state legislature approved expanding naloxone access (KY SB 192, 2015; 201 KAR 2:360,).

Along with increased access, more education would be needed on Narcan administration and re-administration, as well as the signs and symptoms of an opioid overdose. Narcan would be especially relevant and useful in settings such as places of drug dealing, cars, and homes and help offset mortality related to delayed medical action or complete inaction. While Narcan would not reverse every overdose, nor should PWUO use it to avoid calling 911; its life-saving potential cannot be understated and at the very least, it would allow more time for effective

intervention, whether that is calling 911 or having someone drop the overdosing individual off at an emergency room.

Altering the micro physical and social environment through overdose education

The results also indicated fear surrounding calling 9-1-1 and the consequences of a PWUO overdosing on someone's property. This result is not unique to the current study or rural areas (Clark, Wilder, & Winstanley, 2014; Pollini et. al., 2006; Tobin, Davey, Latkin, 2005; Tracy et al., 2005), for example, Darke, Ross & Hall (1996) found only a minority of those witnessing an overdose will call for EMS. These fears are partly based on misunderstandings, as well as differences in policing practices and norms. While altering policing practices is unlikely, educating PWUO on their rights during these encounters could empower individuals and networks to feel more confident calling 9-1-1. This is especially relevant to the current study population and location since the Kentucky state legislature passed a Good Samaritan law in 2015, in an attempt to decrease fear surrounding intervening during an overdose (KY SB 192). Benefits of such education can also begin the dialogue for changing norms surrounding assisting during overdoses. Education could also include helping PWUO come up with an "overdose contingency plan", so that in the event of an overdose they have a predetermined set of steps they know they should and can take to quickly and effectively address the situation. Part of this contingency plan should include how to handle drugs on the property and other intoxicated individuals. Education on the rights of individuals present at the scene should be included, which would be most relevant to the property owner.

While education on medical amnesty and creating a "contingency plan" could prove useful, the larger macro context of stigmatization of PWUO and as a result the criminalization of overdose cannot be understated. While these individual interventions have aspects that address

structural components, for instance lack of Narcan access; and education on the rights of those present at an overdose can affect meso-level interactions with police, unless action is taken to reduce stigma and change law enforcements attitudes towards how overdoses are policed, mortality will continue to increase. Interventions need to encourage PWUO to be less fearful of being detected, seen or helped. They need to eliminate punitive measures in instances of medical emergency and focus on improving health outcomes. As participant 2 expressed, "…addicts can't be afraid to take people to the hospital".

One intervention that could circumvent and eliminate many of the issues found in the present study and cited by other studies is the creation of safe injection sites or facilities (SIS, SIF). While this is a controversial and unlikely development in the near future, an ideal way to circumvent the vulnerabilities that arose as a result of the rural risk environment would be to create safe injection sites where PWUO could use opioids. These facilities could provide privacy so as not to rush, provide tools to increase safely because PWUO could test their drugs and furthermore PWUO would be monitored so in the instance of overdose, they could be revived and cared for instantly, decreasing mortality and improving health outcomes. Other studies have outlined how safe injection sites are beneficial and decrease stigma associated with injecting in public spaces without enhancing drug use or drug trafficking (Potier et. al., 2014).

Conclusion

In summary, the present study elucidated various aspects of the rural risk environment related to vulnerability to overdose as well as an overdose becoming fatal. Stigma management and the desire to conceal their opioid use arose inductively through analysis as the grounded theory. In order to conceal their opioid use, PWUO engage in concealment strategies in order to manage their different selves, or social roles, and in a way claim that they are "no longer a drug

user". However, many of the strategies PWUO employ in order to manage their identities increases their vulnerability to an overdose or the vulnerability of an overdose becoming fatal. It is important to note, that PWUO are responding in kind to the larger macro social, healthcare and law enforcement risk environments that are perpetuating their need to manage their stigma and identities. Their desire to conceal their stigma symbols arises from self-preservation and the desire to be accepted and see as a "creditable" person (Goffman, 1963) by the broader society, despite societies marginalization of PWUO. While these strategies can be effective at managing their identities and as a result stigma and feelings of shame, these strategies run counter to safe injection practices related to protection from overdose and dying from an overdose.

The findings of the current qualitative analysis also build on the idea that "place acts as a contextual amplifier for identity and social marginalization" (Rhodes et. al., 2007 pp. 580) and further suggest that not only do place and one's association with it amplify identity; the social makeup or micro- social risk environment also give meaning and context to place as well as serve to shape the identity of the individual, based on the behavior they are performing in the micro-environment. These meanings can therefore, theoretically change not only based on the place and one's association with it, but also who is present in the space.

