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Now They're Sober and They're Broke: A qualitative study of how people who use drugs' naloxone experiences are shaped by rural risk environment and naloxone distribution/overdose education intervention

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Now They're Sober and They're Broke: A qualitative study of how people who use drugs' naloxone experiences are shaped by rural risk environment and naloxone distribution/overdose education intervention

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An abstract of a thesis submitted to the Faculty of the Rollins School of Public Health of Emory University in partial fulfillment of the requirements for the degree of Master of Public Health

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Abstract

Background

People who use drugs (PWUD) are highly likely to witness overdose. Overdose education and naloxone distribution (OEND) programs are recommended as an evidence-based approach to reducing fatal overdose rates. Despite the growing presence of OEND programs, PWUD experience barriers to accessing, carrying, and administering naloxone, shaped by their risk environments. Rural risk environments pose unique challenges minimally explored in the literature. We investigated how PWUDs' naloxone experiences are shaped both by features of a rural risk environment and an OEND intervention.

Methods

29 one-on-one, semi-structured qualitative interviews were conducted with PWUD in rural Kentucky via Zoom software. All participants were enrolled in the CARE2HOPE (C2H) OEND intervention and recruited via phone calls, texts, and Facebook messages. Audio-recorded interviews were transcribed verbatim. Thematic analysis was conducted, guided by the Risk Environment Framework. NVivo 14.0 software (QSR International) was used for data management and coding.

Results

The OEND intervention altered participants' healthcare environments by providing access to naloxone, increasing participant knowledge, and increasing participant confidence in naloxone administration. Over half of participants gained knowledge on naloxone through the intervention related to the healthcare environment (how to access naloxone, administration technique) and political/law enforcement environment (medical amnesty policies). Through knowledge and skills gained in the intervention, participants became a part of their local healthcare environment. Over half of participants had recent experience administering intervention-provided naloxone. Participants' experiences carrying and administering naloxone were indirectly shaped by the OEND intervention with added influence of other risk environment domains. Most participants opted to carry naloxone, citing factors related to the social environment (sense of responsibility to their community) and physical/healthcare environments (unpredictable nature of overdose, high overdose prevalence, suboptimal emergency response systems). Participants' experiences administering naloxone to peers was largely shaped by social environment barriers (anticipated negative reaction from recipients attributable to physiological withdrawal, loss of high, and economic loss). Participants who felt a strong social ties to their community often administered naloxone despite anticipated consequences.

Conclusions

By providing naloxone paired with non-stigmatizing health and policy information, the OEND intervention both altered participants' healthcare environments and enabled them to become a part of the healthcare environment themselves. PWUDs' naloxone experiences are further shaped by other risk environment domains. Features of the rural physical environment contribute to many participants feeling safer when carrying naloxone. When PWUD administer naloxone to a peer, they are often acting against the recipient's preference, adding a layer of social environment considerations. Although many override this barrier to administer naloxone, the event can be traumatic for all involved parties.

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CHAPTER 1: INTRODUCTION

Overview

Opioid overdose is a leading cause of injury and death throughout the United States (Ahmad et al., 2019; Razaghizad et al., 2021). This burden is elevated in rural areas (Barbosa et al., 2019; Cooper et al., 2020) due to a unique set of risk factors present in these communities (Ibragimov et al., 2020; Fadanelli et al., 2020; Cooper et al., 2019). Fatal overdose is preventable through naloxone, a highly effective opioid receptor antagonist (Razaghizad et al., 2021; Abdelal et al., 2022; Fellows et al., 2017). Distribution and training programs exist to supply people who use drugs (PWUD) with naloxone, given that this population is among the most likely to witness an acute overdose in time to respond (Cid et al., 2021). Despite the presence of these programs, PWUD still experience numerous barriers to accessing, carrying, and administering naloxone (Lai et al., 2021; Kahn et al., 2022; Razaghizad et al., 2021; Zhang et al., 2018). While a growing body of research explores these barriers, few studies explore PWUDs' naloxone experiences through the lens of rural environmental risk factors.

Theoretical Framework: Risk Environment Framework

Rhodes' Risk Environment Framework (REF) asserts that to understand drug-related harm, we must consider the complex interplay between individuals and their sociocultural and physical environments (2002a, 2002b). Previous research within our target community has built upon the REF to identify the unique set of influences present in a *rural risk environment* (Cooper et al., 2020; Batty et al., 2022; Ibragimov et al., 2020; Fadanelli et al., 2020; Cloud et al., 2019).

This study draws upon that existing body of work to view our participants' experiences through the lens of their rural risk environment (R-REF).

Rural-REF Overdose Drivers

Our study setting, Appalachian Kentucky, sits at the intersection of a set of environmental contributors to overdose risk. The *economic environment* was impacted by the coal industry recession (Biesel, 2021), increasing the area's susceptibility to pharmaceutical companies' targeted promotion of prescription opioids (Tunnell, 2006; Van Zee, 2009). These campaigns shaped the *healthcare environment's* over-prescription patterns (Bunting et al., 2018; Keyes et al., 2014) and the *physical environment's* high opioid availability (Bunting et al., 2018). These *physical-healthcare* features, in combination with limited substance use treatment options (Bunting et al., 2018), healthcare stigma (Batty et al., 2022; Surratt et al., 2021), and suboptimal emergency response systems (Kolak et al., 2020; Otachi et al., 2020) contribute to high overdose rates. The *social environment* is characterized by stigma towards PWUD (Batty et al., 2022; Fadanelli et al., 2020) leading to isolation, another risk factor for overdose (Trappen & McLean, 2021). The *law enforcement environment* features heavy criminalization of drug use (Cooper et al., 2019) contributing to risky drug use behavior (van der Meulen et al., 2021; Latimore & Bergstein, 2017). *Politically*, systemic barriers exist to operationalizing syringe service programs (Batty et al., 2022; Ibragimov et al., 2020) and medical amnesty policies (i.e., protection for those who call 911 after witnessing an overdose) are little-known or understood by the public (Evans et al., 2016).

PWUD Naloxone Experiences

Naloxone is the most effective way to reverse overdose when correctly administered (Razaghizad et al., 2021; Abdelal et al., 2022; Fellows et al., 2017). The drug works by reversing overdose-induced respiratory depression, thereby preventing secondary cardiac arrest and death (Razaghizad et al., 2021). Overdose education and naloxone distribution (OEND) programs are widely recognized as a best practice to reduce fatal overdose (Hanson et al., 2020; Piper et al., 2007; Dayton et al., 2019). Numerous studies have evaluated OEND programs, finding that they increase participants' knowledge and confidence in administering naloxone (Razaghizad et al., 2021; Hanson et al., 2020). A growing body of research explores PWUDs' experiences with naloxone, including perceived barriers to carrying and administering naloxone. *Social* barriers to naloxone administration include community stigma and fear that recipient will react negatively (Bennett et al., 2020; Dayton et al., 2019). *Physical* and *healthcare environment* barriers are rooted in knowledge of and access to naloxone (Bennett et al., 2020; Dayton et al., 2019; Dwyer et al., 2016). *Law enforcement-political environment* factors include fear of legal repercussions and police harassment (Bennett et al., 2020; Dayton et al., 2019; Richert, 2015; Lai et al., 2021). This study builds upon previous work that conceptualizes PWUD with naloxone training as healthcare workers (Mamdani et al., 2022; Pauly et al., 2021; Shearer et al., 2019), inextricably linking their naloxone experiences with the *healthcare environment.*

Few studies on this topic have been conducted in rural settings. One qualitative study in rural Alaska explored PWUDs' experiences administering naloxone, finding that participants had positive feelings towards naloxone and perceived it to be highly effective (Hanson et al., 2020). Another qualitative study in rural Oregon found that PWUD were empowered by the experience of administering naloxone (Rochester & Graboyes, 2022). While both studies provide valuable

insight, they reveal little about environmental barriers to naloxone access, carrying, and/or administration.

Study Aim

To date, there is a paucity of qualitative research exploring PWUDs' naloxone experiences in rural settings. Furthermore, much of the research on PWUDs' naloxone experiences focuses on the overdose event itself. There is limited research exploring how PWUD discuss naloxone *before or after* overdose events, or research exploring PWUDs' decisions to accept and/or carry naloxone. Furthermore, few studies analyze this topic through a risk environment lens. No studies to our knowledge explore the role of an OEND intervention both as part of and in relation to PWUDs' risk environment. Guided by the ***R-REF**,* this study qualitatively assesses: ***1)** What are the pathways through which risk environments influence how rural PWUD accept, carry, and administer naloxone, and **2)** How does an OEND intervention affect those pathways?*

CHAPTER 2: LITERATURE REVIEW

Overview

The United States' opioid epidemic is a public health crisis, caused and aggravated by an amalgamation of cultural, political, economic, and biopsychosocial factors. People who use drugs (PWUD), particularly people who inject drugs (PWID), face the brunt of harm associated with this ongoing crisis, including HIV infection, hepatitis B and C virus infection (Degenhardt et al., 2019; Zibbell et al., 2015; Barbosa et al., 2019), injury (e.g., tissue infection) (Rudasill et al., 2019; Vearrier, 2019), respiratory failure (Lavonas & Dezfulian, 2020), and fatal and nonfatal overdose (Macias-Konstantopoulos et al., 2021). Opioid overdose is a leading cause of morbidity and mortality in the United States (Ahmad et al., 2019) and the number one cause of injury-related deaths (Razaghizad et al., 2021). Overdose burden is elevated in rural communities (Barbosa et al., 2019) including the eastern part of Kentucky, largely comprised of rural counties (Crooks, 1999; Wyatt et al., 1998; Lengerich et al., 2005). Kentucky is among the top five U.S. states with the highest age-adjusted drug overdose fatality rates (Hargrove et al., 2018) and one of the eight states that the CDC has labeled most high-burden for fentanyl deaths (Gladden et al., 2016). Each of these deaths was preventable (Strang et al., 2019). Opioid overdoses can be reliably reversed using naloxone, a highly effective opioid receptor antagonist that has been FDA-approved since the 1970s (Barton et al., 2002). OEND programs exist to supply PWUD with naloxone, given that this population is among the most likely to witness an acute overdose in time to respond (Cid et al., 2021). Despite the growing presence of these programs across the United States, PWUD still experience numerous barriers to accessing, possessing, and utilizing naloxone (Lai et al., 2021; Kahn et al., 2022; Razaghizad et al., 2021; Zhang et al., 2018).

Opioid Overdose

The opioid label encompasses drugs that can be legally administered or prescribed by healthcare providers (e.g., oxycodone/OxyContin®, hydrocodone/Vicodin®, morphine, codeine) as well as illicitly manufactured substances like heroin (Armstrong & Cozza, 2003). Individuals with opioid use disorders (OUD) are often initially exposed to opioids through prescription medications (Mars et al., 2014). All opioids work by binding to the brain's existing opioid receptors (Stein, 2016) and blocking neurological pain signals (Snyder, 1977). For many people, opioids also produce feelings of pleasure (Kosten & George, 2002). Sustained opioid use can trigger neuroadaptations that cause increased tolerance, dependence, and withdrawal following cessation (Kosten & George, 2002). These factors contribute to the high abuse potential, addiction propensity, and overdose risk associated with opioid use (Rummans et al., 2018).

Opioid overdose is a leading cause of morbidity and mortality in the United States (Ahmad et al., 2019) and the number one cause of injury-related deaths (Razaghizad et al., 2021). One in five deaths among those ages 24 to 34 is related to opioid use (Gomes et al., 2018). Since 2013, the saturation of drug markets with synthetic opioids, including fentanyl and its analogs (carfentanil, butyrylfentanyl, MT-45, etc.) (Gryczynski et al., 2019), have exponentially increased fatal overdose rates in North America (Jannetto et al., 2019). Fentanyl, a μ-opioid receptor agonist (Kelly et al., 2021), is estimated to be between 100 to 10,000 times more potent than morphine (Comer & Cahill, 2019). This high potency, combined with relatively low production costs (Kuczyńska et al., 2018), incentivized illicit drug manufacturers and traffickers to "cut" less potent and more costly-to-produce drugs, like heroin, with fentanyl (Gryczynski et al., 2019). As a result, people who use opioids (PWUO) are often exposed to fentanyl without

their knowledge, because their heroin or opioid analgesics are cut with fentanyl or one of its analogs (Gryczynski et al., 2019). Due to fentanyl's potency and rapid onset of action (less than 60-seconds) (Vahedi et al., 2019), the risk of fatal overdose is high. Nationally, the number of deaths from synthetic opioids in 2020 were over 18-fold that of the number in 2013 (*Centers for Disease Control and Prevention*, 2022). Morbidity and mortality data reveal that between January and June 2019, 61.5% of U.S. overdose deaths were attributable to illegally manufactured fentanyl (O'Donnell et al., 2020).

Harm reduction & naloxone

Approaches to address drug use and its associated harms vary depending on cultural values, public policy, community need, and sociopolitical factors. One school of thought, *harm reduction*, offers a value-neutral approach (Pauly, 2008) focused on reducing negative consequences related to drug use (Childs et al., 2021). Harm reduction encompasses both an overall philosophy and a spectrum of strategies designed to *meet people where they're at* (Woolhouse et al., 2011). The framework recognizes the social inequities (e.g., racism, criminal justice involvement, poverty, etc.) that contribute to substance use and aims to mitigate harm where possible (Pauly, 2008).

One of the most widely known and effective practices under the harm reduction umbrella is OEND programming. Naloxone, an opioid antagonist, has been used by medical providers to rapidly reverse overdose since the drug's FDA approval in 1971 (Zhang et al., 2018; Martin, 1976). Naloxone works by reversing overdose-induced respiratory depression, preventing secondary cardiac arrest and death (Razaghizad et al., 2021). Clinically effective methods of naloxone administration include intravenous, intramuscular, subcutaneous, and nebulized

delivery (Fellows et al., 2017). Naloxone's most popular brand name, Narcan (McDonald et al., 2017; Bennett et al., 2020), can be administered via nasal spray (Avetian et al., 2018). When administered in a timely manner, naloxone is highly effective at preventing fatal overdose (Lewanowitsch & Irvine, 2002) and has no abuse potential (Barton et al., 2002).

Initially, naloxone was only available to medical providers (Cid et al., 2021). Take-home naloxone programs were proposed in the late 1990s and gained global traction throughout the 2000s as an evidence-based approach to preventing opioid deaths (McDonald et al., 2017). In 2014, the World Health Organization issued guidelines for community-based overdose management, stating that *"people likely to witness an opioid overdose should have access to naloxone and be instructed in its administration"* (*World Health Organization,* 2014). Because PWUD are among the most likely to witness an overdose, peer OEND programs have been widely recognized as a best practice to reduce rates of fatal overdose (Hanson et al., 2020; Piper et al., 2007; Dayton et al., 2019).

Rural risk environment

The theoretical framework guiding this study is Rhodes' Risk Environment Framework (REF) (2002a) which is designed to understand and end overdoses and other drug-related harm through addressing the complex interplay between individuals and their *economic, physical, social,* and *political environments* (2002b). Previous research within our target community has built upon the REF to identify the unique set of influences present in a *rural risk environment* (Cooper et al., 2020; Batty et al., 2022; Ibragimov et al., 2020; Fadanelli et al., 2020; Cloud et al., 2019). Cooper and colleagues' work in this area notably included *healthcare* and *law enforcement* as environmental domains (2009). Rhodes also considers the *micro-* (individual),

meso- (group), and *macro-* (community/policy) *levels of environmental influence* within each environmental domain (2009). Kentucky sits at the center of a set of contributors to fatal overdose which can be mapped using the REF. Beyond overdose risk, the REF allows us to examine PWUDs experiences accessing, carrying, and administering naloxone.

Rural-REF Context: Healthcare, Physical, Law Enforcement, Political Environments

Rural Kentucky's *healthcare environment* is characterized by historic over-prescription of opioids by healthcare providers (Keyes et al., 2014; Bunting et al., 2018); lack of accessible evidence-based substance use treatment programming (Bunting et al., 2018); an *implementation chasm* between what services are proven to be effective (e.g., syringe service programs, medication-assisted treatment) (Lister et al., 2020) and what services are available (Lancaster et al., 2020); limited supply of healthcare workers (Halverson, 2004); and healthcare stigma experienced by PWUD when they try to access services (Ibragimov et al., 2021). A study of PWID in rural Kentucky (n=324) found that 62% of participants reported experiencing stigma from their healthcare providers, characterized by shaming, negative attitudes among providers, judgmental dispositions, and refusal to provide care (Surratt et al., 2021). Healthcare providers' negative attitudes towards PWUD are common and result in suboptimal care for patients who use drugs (Van Boekel et al., 2013).

Turning to the *healthcare environment's* interplay with the *physical environment,* qualitative and quantitative research reveal that Appalachian Kentucky is subject to high opioid availability and limited access to evidence-based substance use disorder treatment (Bunting et al., 2018). Furthermore, the region consistently struggles to recruit and retain healthcare workers (Halverson, 2004). Additional *physical environment* characteristics, introduced through previous

work on substance use in rural communities, include slower emergency response systems and longer travel time to health services (Kolak et al., 2020; Ezell et al., 2021; Otachi et al., 2020; Van Zee, 2009). Furthermore, impacts of the COVID-19 pandemic significantly increased fatal overdose in the United States at-large (Shelley, 2020) and in Kentucky (Slavova et al., 2021). With the onset of the pandemic, supply chains for illicit drugs, including fentanyl, were disrupted, causing overdose rates to increase (Nguyen & Buxton, 2021). Border closures and travel restrictions made the drug supply more unpredictable and toxic (Bonn et al., 2020). Drug accessibility and prices were erratic, causing PWUD to purchase and use more drugs during the times that they *were* accessible and affordable. Isolation, economic instability, and reduced access to services created major barriers for PWUD to achieve or maintain abstinence (Macmadu et al., 2021).

Syringe service programs (SSPs) reduce transmission of bloodborne disease associated with IDU by providing clean syringes to PWID (Des Jarlais et al., 2020). In Kentucky, SSPs have been legal since 2015 through a state senate bill (SB-192) aimed at reducing the high prevalence of drug-related harm (Brinkley, 2018). However, opening an SSP requires gaining approval from the local board of health, county fiscal court, and the city (Chapman, 2022). This multi-step process delays the time it takes to operationalize an SSP and as a result, 57 of Kentucky's 120 counties have no SSPs (Chapman, 2022). Ibragimov and colleagues found that in rural Kentucky, even in counties with SSPs, significant barriers to enrollment exist for PWID, largely rooted in internalized and anticipated stigma and fear of law enforcement (2021), speaking to the interplay between the *social environment, political environment,* and *law enforcement environments.*

SB-192 included a medical amnesty, or "Good Samaritan," policy (Brinkley, 2018) which applies to individuals who call 911 after witnessing an overdose, exempting them from prosecution for possession of a controlled substance or paraphernalia (Samaritan, 2013). However, evaluations of medical amnesty policies have indicated that police officers, paramedics (Kuszler et al., 2011), and PWUD often have limited knowledge and understanding of medical amnesty policies in their communities (Evans et al., 2016).

Kentucky's *law enforcement environment* is characterized by heavy criminalization of drug use. Cooper and colleagues found 39.7% of a sample of PWUD/PWID in rural Kentucky (n=151) had a history of arrest (2019). Systemic punitive responses to drug use drive many to engage in drug use in unsafe and unsanitary environments (Allen et al., 2010), thereby increasing their risk of injury and fatal overdose (Hughes et al., 1982). Qualitative research on PWUD/PWUO in rural Kentucky has found that fear of law enforcement increases vulnerability to overdose in public spaces (Fadanelli et al., 2020). Individuals with criminal justice records are prone to avoid engagement with law enforcement due to fear of harassment and/or arrest, making them less likely to call 911 in the aftermath of an overdose (van der Meulen et al., 2021; Tobin et al., 2005; Latimore & Bergstein, 2017).

Naloxone Experiences: Healthcare, Physical, Law Enforcement, Political Environments

A subset of the literature on PWUDs experiences with naloxone conceptualizes PWUD who respond to overdose in their communities as *first responders, peer responders,* (Mamdani et al., 2022) or *community-based overdose responders* (Shearer et al., 2019). Informed by this body of work, we will conceptualize PWUD who have received overdose response training as a part of the healthcare system. Their involvement ranges from informal (e.g., PWUD who have received

a single training on naloxone) to formal (e.g., PWUD who have been hired and thoroughly trained by overdose response programs/organizations). While there is variance among these experiences, we will encompass all PWUD who have received some level of overdose response training as part of the healthcare system. Accordingly, these individuals' decisions and behaviors are all shaped by the *healthcare environment* (Cloud et al., 2019).

PWUD who receive naloxone training frequently describe feeling an elevated sense of purpose, empowerment (Marshall et al., 2017) and pride regarding their contribution to their community (McAuley et al., 2018; Wagner et al., 2014), speaking to the interplay between the *healthcare* and *social environments*. A study of peer overdose responders in British Columbia (B.C.), Canada (n=42) found that participants perceived themselves as qualified and prepared to respond to community overdose, due to their lived experience. However, they often lacked adequate resources (e.g., oxygen) to respond to complex overdoses. Another significant barrier for this population was secondary trauma and burnout associated with responding to overdose (Mamdani et al., 2022).

For those without less extensive overdose response training, healthcare environment barriers are largely rooted in knowledge of and access to naloxone. The access/availability problem speaks to an intersection of the *physical* and *healthcare environments*. Naloxone is less accessible in rural environments than in urban environments (Sisson et al., 2019). A study of adults presenting to the emergency department in Massachusetts with a history of opioid use (n=10) found that lack of access and availability of naloxone posed a significant barrier.(Lai et al., 2021) A Baltimore-based sample of PWUO with history of IDU (n=577) found that insufficient overdose training was a barrier for participants (Dayton et al., 2019). Similarly, participants from a qualitative New York City–based study of PWUO (n=20) described fear of

misrecognizing the need for naloxone as one of their main barriers to utilization (Bennett et al., 2020). *Healthcare environment* factors have also been identified as facilitators to carrying and utilizing naloxone. One study found that enrollment in a medication-assisted treatment was positively associated with willingness to use naloxone (Dayton et al., 2019).

Turning to the *law enforcement environment,* fear of police was among the most frequently identified barriers both to carrying and utilizing naloxone. The qualitative New York City–based study of PWUO (n=20) found that fear of negative consequences including harassment from law enforcement, made participants hesitant to carry naloxone (Bennett et al., 2020). For the qualitative study PWUO in Worcester, MA (n=10), "fear of legal repercussions" was among the top three barriers to utilizing naloxone (Lai et al., 2021). Similarly, the Baltimore-based study of PWUO (n=577) found that "fear that police would threaten them at an overdose event" was a significant barrier to using naloxone (Dayton et al., 2019). A Sweden-based study of people who use heroin who had previously witnessed an overdose (n=35) also found that fear of police involvement was heavily considered when determining how to respond to an overdose (Richert, 2015). The B.C–based peer responder study revealed that participants frequently experienced negative interactions with law enforcement after responding to an overdose event and that police officers undervalued the peers' experiential knowledge (Mamdani et al., 2022).

Rural-REF Context: Economic Environment

Kentucky was among the U.S. states where Purdue Pharma aggressively promoted and marketed OxyContin from the 1990s through the early 2000s (Van Zee, 2009). Sociocultural factors made Kentucky particularly vulnerable to these campaigns. Kentucky's economy was

historically supported by coal mining, farming, and other industries that relied heavily on manual labor (Quinones, 2015), producing high prevalence of injury and chronic pain (Zibbell et al., 2015). Kentucky was heavily impacted by the coal industry recession, resulting in high rates of unemployment (Greenberg, 2018). Purdue's concentrated marketing efforts in rural communities, including those in Eastern Kentucky, intentionally misrepresented the risk of addiction associated with opioids through widespread promotion, sales campaigns, sponsored studies, and patient- and provider-facing material (Dyer, 2022). These promotional campaigns, rooted in misinformation, contributed to increased opioid prescription rates in Kentucky, concentrated heavily in rural counties (Van Zee, 2009).