Stigmatization, and criminalization of overdose are the catalysts for the strategies PWUO employ. If these larger macro level factors could be altered, in conjunction with expanded Naloxone access or education and other interventions, PWUO might engage in alternative behaviors that are less risky and more compatible with overdose protection, instead of being fearful and managing their identities to mitigate feelings of shame.

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APPENDIX A: INTERVIEW GUIDE 1-ON-1 INTERVIEWS

Interview Guide for 1-on-1 Interviews

(pin-drop/screening version)

IRB: Please note that this will be a qualitative interview. The interviewer may ask questions in a different way or in a different order from how they are written below. Additionally, the interviewer may ask about topics that are not on the guide if a participant raises a topic that is related to the study's aims but not currently covered by the guide.

Thank you for helping us today. I'm excited to learn more from you. I'm going to start the audio recorder so we can get going. We are going to cover three main topics today: (1) places where people use drugs and have sex, and characteristics of those places that make it harder to do these things safely; (2) your thoughts on an online mapping activity; and (3) your thoughts on an online screening activity.

I. Warm up

A. How long have you lived around here?

B. What are some of your favorite things about living here?

II. Risk Environment

A. HIV/hepatitis C Transmission -- injecting

We will often be talking today about sensitive topics, like HIV, hepatitis C, sex, injecting drugs, and overdoses. Remember that you can decide not to answer questions you do not wish to answer, and that we will keep your responses private to the best of our ability. My first questions will be about the ***places*** where young adults have sex or use drugs. We are interested in this because research in ***cities*** suggests that features of these places – like whether police are around or whether they are well lit – might affect whether people can protect themselves from HIV, hepatitis C, and overdoses. We want to find out if this is true around here, too. When you are answering questions, think about how people like you might answer – that is, young adults between the ages of 18 and 29 who use opioids to get high, and live in Rowan, Menifee, Elliot, Morgan, and Bath.

HIV and hepatitis C are viruses that you can get from sharing injection equipment -- like syringes, cotton, or cookers -- with people who are already infected. Anyone – man or woman -- can also get HIV if they have sex without a condom with someone who is already infected. If someone has hepatitis C, they can now get medicine to be cured. If someone has HIV, they can live a long and healthy life with current treatments.

OK let me start with our first question.

1. What do young adults around here do, if anything, to protect themselves from getting HIV or hepatitis C by ***injecting*** drugs? We will talk about getting HIV through sex later.

[Record comments on a piece of paper.]

Probe:

- You've mentioned ___ and ____. What else do people do to protect themselves from getting HIV or hepatitis C from injecting?
- Always have a new syringe/works, or re-use your own
- If you are borrowing a syringe from someone else, cleaning it before you use it
- Keep track of one's own syringe and works if injecting in a group
- Just inject with one person; avoid injecting with many other people

Great. Thank you. We will come back to this, I promise!

2. Now, let's think about different ***places*** where young adults around here go to inject opioids. Some of these places may be inside, and some may be outside. Can you tell me generally where people go – I don't need specific names of places, but general descriptions?

[Record comments on a fresh sheet of paper.]

3. OK so let's look back at the list of ways that people try to protect themselves from HIV and hepatitis C when they inject. And now let's look at the list of places where people inject that you just created.

Looking at the list of places, which are places where it is particularly difficult to protect oneself from getting HIV or hepatitis C? ***[Circle these places on the list.]*** Any others?

4. What is it about these places that makes it hard for people to protect themselves from HIV or hepatitis C?

Probes:

- You've mentioned ___ and ____. What else can you think of?
- Poorly lit, so you may lose track of your own syringes/works?
- No good place to store your own syringes for future use
- [If they mentioned bleaching syringes as a protective action:] No good place to store bleach for future use?
- Peer pressure from the person you are injecting with to use the same syringe
- Not wanting to offend the person you're injecting with by using a different syringe
- Presence of police –
    - What is it about the police that creates problems?
        - Can't carry syringes
        - Have to inject quickly
- Presence of non-users – have to inject rapidly to avoid them

Great – thank you!

5. We asked some people who provide health and social services around here for their insights into features of places that might make it hard to protect oneself from injection-related HIV and hepatitis C, and they came up with this list. ***[Read aloud.]***

Do you want to add any of these features to your list?