Today, Kentucky consistently ranks among the top-five highest poverty states in the nation, and when broken down by county, Appalachian Kentucky has single the highest poverty rate, at 1.7 times the national average (Gan et al., 2019). Living below the poverty line increases one's risk of experiencing homelessness (Morrison, 2009) in turn increasing risk of experienced trauma, development or exacerbation of substance use disorders, and overdose (Bransford & Cole, 2019).

Naloxone Experiences: *Economic environment*

PWUD's naloxone experiences through the lens of their *economic environment* is minimally explored in the literature. One New Hampshire–based qualitative study of PWUO (n=76) and emergency responders (n=36) found that cost was a barrier for PWUD to obtaining naloxone (Bessen et al., 2019), speaking to an interplay between the *economic, physical,* and *healthcare environments*.

Rural-REF Context: Social Environment

Social stigma is a significant contributor to drug-related harm in rural communities, including Appalachian Kentucky. A qualitative study of PWUD in rural Kentucky (n=19) to explore overdose through the lens of a rural-REF found that community stigma drives risky behavior that intersects with the other environmental domains, including drug use settings (*physical environment*) and decision to call 911 in the aftermath of overdose (*law enforcement* and *political environment*) (Fadanelli et al., 2020). Another qualitative study interviewed professional stakeholders who interact with PWUD (n=30) and a complementary sample of PWUD (n=22) and found that social stigma towards PWUD is pervasive in rural communities due in part to decreased anonymity. Furthermore, once rural residents are "marked" as PWUD by their community, it is difficult to shed these labels, leading to isolation and lack of social support (Ezell et al., 2021). Isolation is a proven risk factor for overdose (Trappen & McLean, 2021). Over half of respondents in quantitative rurally based study (n=8,000) said that members of their community view PWUD as *"blameworthy, untrustworthy, and dangerous"* (Schlosser et al., 2022).

Naloxone Experiences: *Social environment*

A qualitative study of people who use opioids in New York City (n=20) found that notable barriers to utilizing naloxone were rooted in stigma related to substance use, indifference toward overdose, reluctance to disrupt someone's high, fear that the recipient will react aggressively, and desire to distance oneself from anything related to substance use (for those who are currently or desire to be in recovery) (Bennett et al., 2020). Similarly, the quantitative study of Baltimore-based people who use opioids with a history of injection drug use (n=577)

found that one of the most commonly reported barriers was fear that the recipient would become aggressive (Dayton et al., 2019).

The qualitative study of PWUO presenting to the emergency department in Worcester, Massachusetts (n=10) found that "fear of disrupting someone's high" was one of the most significant barriers to utilizing naloxone in community settings (Bennett et al., 2020). This same barrier, along with uncertainty regarding motive of overdose, was identified by the qualitative Sweden-based study of PWUO who had previously witnessed an overdose (n=35). This study also identified that the participants being high themselves made it difficult to respond to someone else's overdose (Richert, 2015), speaking to the *social environment* contexts in which people use drugs.

Several studies highlight PWUDs' positive feelings towards using naloxone on peers, emphasizing a sense of empowerment associated with the experience, sometimes in contrast to the disempowerment they perceived in other areas of their lives (Richert, 2015; Dwyer et al., 2016; Rochester & Graboyes, 2022). These findings are largely reflected in studies of trained peer overdose responders (Wagner et al., 2014; Pauly et al., 2021; Brandt et al., 2022), although positive feelings are not universal. A Los Angeles–based study of peer overdose responders (n=30) found that participants often felt guilt, resentment, stress, and strain on their social relationships after responding to overdose (Wagner et al., 2014). A qualitative, New York City–based study about peer overdose responders' emotional reactions to overdose events revealed that some participants experienced emotional blunting, distress, frustration, and rumination (Brandt et al., 2022).

Studies of service providers that work closely with PWUD expand on the challenges to implementing take-home naloxone programming, citing barriers largely rooted in stigma, both

internalized stigma from participants and external stigma from community members (Schlosser et al., 2022) and stakeholders (e.g., police, policymakers, etc.) (Dwyer et al., 2016; Ezell et al., 2021; Childs et al., 2021). The B.C–based peer responder study revealed that participants experienced stigma from emergency service providers who did not respect the peer responders' expertise or experiential knowledge (Mamdani et al., 2022).

Rural Environment-specific Studies

While each of the aforementioned studies on naloxone experiences provide valuable context on the experience of PWUD, they take place in either global or non-rural U.S. settings. Therefore, their results may not be fully generalizable to our target population of PWUD in rural Appalachian communities. The experience of individuals living in a rural risk environment involves specific challenges that present differently than in non-rural environments (Fadanelli et al., 2020).

Although literature from rural communities is limited, several studies do explore naloxone perceptions and experiences among PWUD in rural communities. One qualitative study in rural Alaska explored PWUDs' (n=18) experiences administering naloxone. Findings revealed that this population had overwhelmingly positive feelings towards naloxone and perceived it to be highly effective. These participants emphasized the need for naloxone to be more widely available (Surratt et al., 2021), speaking to the *physical* and *healthcare* risk environments. Findings also revealed that females were more likely than males to try multiple overdose response strategies and that overdose experiences did not have a long-term impact of drug use behaviors (Hanson et al., 2020). Another qualitative study interviewed SSP participants in rural Oregon (n=17), all of whom currently carry naloxone, on their experiences with naloxone and

motivations for carrying it. Regarding the *social environment*, participants found it highly empowering to carry and utilize naloxone, partially because it contrasted with powerlessness in other areas of their lives (Rochester & Graboyes, 2022).

While both studies provide valuable insight on PWUDs' naloxone experiences in rural communities, neither study foregrounds risk environments. Furthermore, the Oregon study interviewed individuals who were actively accessing syringe exchange programming (Rochester & Graboyes, 2022), meaning that the population was already familiar and comfortable with harm reduction strategies. Finally, both studies relied upon a relatively small sample size. While there is no clearly defined minimum sample size for qualitative research, the literature generally suggests 25-30 interviews for grounded theory studies and 15-25 interviews for single case studies (Marshall et al., 2013; Sandelowski, 1995).

Gaps in the literature, problem statement, & research aim

Much of the qualitative literature exploring PWUDs perceptions of and experience with naloxone focuses on service providers and other stakeholders, and/or studies non-rural communities. To date, there is a paucity of qualitative research exploring PWUDs perceptions of naloxone in rural settings. Research from urban settings is not generalizable to the experience of PWUDs in rural settings given the unique facets of a rural risk environment (Cloud et al., 2019). Rural populations' perceptions of naloxone may differ from urban populations, depending on the surrounding communities' cultural attitudes towards harm reduction approaches, criminal justice policies and practices, and local accessibility of naloxone (Fadanelli et al., 2020). Furthermore, much of the research on PWUDs' experience with naloxone focuses on the overdose event itself. There is a lack of research exploring how PWUD discuss naloxone within their social networks

before or after overdose events, or research exploring PWUD decision to accept and/or carry naloxone. Few studies analyze this topic through an REF lens or feature OEND interventions as a component of PWUDs' risk environments. This study aims to fill that gap by qualitatively assessing: 1) the pathways through which risk environments influence how rural PWUD accept, carry, and administer naloxone, and 2) how OEND intervention affects those pathways.

CHAPTER 3: STUDENT CONTRIBUTION

This study utilized a subset of data from a parent study on healthcare linkage for rural PWUD. The lead author of this study, ZK, joined CARE2HOPE (C2H), the parent study for this project, as a Graduate Research Assistant (GRA) in January 2022. Prior to ZK joining C2H, the study team had selected qualitative methods to evaluate the effectiveness of the intervention and developed a preliminary interview guide. ZK's contribution to the study involved **recruitment, data collection, conceptualization of thesis project, iterative revision of interview guide, development and revision of codebook, coding,** and **thematic analysis.**

Recruitment

All participants were enrolled in the C2H healthcare linkage intervention. The only eligibility criteria for this study was having been enrolled in the C2H intervention for at least three months prior to the interview. See *Table 1* for a description of the sample. ZK was one of two study team members responsible for contacting participants who met this criterion, inviting them to participate in a qualitative interview. Recruitment was conducted through phone calls, texts, emails, and Facebook Messenger messages.

Data Collection

ZK was one of two GRAs conducting one-on-one, in-depth, semi-structured interviews with participants. ZK conducted 25 of the 29 interviews. Interviews were conducted between March 18th, 2022 and October 24th, 2022 over Zoom and lasted between 00:29:08 and 1:36:47. With the participants' verbal consent, all interviews were audio-recorded. Additionally, the interviewer took hand-written notes. Immediately after the interviews, the interviewer ensured

that the audio recording was intact and wrote a brief memo detailing important takeaways and her perceptions of the interview. All audio recordings were subsequently sent to *Rev Transcription* for verbatim transcription services. The interviewer then reviewed transcripts for accuracy and replaced participant and program staff's names with pseudonyms.

Conceptualization of Thesis Project

ZK worked with HC (Co-Principal Investigator of C2H and Thesis Chair) to identify the topic area for this project. ZK proposed naloxone experiences as an area of interest and ZK and HC refined the research question to encompass *rural PWUDs' experiences accepting, carrying, and administering naloxone.*

Revision of Interview Guide

For the purposes of this analysis, ZK added a subset of questions to the interview guide, specifically pertaining to participants' experience accessing, carrying, and administering naloxone. This subset of questions is listed in *Table 2.*

Codebook Development

ZK was one of the study team members responsible for codebook development. An initial codebook was developed, using both deductive codes (derived from interview guides and relevant literature) and inductive codes (derived from interview memos and recurring topics). The structure of the codebook included: parent codes, subcodes, definitions, and examples from the transcripts. The codebook was reflexively updated throughout the analysis to reflect nuances

in the terms, add topics that emerged as relevant, and remove topics that were not relevant to the analysis' direction. See *Table 3* for a selection of the codebook.

Analysis

This thesis focuses on an analysis of a subsection of the C2H data, related to participants' experiences with and perceptions of naloxone. ZK conducted a reflexive thematic analysis, informed by Braun & Clarke's approach (2006), detailed below.

First, ZK ***immersed herself in the data*** through re-reading transcripts, listening to the audio recordings of interviews, reviewing interview notes, and discussing interview content with the study team. Initial ***code generation*** was driven by the interview guide. Codes included, "Accepting Narcan," "Carrying Narcan," "Utilizing Narcan," "Narcan opinions," "overdose," and "education." ZK generated a codebook that included the code name, definition, inclusion/exclusion criteria, and an example line of text. This codebook was iteratively updated throughout the coding process as new codes emerged as relevant.

Theme construction was supported by NVivo qualitative analysis software. ZK examined which codes were commonly grouped together and developed memos about the potential relationships between codes. ZK then grouped code sets into preliminary themes, eliciting continuous feedback from the study team. ZK then ***reviewed potential themes*** and drafted diagrams illustrating how they existed in relation to one another. This process involved collapsing overlapping themes and distinguishing pertinent differences between themes. ZK ***defined and named themes*** by reviewing relevant participant quotes within each theme and outlining how each theme contributed meaning to the research question. ZK ***produced an analysis report*** with accompanying data visualizations, guided by memos, theme diagrams, and

coded transcripts. ZK elicited continuous feedback from the study team to refine the presentation of themes into a coherent story. Once themes were developed and defined, ZK compared sub-groups of participants according to their experience with the intervention (e.g., assessing which themes were most relevant to participants who administered C2H naloxone).

CHAPTER 4: MANUSCRIPT

Chapter 4: Abstract

Background

People who use drugs (PWUD) are highly likely to witness overdose. Overdose education and naloxone distribution (OEND) programs are recommended as an evidence-based approach to reducing fatal overdose rates. Despite the growing presence of OEND programs, PWUD experience barriers to accessing, carrying, and administering naloxone, shaped by their risk environments. Rural risk environments pose unique challenges minimally explored in the literature. We investigated how PWUDs' naloxone experiences are shaped both by features of a rural risk environment and an OEND intervention.

Methods

29 one-on-one, semi-structured qualitative interviews were conducted with PWUD in rural Kentucky via Zoom software. All participants were enrolled in the CARE2HOPE (C2H) OEND intervention and recruited via phone calls, texts, and Facebook messages. Audio-recorded interviews were transcribed verbatim. Thematic analysis was conducted, guided by the Risk Environment Framework. NVivo 14.0 software (QSR International) was used for data management and coding.

Results

The OEND intervention altered participants' healthcare environments by providing access to naloxone, increasing participant knowledge, and increasing participant confidence in naloxone administration. Over half of participants gained knowledge on naloxone through the intervention related to the healthcare environment (how to access naloxone, administration technique) and political/law enforcement environment (medical amnesty policies). Through knowledge and skills gained in the intervention, participants became a part of their local healthcare environment. Over half of participants had recent experience administering intervention-provided naloxone. Participants' experiences carrying and administering naloxone were indirectly shaped by the OEND intervention with added influence of other risk environment domains. Most participants opted to carry naloxone, citing factors related to the social environment (sense of responsibility to their community) and physical/healthcare environments (unpredictable nature of overdose, high overdose prevalence, suboptimal emergency response systems). Participants' experiences administering naloxone to peers was largely shaped by social environment barriers (anticipated negative reaction from recipients attributable to physiological withdrawal, loss of high, and economic loss). Participants who felt a strong social ties to their community often administered naloxone despite anticipated consequences.

Conclusions

By providing naloxone paired with non-stigmatizing health and policy information, the OEND intervention both altered participants' healthcare environments and enabled them to become a part of the healthcare environment themselves. PWUDs' naloxone experiences are further shaped by other risk environment domains. Features of the rural physical environment contribute to many participants feeling safer when carrying naloxone. When PWUD administer naloxone to a peer, they are often acting against the recipient's preference, adding a layer of social environment considerations. Although many override this barrier to administer naloxone, the event can be traumatic for all involved parties.

Chapter 4: Introduction

The United States' opioid epidemic is a public health crisis, caused and aggravated by an amalgamation of cultural, political, economic, and biopsychosocial factors. Opioid overdose is a leading cause of morbidity and mortality in the United States (Ahmad et al., 2019) and the number one cause of injury-related deaths (Razaghizad et al., 2021). Overdose burden is elevated in rural communities (Barbosa et al., 2019) including Appalachian Kentucky (Wyatt et al., 1998; Lengerich et al., 2005). In 2021, Kentucky had the fifth-highest age-adjusted overdose death rate in the U.S. at 55.6 per 100,000 people, 1.7 times the national average (Centers for Disease Control and Prevention, 2022).

Rhodes' ***Risk Environment Framework (REF)*** asserts that to understand drug-related harm, we much consider the complex interplay between individuals and their *economic, physical, social,* and *political environments* (2002a, 2002b). Previous research within our target community has built upon the REF to identify the unique set of influences present in a ***rural risk environment (R-REF),*** introducing *healthcare* and *law enforcement* as key environmental domains (Cooper et al., 2009; 2020; Batty et al., 2022; Ibragimov et al., 2020; Fadanelli et al., 2020; Cloud et al., 2019).

Naloxone, commonly known by its most popular brand name, ***Narcan,*** is the most effective way to reverse overdose when correctly administered (Razaghizad et al., 2021; Abdelal et al., 2022; Fellows et al., 2017). The drug works by reversing overdose-induced respiratory depression, preventing cardiac arrest (Razaghizad et al., 2021). In 2014, the World Health Organization issued guidelines for community-based overdose management, stating that *"people likely to witness an opioid overdose should have access to naloxone and be instructed in its*

administration" (World Health Organization, 2014). Because PWUD are among the most likely to witness an acute overdose, peer overdose education and naloxone distribution (OEND) programs have been widely recognized as a best practice (Hanson et al., 2020; Piper et al., 2007; Dayton et al., 2019). Numerous studies have evaluated OEND programs, finding that they increase participants' knowledge and confidence in administering naloxone (Razaghizad et al., 2021; Hanson et al., 2020).

Despite the growing presence of OEND programs, PWUD face numerous barriers to engaging with naloxone (Lai et al., 2021; Kahn et al., 2022; Razaghizad et al., 2021; Zhang et al., 2018). ***Social*** barriers to naloxone administration include fear that recipient will react aggressively and fear of disrupting someone's high (Bennett et al., 2020; Dayton et al., 2019; Richert, 2015). Several studies highlight ***social*** facilitators to peer naloxone administration, emphasizing a sense of empowerment (Richert, 2015; Dwyer et al., 2016; Rochester & Graboyes, 2022). In areas where free naloxone is not easily accessible, the cost of the drug acts as an ***economic*** barrier (Bessen et al., 2019). ***Law enforcement/political*** barriers to administering naloxone include fear of legal repercussions and police harassment (Bennett et al., 2020; Dayton et al., 2019; Richert, 2015; Lai et al., 2021). ***Healthcare environment*** barriers are commonly rooted in access to information and naloxone (Bennett et al., 2020; Dayton et al., 2019; Dwyer et al., 2016). This study builds upon work that conceptualizes PWUD with naloxone training as healthcare workers (Mamdani et al., 2022; Pauly et al., 2021; Shearer et al., 2019), inextricably linking their naloxone experiences with the ***healthcare environment***.

Few qualitative studies on this topic have been conducted in rural settings. One such study in rural Alaska explored PWUDs' experiences administering naloxone, finding that participants had positive feelings towards naloxone and perceived it to be highly effective

(Hanson et al., 2020). Another study in rural Oregon found that PWUD were empowered by the experience of administering naloxone (Rochester & Graboyes, 2022). While both studies provide valuable insight, they reveal little about ***environmental barriers*** to naloxone access, carrying, and/or administration.

To date, there is a paucity of qualitative research exploring PWUDs' naloxone experiences in rural settings. Furthermore, most of the research on PWUDs' naloxone experiences focuses on the overdose event itself. There is limited research exploring how PWUD discuss naloxone before or after overdose events, or research exploring PWUDs' decisions to accept and/or carry naloxone. There is a lack of studies that analyze this topic through the lens of PWUDs' risk environments or foreground OEND intervention as a component of the healthcare environment. Guided by the ***R-REF****,* this study qualitatively assesses: ***1)*** *What are the pathways through which risk environments influence how rural PWUD accept, carry, and administer naloxone?, and* ***2)*** *How does an OEND intervention affect those pathways?*

Chapter 4: Methods

This study utilized a subset of data from a parent study on healthcare linkage for rural PWUD. The study team, including the lead author (ZK) conducted one-on-one, in-depth, semi-structured interviews with participants and thematically analyzed data, guided by the rural-REF.

Population & sample

The target population for this study was PWUD in rural Kentucky. All participants were part of a larger parent study, CARE2HOPE (C2H) which assessed the extent to which PWUD benefited from healthcare navigation and overdose education. The C2H intervention was a modified version of a CDC evidence-based initiative, Project START (Wolitski & Group, 2006). C2H intervention sessions and data collection were delivered by project staff called "Rural Health Navigators" or ***"REHNs."*** During intervention sessions, REHNs helped participants to set risk reduction goals, create plans to attain goals, and form connections to community-based providers. REHNs also provided overdose prevention education and supplied participants with naloxone and fentanyl test strips.

To be eligible for C2H, participants met one of two sets of criteria: **1a)** be a participant in a previous C2H longitudinal survey who consented to future contact, and **1b)** be a resident of or anticipate being released to one of the 12 C2H counties randomized to intervention or control data collection, and **1c)** be incarcerated in a local jail and expected to be released in <21 days, **OR: 2a)** Be a resident of or anticipate being released to one of the 12 counties randomized to intervention or control data collection, or be a criminal justice/legal system–involved community member (current or within past 30 days), and **2b)** Have used opioids to get high or have injected any drug in the 30 days prior to incarceration, and **2c)** be age 18 or older.

The sample for this study includes a subset of 29 C2H participants who voluntarily participated in one-on-one, in-depth interviews designed for quality improvement and assessment of the intervention. The only eligibility criteria for this study was having been enrolled in the C2H intervention for at least three months prior to the interview. See *Table 1* for a frequency description of the sample.

Research design

This study utilized a qualitative design, involving in-depth, semi-structured interviews and thematic analysis. Qualitative methods were chosen because they allow us to understand individuals' lived experiences through their own interpretive lens (Hennink, 2008; Bailey et al., 2020). Our study seeks to understand the pathways through which risk environments influence rural PWUDs' experiences accepting, carrying, and administering naloxone, and how overdose education and naloxone distribution intervention affects those experiences. In-depth, semi-structured interviews allow participants to share narrative, enriched by contextual details (Dearnley, 2005; Mahat-Shamir et al., 2021; Whiting, 2008). Open-ended questions allow participants' responses to reflect their own perceptions. Open-ended questions lend themselves to rich, narrative-driven responses. The semi-structured nature of the guide allows for the interviewer to adjust their approach according to the flow of the interview. The interviewer may introduce new probes based upon topics that emerge during the interview (Newcomer et al., 2015; Bailey et al., 2020).

Procedures

Following approval by the University of Kentucky IRB, Graduate Research Assistants (GRAs) contacted participants through phone calls, texts, emails, and Facebook messages

inviting them to participate in a qualitative interview. As part of their participation in C2H, all participants had previously consented to contact in any of these forms. Some recruitment was facilitated through C2H REHNs who a) helped GRAs contact hard-to-reach participants, and b) offered participants private office space and a Zoom-equipped device.

In-depth, semi-structured interviews were conducted with all participants between March 18th, 2022, and October 24th, 2022. Interviews took place over Zoom and lasted between 30 and 94 minutes. Verbal informed consent was obtained, and all participants received $30 in compensation. All interviews were audio-recorded and transcribed verbatim. Transcripts were checked for accuracy and identifying information was replaced. Data was stored and analyzed in NVivo 14.0 software (QSR International).

Measures

The interview guide was informed by literature (including previous research on the study population) (Cooper et al., 2020; Batty et al., 2022; Cloud et al., 2019), theory (including R-REF) (Rhodes, 2002a; Cooper et al., 2009, 2020), and input from C2H REHNs. The guide length was designed for interviews to last between 60 and 90 minutes. The interview guide aimed to assess the effectiveness of the C2H intervention. Domains covered participants' ***social environments*** (e.g., family support), ***economic environments*** (e.g., financial needs, employment barriers), ***healthcare environments*** (e.g., experience being connected to healthcare services through C2H), ***physical environments*** (e.g., current and prior experiences with homelessness), and ***political/law enforcement environments*** (e.g., interactions with law enforcement and criminal justice systems). A subset of interview questions (*Table 2*) covered participants' ***experiences accessing, carrying, and administering naloxone.***

Data analysis methodology

An initial codebook was developed (see *Table 3)*, using both deductive codes (derived from interview guide and literature) and inductive codes (derived from interview memos and recurring topics). The codebook was reflexively updated throughout the analysis to reflect nuances in the terms, add topics that emerged as relevant, and remove topics that were not relevant to the analysis' direction.

This study analyzes a subset of the C2H data, related to participants' experiences with and perceptions of naloxone. The study team, including ZK (lead author), HC (C2H co-PI) and UI (C2H qualitative lead), conducted a reflexive thematic analysis, informed by Braun & Clarke's approach (2006) (detailed below).

First, ZK ***immersed herself in the data*** through re-reading transcripts, listening to the audio recordings of interviews, reviewing interview notes, and discussing interview content with the study team. Initial ***code generation*** was driven by the interview guide. Codes included, "Accepting Narcan," "Carrying Narcan," "Utilizing Narcan," "Narcan opinions," "overdose," and "education." ZK generated a codebook that included the code name, definition, inclusion/exclusion criteria, and an example line of text. This codebook was iteratively updated throughout the coding process as new codes emerged as relevant.