6. Now, let's rank these features by how important they are. Looking at the list, what might be the ***biggest*** barrier to preventing HIV/hepatitis C transmission from injection drug use? How about second biggest barrier? Next biggest? ***[Assign numbers to the features, with 1 indicating the biggest barrier. It is OK to just get through the five worst features on the list.]***

7. Let's consider the top 5 barriers. How ***common*** is each? (Very common – A lot of people may encounter it; somewhat common – some people might encounter it; pretty rare – very few people might encounter it) ***[Assign LETTERS to the features, with A being the MOST common barrier.]***

Great – thank you!

[Put away the lists from Injecting section.]

B. HIV Transmission – sex with main or casual partner

1. Now we are going to talk about getting HIV from sex. What do young adults around here do to protect themselves from getting HIV through sex with someone who is their *main* partner, or from someone who is more of a *casual* partner? A main partner is someone who you might feel some commitment to; a casual partner is someone who you might not have a commitment to.

[Record comments on a sheet of paper.]

Probe:

- You've mentioned ___ and ____. What else do people do to protect themselves from getting HIV from having sex? ***[OK if the list is basically condoms and not having lots of partners.]***
- Getting treated for STIs
- Not having sex while high

2. Now, let's think about different ***places*** where young adults around here have sex with a main partner or a casual partner. Just like before, some of these places may be inside, and some may be outside. Can you tell me generally where people go – I don't need specific names of places, but general descriptions?

[Record comments on a fresh sheet of paper.]

Great – thank you. Anyplace else?

3. OK so let's look back at your list of ways that people try to protect themselves from getting HIV during sex with a main partner or a casual partner. And now let's look at the list of places you just created about where people have sex with these partners.

a. Looking at the list of places, which ones are places where it is particularly difficult to protect yourself from getting HIV from a partner? ***[Circle these places on the list.]*** Any others?

b. What is it about these places that makes it hard for people to protect themselves from getting HIV from having sex with a partner? ***[Record next to each circled place.]***

Probes:

- You've mentioned ___ and ____. What else can you think of?
- ***[Look up at the list of protective behaviors – what else makes sense?]***
- No privacy – too little time for condoms
- No place to keep condoms

Great – thank you!

4. We asked some people who provide health and social services around here for their insights into features of places that might make it hard to protect oneself from getting HIV, and they came up with this list. ***[Read aloud.]***

Do you want to add any of these features to your list?

5. Now, let's rank these features by how important they are. Looking at the list, what might be the ***biggest*** barrier to preventing HIV transmission between sex partners? How about second biggest barrier? Next biggest? ***[Assign numbers to the features, with 1 indicating the biggest barrier. You can limit this activity to the top five and then stop.]***

6. Let's consider the top 5 barriers. How ***common*** is each? (Very common – A lot of people may encounter it; somewhat common – some people might encounter it; pretty rare – very few people might encounter it). ***[Assign LETTERS to the features, with A indicating the most common barrier.]***

Great – thank you!

C. Overdosing

1. Now I'd like to talk with you about overdosing. What do young adults around here do to protect themselves from having an overdose, or to prevent an overdose from becoming fatal?

[Record ideas on a sheet of paper.]

Probe:

- You've mentioned ___ and ____. What else do people do to protect themselves from an overdose?
- Use where other people are around
- Opportunity to test the drugs first to get a sense of their strength
- Light enough for others to see if you need help
- Use near people who have naloxone.
- Close to hospital if you overdose and help

2. OK, now let's think about different places where young adults around here go to use opioids to get high. Some of these places may be inside, and some may be outside. Can you tell me generally where people go – I don't need specific names of places, but general descriptions?

[Record ideas on a new sheet of paper.]

Great – thank you. Anyplace else?

3. OK so let's look back at your list of ways that people try to protect themselves from overdosing. And now let's look at the list of places where people go to use opioids.

a. Looking at the list of places, which ones are places where it is particularly difficult to protect oneself from an overdose? ***[Circle these places on the list.]*** Any others?

[Write the name of each place that was circled as dangerous on a new sheet, with space to add in features next to each place.]

b. What is it about these places that makes it hard for people to protect themselves from overdosing? ***[Record next to each circled place.]***

Probes:

- You've mentioned ___ and ____. What else can you think of?
- Poorly lit, so can't see if people might be overdosing.
- Presence of police
    - What is it about the police that creates problems?
- Presence of non-users
    - What is it about non-users that creates problems?
- Far from medical assistance
- People are often using alone there, and so no one can help

Great – thank you!

4. We asked some people who provide health and social services around here for their insights into features of places that might make it hard to protect oneself from overdose, and they came up with this list. ***[Read aloud.]***

Do you want to add any of these features to your list?