Theme construction was supported by NVivo 14.0 qualitative analysis software. ZK examined which codes were commonly grouped together and developed memos about the potential relationships between codes. ZK then grouped code sets into preliminary themes, eliciting continuous feedback from the study team. ZK then ***reviewed potential themes*** and drafted diagrams illustrating how they existed in relation to one another. The study team also reviewed potential themes and provided feedback on collapsing overlapping themes and

distinguishing pertinent differences between themes. ZK ***defined and named themes*** by reviewing relevant participant quotes within each theme and outlining how each theme contributed meaning to the research question. ZK ***produced an analysis report*** with accompanying data visualizations, guided by memos, theme diagrams, and coded transcripts. ZK elicited continuous feedback from the study team to refine the presentation of themes into a coherent story. Once themes were developed and defined, ZK compared sub-groups of participants according to their experience with the intervention (e.g., assessing which themes were most relevant to participants who administered C2H naloxone).

Chapter 4: Results

Sample

All participants in this sample were part of a parent study, **CARE2HOPE (C2H),** which assessed the extent to which PWUD benefited from a healthcare navigation/OEND intervention. Intervention sessions and data collection were delivered by project staff called "Rural Health Navigators" or "REHNs." During intervention sessions, REHNs helped participants set risk reduction goals, create plans to attain goals, identify strategies to overcome barriers, and form connections to community-based providers. REHNs also provided overdose prevention education and supplied participants with Narcan and fentanyl test strips. The final sample for this study included 29 total participants. See *Table 2* for a description of the sample. All names used throughout this paper are pseudonyms. Naloxone's brand name, Narcan, will be used throughout this section to mirror participants' language.

Results overview

Themes are categorized by their corresponding R-REF domains (***physical, social, political, law enforcement, healthcare*** and ***economic environments)*** as well as corresponding participant experience elements (***accessing/accepting Narcan, carrying Narcan,*** and ***administering Narcan).*** Because all participants were a part of the C2H OEND intervention, we have conceptualized them as part of the healthcare system and all themes are mapped onto the ***healthcare environment.*** See *Figure 1* for a visual representation of the intersectional relationships between themes, R-REF domains, and participant experience elements.

The C2H OEND intervention directly impacted participants' experiences accessing/accepting Narcan, shaping their ***healthcare environment*** through providing access to

Narcan, increasing participant knowledge, and increasing participant ability/confidence in Narcan administration. (*Table 4* maps C2H OEND intervention components to corresponding participant-level impacts.) Over half of participants gained knowledge on Narcan through the intervention related to the ***healthcare environment*** (how to access Narcan, administration technique) and ***political/law enforcement environment*** (medical amnesty policies). Through knowledge and skills acquired in the intervention, participants became a part of their local ***healthcare environment.***

The OEND intervention had an indirect impact on participants' experiences carrying and administering Narcan. Most participants opted to carry intervention-provided Narcan, citing factors related to the ***social environment*** (sense of responsibility to their community) and ***physical/healthcare environments*** (unpredictable nature of overdose, high overdose prevalence, suboptimal emergency response systems). Over half of participants had recent experience administering intervention-provided naloxone, embodying the role of peer overdose responder. Participants' experiences administering Narcan to peers was largely shaped by ***social environment*** barriers (anticipated negative reaction from recipients attributable to physiological withdrawal, loss of high, and economic loss). Participants who felt a strong social ties to their community often administered naloxone despite anticipated consequences.

Intervention Direct Impact

Accessing/accepting Narcan

KNOWLEDGE OF NARCAN AVAILABILITY, EFFECTIVENESS, MEDICAL AMNESTY LAWS: ***AT FIRST I WAS LIKE… 'AIN'T NO WAY IT SAVES SOMEBODY'S LIFE'***

Over half of participants (55%, n=16) learned something new about Narcan through the intervention. Among those who gained Narcan knowledge, approximately 31% (n=5) learned about medical amnesty, approximately 56% (n=9) learned about how to administer Narcan, and approximately 31% (n=5) learned about where and how to access Narcan. For participants who learned about the efficacy and administration of Narcan through the intervention, REHNs met their needs through providing comprehensive, relevant overdose response training. Participants' receptivity to training was facilitated through relationships with REHNs and perception of REHNs as a trusted information source. This dynamic represents interplay between the ***healthcare,*** *and* ***social environments.***

A subgroup of participants (n=5) learned about the existence and/or availability of Narcan through the C2H intervention. Participants used language like, "*I didn't know what it was"* when describing their previous knowledge of Narcan. Others were previously unaware of how to access Narcan.

> ***Interviewer:*** *Before you joined the study, did you have Narcan with you already?*
> ***Participant:*** *No, I never had it.*
> ***Interviewer:*** *Oh, okay. Were you familiar with Narcan…?*
> ***Participant:*** *No, I had no idea what it was.*
> *– Earl,* Perry male*

REHNs met these participants' needs by providing Narcan and information on where they could access Narcan in the future. One participant, Lillian, expressed that she had heard

about Narcan being offered in her community but was skeptical of the legitimacy of these claims. *"I know that sometimes they would give it out, I heard. But I was like, 'I don't believe that. I can't believe that.'"* For participants like Lillian, trust in their REHN increased receptivity to informational support (e.g., where and how to access Narcan).

The access/availability aspect of the ***healthcare environment*** expanded beyond participant knowledge. For one participant, James, the decision to accept Narcan offered through the intervention was contingent upon how much Narcan he currently possessed.

> *Sometimes, like if I had a couple [Narcans] stored up already, because I don't want to take something that somebody else could possibly use it. But if I had like 10 at home, that's enough for me for the time until I use some... I don't want to over-take something and somebody go after me and them not have it. Selfish. Because I want everybody to live.*
>
> *- James,* Lee Male*

While James' case was an outlier, it highlights the role of knowledge. Because James had trusted methods of accessing Narcan prior to the intervention, he did not perceive scarcity and embraced a more community-focused mindset, highlighting interplay between the ***healthcare, social*** and ***physical environments.***

Over half of participants (56%, n=9) who reported new Narcan knowledge and 31% of total participants spoke about **learning how to administer Narcan** through the intervention's training. For these participants, training increased their knowledge of and comfort level with Narcan. Participants described increased understanding of how to correctly administer Narcan and what to expect in the process. One participant, Ben, said the training taught him: *"How to use [Narcan], and how to position the person, and how long it takes to kick in… Just everything about it. I didn't know nothing before."* Another participant, Sandra, said that the training taught her that she could administer multiple doses of Narcan if she waited two-to-three minutes between each dose. Similarly, James shared that the training taught him about "*the recovery*

positions, like putting them on their side… their mouth closed, their head tilted back, the Narcan, and wait two to three minutes between each one."

Beyond learning how to administer Narcan, participants gained confidence in the efficacy of Narcan. Melinda said that before her time in the intervention, she had heard about Narcan but was skeptical that it worked to reverse overdose:

> ***Interviewer:*** *Has your opinion of Narcan changed personally since joining CARE2HOPE?*
> ***Participant:*** *Yeah, at first I was like, what the heck, ain't no way it saves somebody's life. Yeah, it does. Absolutely.*
> ***Interviewer:*** *So, before you didn't necessarily believe that it would work?*
> ***Participant:*** *No, I didn't believe it, ain't no way. Yeah, it works good.*
> *– Melinda,* Perry female*

Turning to the ***law enforcement environment*****,** some participants (n=5) described learning about the legality of Narcan, including the fact that they could *not* be prosecuted for possessing Narcan. Kelly said the training taught her "*that you can be arrested, you can be charged, but they can't prosecute you and make it stick if you're having Narcan in your pocket."* Speaking to the interplay between the ***law enforcement*** and ***social environments,*** James said he shared his newfound knowledge of medical amnesty laws with his social network:

> *I try my best to teach them as much as possible about it, and what to do without calling 911 because everybody's so afraid to call 911. And then I'm like, "Look, there's a law passed, it's American law, if anybody here's got warrants, get out. You don't have to leave, but hey, we're getting this person help, that's the main thing."*
> *-James,* Lee male*

One participant, Stephen, explicitly invoked the ***political environment*****,** citing the supreme court's decision to legalize Narcan:

> ***Interviewer:*** *Before you joined the study, did you carry Narcan with you-?*
> ***Participant:*** *No, I didn't think I could.*
> ***Interviewer:*** *…What did you learn that made you feel comfortable carrying it?*
> ***Participant:*** *To know the supreme court issued it, deemed it to be legal…*
> *– Stephen,* Menifee male*

Participants who learned about the legality of Narcan were supported by the intervention's training which included relevant, up-to-date information on medical amnesty policies and limits of the legal system.

By providing **instrumental support** (Narcan distribution) paired with **informational support** (Narcan training, education, and policy information), the intervention both altered participants' ***healthcare environments*** and enabled them to become a part of the ***healthcare environment themselves.*** The intervention provided participants with the necessary material and non-material tools to act as peer overdose responders within their communities.

Overall, participants were receptive to receiving and learning about Narcan through the intervention. While some participants (n=13) were well-versed on Narcan prior to the intervention, others had no familiarity with it or had misperceptions, representing a range of knowledge on the topic. Almost all participants (n=28), opted to accept Narcan, indicating that individuals who receive education on Narcan are likely to accept it when offered. However, acceptance does not always translate to consistent carrying or administration of Narcan.

Intervention Indirect Impact

Carrying Narcan

Approximately 65% (n=19) of participants opt to carry Narcan at least some of the time. When discussing the factors that motivated this decision, participants invoked a self-imposed social responsibility to community members and an enhanced sense of security associated with carrying Narcan. Participants who described *"feeling safer with Narcan"* spoke to a) the unpredictable, chaotic nature of overdose, and b) living in a rural physical environment where overdose is prevalent and emergency response systems are slow. When describing barriers to

carrying Narcan, several participants (n=5) described stigma, either from law enforcement, community members, or both.

The C2H OEND intervention indirectly impacted participants' experiences carrying Narcan by, a) providing access to Narcan, b) increasing participant confidence in legal ability to carry Narcan, c) mitigating impact of police stigma, and d) enhancing positive feelings towards Narcan.

SOCIAL OBLIGATION TO COMMUNITY: *IT FEELS GOOD TO HAVE A PART IN SOMETHING*

Regarding the ***social environment,*** some participants (n=7) expressed that their decision to carry Narcan was partially attributable to a sense of social responsibility. Participants used language like "*doing your part,"* speaking to an internalized role. Cassandra explained: *"I can't walk by somebody laying on the ground and not try to help… That's somebody's daddy or mother or daughter or son… I won't walk by."* Participants described being known within their community as someone who has Narcan:

> *People would always come running to us when they would need [Narcan], when people would OD. We actually saved eight or nine, 10 lives. People would OD, we would be the ones to have the Narcan. Everywhere we go, we got Narcan. People we don't know, we have saved their lives with Narcan…People we didn't even know, just because we knew we had it and they didn't.*
>
> *-Zeke,* Perry male*

Denise shared that her social role as a Narcan carrier was important because "*If I'm around [community members] and I have Narcan, they can't misplace it or not be able to find it when they need it,"* speaking to her self-perception as someone equipped with the tools and knowledge to respond to overdose. Pete expressed that this social role was a source of self-esteem, explaining that *"It's like doing your part… It feels good to have a part in something."*

One participant, Monica, explained that she did not experience of social obligation in the past:

> ***Interviewer:*** *Did that experience make you more likely to carry Narcan in the future?*
>
> ***Participant:*** *Honestly, no. No, I was a very careless addict. I didn't really care. I was the type of addict on heroin that my friend would overdose in front of me and I would pick their pockets for their dope and not even call an ambulance. So I didn't really care. I didn't feel the need to have it.*
>
> *-Monica,* Perry female*

Later in the interview, Monica went on to say that several recent life changes (e.g., moving, drug cessation, family loss) had led changes in her perceptions and behavior, and that she now does carry Narcan with her.

The self-imposed helper role was a critical driver for some participants (n=7) in their decision to carry Narcan. These participants explained that they carried Narcan in part because they had access to it and their fellow community members often did not. In addition to the ***healthcare*** and ***social environments***, this experience speaks to **the *physical environment.*** Participants who possess Narcan are aware that not everyone in their community does, amplifying their sense of social responsibility.

SAFER WITH NARCAN: *YOU NEVER KNOW WHEN YOU CAN RUN INTO SOMEONE THAT IS OVERDOSING*

Participants (n=10) shared that they felt safer with Narcan than they did without it, which we characterize as intersectional influence of the ***physical, social,*** and ***healthcare*** environments. Despite the potential consequences of carrying or possessing Narcan, participants reported an enhanced sense of security from having Narcan at their disposal. Some participants expressed that while they were not actively using drugs, people within their social networks were. Possessing Narcan helped these participants feel prepared to respond to overdose in their community. Francesca said, *"I feel a lot safer with Narcan"* and James similarly shared *"I feel safe and secure, a little bit more secure with [Narcan] on me."* Pete of Wolfe County explained that carrying Narcan made him feel safer in light of the fentanyl influx in his community because

Narcan *"helps with everything."* Ben explicitly invoked the ***law enforcement environment,*** explaining that the desire to be prepared to respond to overdose outweighed the fear of arrest: *"I'd rather have it on me and go to jail, as [opposed] to not being able to save someone because I don't have it."*

Participants used language like *"anything can happen"* and *"you never know"* when describing unpredictable, erratic overdose patterns in their community. Carrying Narcan helped these participants feel prepared to respond to emergent overdose situations as they arose.

> ***Interviewer:*** *Is there anything that makes you nervous about carrying Narcan on you or having it in your possession?*
> ***Participant****: No, because I know when I have it on me, because you can't ever tell in wherever you're at, what kind of situations going on, anything can happen in the spur of a moment. And I know as long as I've got that on me, if something like that ever happens around me, it could save somebody's life.*
> *– Dawn,* Perry female*

Two participants explained that they began carrying Narcan after witnessing a friend's overdose. For these participants, the feeling of being unequipped to respond to their friend's overdose spurred a significant behavioral change. One of these participants, Pete recalled *"I didn't have [Narcan] that night, and ever since, it's always been with me."*

A pertinent aspect of participants' ***physical environments*** was the rural makeup of their communities. Participants' rural environments were often characterized by pervasive overdose presence as well as slow emergency response times. ***Physical environment*** played a significant role in participants' thought processes when deciding to carry Narcan. Slow emergency response times are a primary feature of the rural risk environment (Cloud et al., 2019, H. L. Cooper et al., 2020) which was reflected in our participants' descriptions of their community. Another component of the rural risk environment is the sheer number of overdoses routinely encountered by participants. This combination of high overdose prevalence and suboptimal emergency

response systems contributed to participants' desire to carry their own Narcan, rather than relying on an ambulance.

> *But I mean, I don't think a lot of people know where they can obtain Narcan without... Or how to get access to it without having to call a ambulance and having to wait. And then, that's such a crucial thing here, too. Because in rural areas, ambulance doesn't always come… time is very precious in those moments. Every second counts.*
> *-Tony,* Menifee male*

> *I grabbed the Narcan, and my boyfriend, he's got fourth stage emphysema and it just so happened, he had his oxygen tanks there, and he ran out with his oxygen tank and he hooked her up to oxygen and we gave her that Narcan. And I think if we wouldn't have had those two things that day, because I know the ambulance wouldn't have gotten to her in enough time, she probably wouldn't have made it.*
> *-Dawn,* Perry female*

The unpredictability and prevalence of overdose in conjunction with participants' low expectations of emergency response systems influenced their decisions to carry Narcan. However, there were also notable barriers that influenced participants' decisions carry Narcan. The most common barrier, stigma, is explored below.

STIGMA: *WEAR A BADGE, THEY THINK THEY'RE BETTER THAN EVERYONE ELSE*

Police stigma, part of the ***law enforcement environment,*** played a significant role in some participants' (n=5) decision to carry Narcan. Because most of this study's participants are criminal justice involved, they have a uniquely adversarial relationship with law enforcement rooted in prior conflict and experienced trauma. Approximately 17% of participants described law enforcement stigma as something that had, at one point, made them hesitant to carry Narcan:

> *There's times I have been stopped, afraid the law would try to charge me with something... But [that was] before I got into the CARE2HOPE. Once I got into this program, it lightened my feelings up on if I got stopped, because [Narcan] actually helps people…I realized not to worry… if I've got it, because it's actually to help people, and really not care for me to carry it. It don't bother me no more.*
> *-Zeke,* Perry male*

In Zeke's case, the intervention worked to mitigate the impact of stigma in his life. Through engaging in Narcan training with his REHN, Zeke both enhanced his positive feelings towards Narcan and reduced his fear of consequences to carrying it. However, for some participants, like Lillian, apprehension of law enforcement stigma remains a barrier to carrying Narcan. When asked if carrying Narcan made her feel nervous, Lillian replied, *"A little bit, yeah. You never know what cops will think… They could say, 'You got that because you use…?'"* Lillian's concern, that carrying Narcan would lead police to assume she used drugs, was shared by others. Denise explained, *"if I'm carrying Narcan, then that's going to make [police] judge me or question me more and wonder why I have that."*

Turning to the ***social environment,*** stigma from community members related to carrying Narcan was less pervasive than police stigma. Melinda reported that she had not noticed judgement from others, and that *"even if they did [judge me], I don't care. That's irrelevant to me."* Another participant, Ben, explained that carrying Narcan was normalized in his community, stating, *"Everybody I know carries it, whether they've done a drug in their life, they still carry it… The preacher's got some in his glove box."* Conversely, one participant, Sandra, did describe experiencing stigma from a community member for carrying Narcan. Her experience mirrored the police stigma descriptions in that someone assumed she used drugs because she carried Narcan. *"She seen Narcan in my car and just automatically said, 'Oh, so you're on [drugs] now?' To me, that was judgmental… Just because I have [Narcan] in my car, does not mean that I'm on drugs."*

Participants' decisions to carry Narcan were sometimes influenced by anticipated stigma, mostly from law enforcement. While the intervention could not reduce stigma itself, it did provide participants with information on their legal rights surrounding Narcan. For some, this

context helped them feel more secure in their interactions with law enforcement. While participants' barriers to *carrying* Narcan largely stemmed from their ***law enforcement environment,*** barriers to *administering* Narcan were much more focused on their ***social environments.***

Administering Narcan

The OEND intervention indirectly impacted participants' experiences administering Narcan by, a) physically providing Narcan, b) providing training on administration technique, and c) increasing positive feelings towards Narcan. Over half (55%, n=16) of participants described recent experience with C2H-provided Narcan. 14 participants administered intervention-provided Narcan on someone else, one participant had the Narcan administered on her, and one participant handed someone else the Narcan to administer during an overdose event. Approximately 21% (n=6) of participants described administering Narcan in the past but did not have recent experience with C2H-provided Narcan. Another 21% (n=6) recalled no experiences administering Narcan, before or after the intervention.

Participants' experiences administering Narcan are categorized as *"Intervention Indirect Impact"* rather than *"Direct Impact"* because the main barriers and facilitators described by participants fell outside the scope of the intervention. Participants with recent Narcan experience (n=16) described a range of barriers and facilitators to administering Narcan, largely rooted in the ***social environment***. These fell into two main categories: **1) consideration of the recipient's reaction**, and **2) prior communication between the participant and recipient about Narcan.**

RECIPIENT REACTION: *NOW THEY'RE SOBER AND THEY'RE BROKE*

Participants expressed that when they used Narcan to reverse someone's overdose, they were often met with anger and frustration upon the recipient's arousal. Participants provided various explanations for these reactions, including loss of high and acute withdrawal symptoms. A subset of the *"loss of high"* reactions included individuals who were upset to have spent their limited funds on drugs only to have their high taken away by the Narcan. Several participants had experienced overdose and overdose reversal themselves and were empathetic to the experience of their peers.

Participants' apprehension to administer Narcan was often rooted in their knowledge of overdose reversal discomfort. This knowledge stemmed from both first-hand and observed experience. Participants cited rapid withdrawal symptoms associated with overdose reversal. Elaine said that after she administered Narcan on her brother, he became angry with her because *"He says that you feel rough after you get Narcan…for a day or two."* Noelle explained that she had been angry with people in the past for using Narcan on her because, *"You wake up sick and pissed off. You just need another shot [of heroin]… I would wake up mad as hell, then get me another shot… that way I wouldn't be sick."*

Often, recipients' negative reactions to overdose reversal stemmed from the loss of high in addition to the physiological withdrawal symptoms described above. Nine participants spoke to recipients' *"loss of high"* as something they considered before administering Narcan. Melissa recalled that in her experience administering Narcan, the recipient wakes up *"swinging, madder than hell because I took their buzz away."* Similarly, Jenna explained that she had seen people deny Narcan because *"They didn't want their high to go away. They were so high that it could kill them, but they didn't want to lose their high."*

A subset of the *loss of high* group had a negative reaction to losing funds, rooted in the ***economic environment***. Some participants (n=3) spoke specifically to the economic loss perceived by Narcan recipients. Participants explained that the recipients' reactions upon arousal were driven in part by feelings of having lost or "wasted" money. These feelings were closely related to the *"loss of high"* feelings described above. Participants used language like, "*you don't want to lose that feeling you paid for*" speaking to the idea that overdose reversal robbed them of both their high and the money they paid for the drugs that caused the overdose. Francesca explained that in her experience administering Narcan, the recipient reacts negatively because "*Now they're sober and they're broke… I had a man that was in full overdose one time. When he come to, he said '…You just caused me to waste $160.'"* Denise recounted similar experiences:

> *Some of them are just like, "That's the only money I got. If you Narcan me and I go back to being completely sober, I'm going to be mad because, pretty much, I bought those drugs for nothing. I'm not going to feel them, and I'm not going to be able to get anymore," which, even as an addict, it's crazy to me. I just couldn't imagine being in that mindset and thinking that that high is more important than me waking up.*
> *-Denise,* Perry female*

Despite recipients' negative reactions to Narcan, participants often administered Narcan anyway, evidenced by the significant percentage of our sample (48%) who had recently administered intervention-provided Narcan. In participants' reasoning for administering Narcan in the face of negative consequences, they invoked some of the same sentiments that factored into their decision to ***carry*** Narcan. The social obligation to their community and their self-imposed helper role allowed participants to overcome the fear of a negative reaction.

Brenda reasoned, *"You may get hit but that's just part of it… I'm not going to lay back and watch somebody die."* Participants were empathetic to the experience of overdose reversal, particularly when they had been on the receiving end of Narcan in the past. When asked how he responds when recipients react negatively, Ben's thought process was similar to Brenda's: *"I*

understand [their reaction] because I've been in their shoes… It doesn't bother me. I'm just not going to let somebody lay there and die." This sentiment was echoed by other participants. Monica said, *"I would rather someone hit me or knock m*e *out and then live"* and Jaclyn said, *"I'll fight with them, I don't care. To save their life, you don't want them to die."* For Denise, the decision to administer Narcan despite potential consequences came down to ***social environment*** considerations of the recipient's family: *"I just think… they might be having a bad day today, but that doesn't change the fact that they have a family that's going to have to deal with the consequences if something happens to them."*

Two participants said that anticipation of the recipient's reaction made them delay Narcan administration or exhaust alternative options prior to trying Narcan. Ben explicitly stated that Narcan was a last resort: *"I'd try to save them at all costs without using Narcan if possible… I would resort to everything but [Narcan]. Use it last."* Ben's experience was informed by his own experience having an overdose reversed with Narcan. Another participant, Elaine, shared that sometimes she was hesitant to administer Narcan because she feared the recipient would be upset with her. In response, she delayed administration: *"I try to wait a little longer than what I usually would… I don't know, I don't want to wait too long, but then I have it in my head, they're going to get mad at me… It's nerve racking."*

Largely, participants were able to overcome barriers to administering Narcan by weighing the consequences of Narcan administration (e.g., adverse recipient reaction) against the consequences of doing nothing (fatal overdose). However, our findings indicate that the experience of administering Narcan, particularly to someone in one's own social network, is wrought with complex ***social environment*** considerations. These are further illuminated in

participants' communication with social network members regarding expectations and intentions for Narcan administration.