5. Now, let's rank these features by how important they are. Looking at the list, what might be the ***biggest*** barrier to preventing an overdose, or preventing an overdose from becoming fatal? How about second biggest barrier? Next biggest? ***[Assign numbers to the features, with 1 indicating the biggest barrier. You can limit this list to the top five.]***

6. Let's consider the top five barriers. How ***common*** is each? (Very common – A lot of people may encounter it; somewhat common – some people might encounter it; pretty rare – very few people might encounter it) ***[Assign LETTERS to the features, with A indicating the most common barrier.]***

III. Pin-Drop Mapping Activity

Thank you so much for your help. We are going to spend the next 20 minutes testing out an online map. As the consent form noted, participants in the survey will complete the survey online. All of the people who do the survey will be young adults living around here who use opioids to get high. The survey will ask about sensitive topics, like drug use behaviors and sexual behaviors. It will also ask about the *places* where people live, use drugs, and have sex. The survey will take about 30 minutes. Each person will do it by themselves, and on their own time. People can complete this online survey on computers, iphones, and other devices.

One set of questions on the survey asks people to map out different locations, including the places where they last used opioids to get high and places where they last had sex with a main or casual partner, or with someone who they exchanged sex with for drugs or money.

1. For this next part of the interview, I'd like you to test out the mapping questions on the online survey. Please do NOT enter in information about yourself. Instead, please pretend that you are someone else, or many different people. Take as long as you need ***[record how many minutes the mapping section takes, and any issues that arise while the participant is completing it].***

2. Imagine that you were answering these mapping questions about yourself on an online survey. What are some concerns that you might have about answering them?

[Record concerns on a sheet of paper.]

Probes:

- If you were doing this on your own – maybe at your house – what other concerns might you have?
- You've mentioned ___ and ____. What else didn't you like?

- Concerns about disclosing information about sensitive or illegal behaviors.

- Concerns about the security/confidentiality of their online responses.

- Poor access to the internet, particularly if need to download maps.

3. Now, let's rank these concerns by how important they are. Looking at the list, what might be the ***largest*** concern for people about doing the mapping? How about second largest concern? Next largest? ***[Number concerns in order, with 1 being the largest concern.]***

4. Let's consider the top five concerns. How ***common*** is each? (Very common – A lot of people may have this concern; somewhat common – some people might have it; pretty rare – very few people might have it) – ***[Record responses next to each of the five concerns.]***

5. Still considering the top five concerns. What could we do to overcome each of these concerns?

Great – thank you! This is a huge help.

IV. Intensive screener

1. We are going to screen people for this study online. By "screen people", we mean that we are going to ask them questions to determine if they meet criteria to be eligible for participation. We would like your input into that screening process. This next part of the interview should take about 20 minutes. This is what the screening process will look like. ***[2-minute demonstration of the screener online.]***

2. Please take a few minutes to do this screener on your iPad. Please DO NOT enter information about yourself. Pretend that you are someone else, or many different people. Take as long as you need. ***[Record how many minutes, and any questions that arise.]***

Great. Thanks!

3. Imagine that you were answering these questions about yourself online. What are some concerns that you might have about answering these questions?

[Write down concerns on a sheet of paper.]

Probes:

- You've mentioned ___ and ____. What else didn't you like?
- If you were doing this on your own – maybe at your house – what other concerns might you have?

- Concerns about disclosing information about sensitive or illegal behaviors.

- Concerns about the security/confidentiality of their online responses.

- Poor access to the internet.

4. Now, I'd like you to rank these concerns by how important they are. Looking at the list, what might be the ***largest*** concerns to doing the screener? How about second largest concern? Next largest? ***[Number the concerns from 1-5, with 1 being the largest concern.]***

5. Let's consider the top five concerns. How ***common*** is each? (Very common – A lot of people may have it; somewhat common – some people might have it; pretty rare – very few people might have it) ***[Record responses next to each concern.]***

6. Still considering the top five concerns. What could we do to overcome each of these concerns?

Great – thank you! This is a huge help.

V. Wrap up

1. What else do you think we should know as we begin this study?

2. You know from the consent process that we will need help finding the first people to do an online survey. You are not eligible to do the online survey yourself because you just helped us here, but you may know people who could do the survey. If you said on the form that you didn't want to help us recruit but you have changed your mind, you can change your mind now ***[revise answer to that part of the consent]***. We'll be in touch with all the people who volunteered to help recruit in the next few weeks.

THANK YOU so much for all of this invaluable help today!