PRIOR COMMUNICATION: *WAIT THREE MINUTES BEFORE YOU NARCAN ME*

Participants' ***social environments*** featured discussion about the use of Narcan prior to overdose events involving a) the participant's intention to administer Narcan if they observe signs of overdose, and/or b) the recipient's desires regarding if/when they wish to have their overdose reversed with Narcan.

Some participants communicated to network members that they would administer Narcan if deemed necessary. Sandra explained she informed her friends, *"'If you nod out, and if you don't respond to me… I will Narcan you.' Even before they [use drugs], I'm like, 'I do have Narcan. I will Narcan you.'"*

Another component of these conversations was the recipient's communicated desire, or lack thereof, to receive Narcan. Participants described receiving instructions to wait an allotted amount of time before administering Narcan or to avoid administering Narcan entirely:

> ***Interviewer:*** *have you ever been in situations or seen situations where people don't want to be Narcaned?*
> ***Participant:*** *Oh yes. My boyfriend. Yes. My boyfriend. Yeah. He told me, I have used it in the past for heroin. So, we used [heroin] together once and he told me, he said, "if I go out at least wait three minutes before you Narcan me." And that's when I realized I didn't want to do this no more… He said, "if I go out at least wait three minutes before you Narcan me."*
> ***-****Kelly,* Knott female*

For some, these conversations involve one party's intention to administer Narcan despite the other party's objections. *"Some people say, 'If I need [Narcan], don't,'* Michelle recounted. Her response: *"Sorry, but I'm going to."* For some participants, conversations regarding intentions to administer Narcan acted as a facilitator to future Narcan administration. For others, these conversations made it more difficult to administer Narcan, particularly when the recipient

expressed a strong desire not to receive Narcan. Participants shared that this barrier was often overridden by other facilitators, like social obligation to community, self-imposed helper role, and knowledge/confidence in Narcan administration.

Chapter 4: Discussion

Goal & key results

The goal of this study was to qualitatively assess: *1) What are the pathways through which risk environments influence how rural PWUD accept, carry, and administer naloxone, and 2) How does an OEND intervention affect those pathways?*

The OEND intervention altered participants' healthcare environments by providing access to naloxone, increasing participant knowledge, and increasing participant confidence in naloxone administration. Over half of participants gained knowledge on naloxone through the intervention related to the healthcare environment (how to access naloxone, administration technique) and political/law enforcement environment (medical amnesty policies). Through knowledge and skills gained in the intervention, participants became a part of their local healthcare environment. Over half of participants had recent experience administering intervention-provided naloxone. The intervention had an indirect impact on participants' experiences carrying and administering naloxone. Most participants opted to carry naloxone, citing factors related to the social environment (sense of responsibility to their community) and physical/healthcare environments (unpredictable nature of overdose, high overdose prevalence, suboptimal emergency response systems). Participants' experiences administering naloxone to peers was largely shaped by social environment barriers (anticipated negative reaction from recipients attributable to physiological withdrawal, loss of high, and economic loss). Participants who felt a strong social ties to their community often administered naloxone despite anticipated consequences.

Study contribution to existing literature

While there is a growing body of research on naloxone experiences, our study was the first to our knowledge to qualitatively assess PWUDs' experiences accessing, carrying, and administering naloxone through the lens of their rural risk environment. Much of the previous research in this area centers the perspective of non-drug using stakeholders (e.g., emergency responders, pharmacists, etc.). Studies that do center PWUD as experts primarily take place in non-rural settings. A small number of studies are based in rural settings (Marshall et al., 2017; Hanson et al., 2020; Rochester & Graboyes, 2022), but do not foreground the R-REF as a guiding framework.

Accessing/Accepting Naloxone & Direct Influence of OEND Intervention

Other studies identified ***healthcare environment*** factors, like PWUDs' access to information on naloxone (Dayton et al., 2019; Lai et al., 2021) as key drivers for behavior. Our results supported these findings and identified several other knowledge-based factors relevant to a rural population. Our sample exhibited a range of naloxone knowledge and for some participants, learning that naloxone existed was a critical first step. Some participants were familiar with naloxone but skeptical that it worked. This skepticism speaks to PWUDs' ***healthcare environments*** characterized by healthcare stigma and resulting distrust of healthcare professionals. For these participants, the intervention played an important role in providing a trusted source of information, speaking to interplay between the ***healthcare and social environments***. Knowledge of medical amnesty/Good Samaritan policies also played an important role for our participants. This was especially relevant because most of our participants were criminal justice involved and distrustful of law enforcement. Learning about their legal

rights helped participants feel more confident carrying and administering naloxone, speaking to the influence of the ***law enforcement/political environments.***

Carrying Naloxone

Previous studies identified feelings of purpose and empowerment (Marshall et al., 2017; McAuley et al., 2018; Wagner et al., 2014) as facilitators to *administering* naloxone. Limited studies explore these feelings in relation to *carrying* naloxone. Our findings partially aligned with previous research in this area. Our participants did not specifically highlight *empowerment* but did emphasize a sense of ***social*** *responsibility to their community.* These feelings factored into decisions to carry and to administer naloxone. Social responsibility plays a critical role in rural communities, where social networks can be integral to survival. Our findings identified that participants' rural environments often facilitated their desire to carry naloxone, highlighting the importance of the ***physical environment***. Participants explained that the prevalence of overdose in their community, combined with slow emergency response systems, made them feel safer with naloxone than without it.

Administering Naloxone

Previous studies identified fear of recipient reaction (Bennett et al., 2020; Dayton et al., 2019; Richert, 2015) as a key a ***social environment*** barrier to naloxone administration. Our results supported these findings with the caveat that for most participants, this barrier did not prevent them from naloxone administration. However, it did make the administration process more difficult.

Other studies highlighted fear of disrupting someone's high (Bennett et al., 2020) as a barrier. Our findings align with the notion that recipients' loss of high is a significant consideration in PWUDs' decisions to administer naloxone. Intertwined with loss of high, our results also found that economic loss heavily factored into these considerations. This finding speaks to the influence of the ***economic environment*** in decision-making .

Further highlighting the ***social environment*** influence, our findings identified that conversations about naloxone prior to overdose events could act either as a barrier or facilitator to future naloxone administration. For some participants, clearly communicating their intention to administer naloxone helped them feel more prepared to do so if necessary. For some, these conversations complicated the decision to administer naloxone. This area warrants further research to identify factors that impact the productivity of these conversations.

Strengths

This study fills a gap in the literature regarding naloxone experiences of PWUD in rural Appalachian communities. Furthermore, our study explores the ways that PWUD discuss naloxone with their social networks, before, during, and after overdose events. This focus area yielded rich data, providing meaningful context to the existing body of literature.
Another strength is the application of the R-REF as the guiding framework for our study. This framework helps us to contextualize our findings in relation to a long-standing body of scholarly work (Rhodes, 2002a; H. L. Cooper et al., 2020; Cloud et al., 2019).

We engaged in rigorous qualitative protocol at each stage of the study. This entailed thorough and timely documentation, routine study team debriefing, and researcher reflexivity practices. We also placed a heavy emphasis on recruitment, interviewing 29 participants. This

sample size falls well within best practices for qualitative research (Marshall et al., 2017; Sandelowski, 1995).

Limitations

Among the limitations of this study is missing perspectives. Our sample is skewed towards participants who sustained engagement in the intervention. We are missing the perspectives of people who were re-incarcerated or otherwise disengaged from the program during our recruitment period. Furthermore, our sample is largely composed of white participants meaning that we are missing perspectives of rural people of color.

During data collection, there were several instances where interviews were impacted by poor cellular or internet connection. While the researchers took steps to mitigate this (e.g., arranging office space/computers for participants to use, asking participants to repeat themselves, supplementing transcripts with detailed notes), transcripts still reflect some inaudible moments. Another limitation is that naloxone experiences were not the sole focus of the interview guide. Furthermore, the naloxone questions were placed towards the end of the guide. While this structure allowed the interviewer to build trust and rapport with participants before discussing naloxone experiences, it also increased risk of participant fatigue.

Finally, it is important to consider the researcher's positionality. The primary interviewer is not from a rural Appalachian community. While the interviewer strived to build rapport and avoid stigmatizing language, she may still be perceived as an outsider by participants.

Conclusion

The factors that influence PWUDs' decisions to accept, carry, and administer naloxone are complex and touch upon all areas of their rural risk environment. Having a trusted source of non-stigmatizing, accurate healthcare information is highly important for this population. An up-to-date understanding of local medical amnesty/Good Samaritan laws is critical for PWUDs' perceived safety. PWUDs' decisions to administer naloxone are complicated by social environment considerations. Our findings reveal that when PWUD administer naloxone to a network member, they are often acting against the recipient's communicated desires. This is often met with anger and sometimes physical aggression. Although many individuals work through this barrier and administer naloxone, the event can be traumatic for all involved parties.

Further research

The topic of communication about naloxone prior to overdose warrants further research. A future study could help clarify what factors make these conversations productive. Conversely, when and how can these conversations act as a barrier to naloxone administration? Results could identify strategies for OEND programs to help PWUD engage in productive dialogue with peers about naloxone.

CHAPTER 5: PUBLIC HEALTH IMPLICATIONS

Future research, practice, & policy recommendations

Future studies may address facilitators/barriers to staff-PWUD relationships in OEND programs. These studies could provide additional context on how trust is established and maintained within these relationships.

Results from this study reveal a need for greater understanding of peer-to-peer communication about naloxone prior to overdose events. Future studies may attempt to answer: *What factors make these conversations productive?* Conversely, *when and how can these conversations be barriers to naloxone administration?*

Future programs and interventions should aim to support PWUD in having productive conversations with network members about naloxone. These programs could help PWUD navigate interpersonal conflict associated with overdose reversal.

Furthermore, there is a significant need for programs that monitor evolving medical amnesty/Good Samaritan policies. While such programs exist, there remains a high population of PWUD who are unaware of their legal rights surrounding naloxone. Programs should prioritize community outreach to PWUD, providing up-to-date, accurate policy information and legal resources to pursue if rights are violated.

On a policy level, there is a need for expanded and enforced medical amnesty policies nationwide. To support these policies, all law enforcement and emergency responders must be properly trained in overdose response protocol. This training must involve non-violent community engagement strategies. Finally, enhanced policy-level penalties for police harassment and intimidation of PWUD could help reduce harm.

References

Abdelal, R., Banerjee, A. R., Carlberg-Racich, S., Darwaza, N., Ito, D., & Epstein, J. (2022). The need for multiple naloxone administrations for opioid overdose reversals: A review of the literature. *Substance Abuse*, *43*(1), 774–784.

Ahmad, F. B., Escobedo, L. A., Rossen, L. M., Spencer, M. R., Warner, M., & Sutton, P. (2019). Provisional drug overdose death counts National Center for Health Statistics. 2019. *Statistics, Centers for Disease Control and Prevention (CDC)(Ed.). CDC.*

Allen, S., Flaherty, C., & Ely, G. (2010). Throwaway moms: Maternal incarceration and the criminalization of female poverty. *Affilia*, *25*(2), 160–172.

Armstrong, S. C., & Cozza, K. L. (2003). Pharmacokinetic drug interactions of morphine, codeine, and their derivatives: Theory and clinical reality, Part II. *Psychosomatics*, *44*(6), 515–520.

Avetian, G. K., Fiuty, P., Mazzella, S., Koppa, D., Heye, V., & Hebbar, P. (2018). Use of naloxone nasal spray 4 mg in the community setting: A survey of use by community organizations. *Current Medical Research and Opinion*, *34*(4), 573–576.

Bailey, A., Hutter, I., & Hennink, M. (2020). Qualitative research methods. *Qualitative Research Methods*, 1–376.

Barbosa, C., Fraser, H., Hoerger, T. J., Leib, A., Havens, J. R., Young, A., Kral, A., Page, K., Evans, J., & Zibbell, J. (2019). Cost-effectiveness of scaling-up HCV prevention and treatment in the United States for people who inject drugs. *Addiction*, *114*(12), 2267–2278.

Barton, E. D., Ramos, J., Colwell, C., Benson, J., Baily, J., & Dunn, W. (2002). I Ntranasal a dministration of n aloxone by p aramedics. *Prehospital Emergency Care*, *6*(1), 54–58.

Batty, E. J., Ibragimov, U., Fadanelli, M., Gross, S., Cooper, K., Klein, E., Ballard, A. M., Young, A. M., Lockard, A. S., & Oser, C. B. (2022). A qualitative analysis of rural syringe service program fidelity in Appalachian Kentucky: Staff and participant perspectives. *The Journal of Rural Health*.

Bennett, A., Freeman, R., Jarlais, D. C. D., & Aronson, I. D. (2020). Reasons People Who Use Opioids Do Not Accept or Carry No-Cost Naloxone: Qualitative Interview Study. *JMIR Form Res.*, *4*(12), e22411.

Bessen, S., Metcalf, S. A., Saunders, E. C., Moore, S. K., Meier, A., McLeman, B., Walsh, O., & Marsch, L. A. (2019). Barriers to naloxone use and acceptance among opioid users, first responders, and emergency department providers in New Hampshire, USA. *International Journal of Drug Policy*, *74*, 144–151.

Biesel, S. A. (2021). When disinformation makes sense: Contextualizing the war on coal in Appalachian Kentucky. *Economic Anthropology*, *8*(1), 7–21.

Bonn, M., Palayew, A., Bartlett, S., Brothers, T. D., Touesnard, N., & Tyndall, M. (2020). Addressing the syndemic of HIV, hepatitis C, overdose, and COVID-19 among people who use drugs: The potential roles for decriminalization and safe supply. *Journal of Studies on Alcohol and Drugs*, *81*(5), 556–560.

Brandt, L., Campbell, A. N., Jones, J. D., Martinez, S., Neale, J., Parkin, S., Brown, C., Strang, J., & Comer, S. D. (2022). Emotional reactions of trained overdose responders who use opioids following intervention in an overdose event. *Substance Abuse*, *43*(1), 581–591.

Bransford, C., & Cole, M. (2019). Trauma-informed care in homelessness service settings: Challenges and opportunities. *Homelessness Prevention and Intervention in Social Work*, 255–277.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101.

Brinkley, J. L. (2018). Opioid Crisis and the Law: An Examination of Efforts Made in Kentucky. *SCL Rev.*, *70*, 741.

Bunting, A. M., Oser, C. B., Staton, M., Eddens, K. S., & Knudsen, H. (2018). Clinician identified barriers to treatment for individuals in Appalachia with opioid use disorder following release from prison: A social ecological approach. *Addiction Science & Clinical Practice*, *13*(1), 1–10.

Chapman, H. (2022, September 12). Ky. Has 82 syringe exchange programs in 63 counties, the most of any state, but state drug-control official says 'That's not enough.' *Kentucky Health News*.

Childs, E., Biello, K. B., Valente, P. K., Salhaney, P., Biancarelli, D. L., Olson, J., Earlywine, J. J., Marshall, B., & Bazzi, A. R. (2021). Implementing harm reduction in non-urban communities affected by opioids and polysubstance use: A qualitative study exploring challenges and mitigating strategies. *The International Journal on Drug Policy*, *90*.

Cid, A., Daskalakis, G., Grindrod, K., & Beazely, M. A. (2021). What is known about community pharmacy-based take-home naloxone programs and program interventions? A scoping review. *Pharmacy*, *9*(1), 30.

Cloud, D. H., Ibragimov, U., Prood, N., Young, A. M., & Cooper, H. L. (2019). Rural risk environments for hepatitis c among young adults in Appalachian Kentucky. *International Journal of Drug Policy*, *72*, 47–54.

Comer, S. D., & Cahill, C. M. (2019). Fentanyl: Receptor pharmacology, abuse potential, and implications for treatment. *Neuroscience & Biobehavioral Reviews*, *106*, 49–57.

Cooper, H. L., Bossak, B., Tempalski, B., Des Jarlais, D. C., & Friedman, S. R. (2009). Geographic approaches to quantifying the risk environment: Drug-related law enforcement and access to syringe exchange programmes. *International Journal of Drug Policy*, *20*(3), 217–226.

Cooper, H. L., Cloud, D. H., Freeman, P. R., Fadanelli, M., Green, T., Van Meter, C., Beane, S., Ibragimov, U., & Young, A. M. (2020). Buprenorphine dispensing in an epicenter of the US opioid epidemic: A case study of the rural risk environment in Appalachian Kentucky. *International Journal of Drug Policy*, *85*, 102701.

Cooper, H. L. F., Crawford, N. D., Haardöerfer, R., Prood, N., Jones-Harrell, C., Ibragimov, U., Ballard, A. M., & Young, A. M. (2019). Using web-based pin-drop maps to capture activity spaces among young adults who use drugs in rural areas: Cross-sectional survey. *JMIR Public Health and Surveillance*, *5*(4), e13593.

Crooks, D. L. (1999). Child growth and nutritional status in a high-poverty community in eastern Kentucky. *American Journal of Physical Anthropology: The Official Publication of the American Association of Physical Anthropologists*, *109*(1), 129–142.

Dayton, L., Gicquelais, R. E., Tobin, K., Davey-Rothwell, M., Falade-Nwulia, O., Kong, X., Fingerhood, M., Jones, A. A., & Latkin, C. (2019). More than just availability: Who has access and who administers take-home naloxone in Baltimore, MD. *PloS One*, *14*(11), e0224686.

Dearnley, C. (2005). A reflection on the use of semi-structured interviews. *Nurse Researcher*, *13*(1).

Degenhardt, L., Grebely, J., Stone, J., Hickman, M., Vickerman, P., Marshall, B. D., Bruneau, J., Altice, F. L., Henderson, G., & Rahimi-Movaghar, A. (2019). Global patterns of opioid use and dependence: Harms to populations, interventions, and future action. *The Lancet*, *394*(10208), 1560–1579.

Des Jarlais, D. C., Feelemyer, J., LaKosky, P., Szymanowski, K., & Arasteh, K. (2020). Expansion of syringe service programs in the United States, 2015–2018. *American Journal of Public Health*, *110*(4), 517–519.

Dwyer, R., Fraser, S., & Dietze, P. (2016). Benefits and barriers to expanding the availability of take-home naloxone in Australia: A qualitative interview study with service providers. *Drugs: Education, Prevention and Policy*, *23*(5), 388–396.

Dyer, O. (2022). *Opioid lawsuits: Sackler family agree final $6 bn civil settlement with US states*. British Medical Journal Publishing Group.

Evans, T. I., Hadland, S. E., Clark, M. A., Green, T. C., & Marshall, B. D. (2016). Factors associated with knowledge of a Good Samaritan Law among young adults who use prescription opioids non-medically. *Harm Reduction Journal*, *13*(1), 1–6.

Ezell, J. M., Walters, S., Friedman, S. R., Bolinski, R., Jenkins, W. D., Schneider, J., Link, B., & Pho, M. T. (2021). Stigmatize the use, not the user? Attitudes on opioid use, drug injection, treatment, and overdose prevention in rural communities. *Social Science & Medicine*, *268*, 113470.

Fadanelli, M., Cloud, D. H., Ibragimov, U., Ballard, A. M., Prood, N., Young, A. M., & Cooper, H. L. (2020). People, places, and stigma: A qualitative study exploring the overdose risk environment in rural Kentucky. *International Journal of Drug Policy*, *85*, 102588.

Fellows, S. E., Coppola, A. J., & Gandhi, M. A. (2017). Comparing methods of naloxone administration: A narrative review. *Journal of Opioid Management*, *13*(4), 253–260.

Gan, T., Sinner, H. F., Walling, S. C., Chen, Q., Huang, B., Tucker, T. C., Patel, J. A., Evers, B. M., & Bhakta, A. S. (2019). Impact of the Affordable Care Act on colorectal cancer screening, incidence, and survival in Kentucky. *Journal of the American College of Surgeons*, *228*(4), 342–353.

Gladden, M., Martinez, P., & Seth, P. (n.d.). *Fentanyl law enforcement submissions and increases in synthetic opioid–involved overdose deaths—27 states, 2013–2014.* (65.33; Morbidity and Mortality Weekly Report, pp. 837–843).

Gomes, T., Tadrous, M., Mamdani, M. M., Paterson, J. M., & Juurlink, D. N. (2018). The burden of opioid-related mortality in the United States. *JAMA Network Open*, *1*(2), e180217–e180217.

Greenberg, P. (2018). Coal waste, socioeconomic change, and environmental inequality in Appalachia: Implications for a just transition in coal country. *Society & Natural Resources*, *31*(9), 995–1011.

Gryczynski, J., Nichols, H., Schwartz, R. P., Mitchell, S. G., Hill, P., & Wireman, K. (2019). Fentanyl exposure and preferences among individuals starting treatment for opioid use disorder. *Drug and Alcohol Dependence*, *204*, 107515.

Halverson, J. A., Ma, L., & Harner, E. J. (2004). *An analysis of disparities in health status and access to health care in the Appalachian region*. Appalachian Regional Commission.

Hanson, B. L., Porter, R. R., Zöld, A. L., & Terhorst-Miller, H. (2020). Preventing opioid overdose with peer-administered naloxone: Findings from a rural state. *Harm Reduction Journal*, *17*(1), 1–9.

Hargrove, S. L., Bunn, T. L., Slavova, S., Quesinberry, D., Corey, T., Ralston, W., Singleton, M. D., & Ingram, V. (2018). Establishment of a comprehensive drug overdose fatality surveillance system in Kentucky to inform drug overdose prevention policies, interventions and best practices. *Injury Prevention*, *24*(1), 60–67.

Hennink, M. M. (2008). Language and communication in cross-cultural qualitative research. In *Doing cross-cultural research* (pp. 21–33). Springer.

Hughes, P. H., Jarvis, G. K., Khant, U., Medina-Mora, M. E., Navaratnam, V., Poshyachinda, V., & Wadud, K. A. (1982). Ethnographic and secrecy patterns among drug abusers. *Bulletin on Narcotics*, *34*(1), 1–12.

Ibragimov, U., Cooper, K. E., Batty, E., Ballard, A. M., Fadanelli, M., Gross, S. B., Klein, E. M., Lockard, S., Young, A. M., & Cooper, H. L. (2021). Factors that influence enrollment in syringe services programs in rural areas: A qualitative study among program clients in Appalachian Kentucky. *Harm Reduction Journal*, *18*(1), 1–15.

Ibragimov, U., Young, A. M., & Cooper, H. L. (2020). Understanding rural risk environments for drug-related harms: Progress, challenges, and steps forward. In *International Journal of Drug Policy* (Vol. 85, p. 102926). Elsevier.

Jannetto, P. J., Helander, A., Garg, U., Janis, G. C., Goldberger, B., & Ketha, H. (2019). The fentanyl epidemic and evolution of fentanyl analogs in the United States and the European Union. *Clinical Chemistry*, *65*(2), 242–253.

Kahn, L. S., Wozniak, M., Vest, B. M., & Moore, C. (2022). "Narcan encounters:" overdose and naloxone rescue experiences among people who use opioids. *Substance Abuse*, *43*(1), 113–126.

Kelly, E., Sutcliffe, K., Cavallo, D., Ramos-Gonzalez, N., Alhosan, N., & Henderson, G. (2021). The anomalous pharmacology of fentanyl. *British Journal of Pharmacology*.

Keyes, K. M., Cerdá, M., Brady, J. E., Havens, J. R., & Galea, S. (2014). Understanding the rural–urban differences in nonmedical prescription opioid use and abuse in the United States. *American Journal of Public Health*, *104*(2), e52–e59.

KFF analysis of Centers for Disease Control and Prevention (CDC), National Center for Health Statistics. Multiple Cause of Death 1999-2020 on CDC WONDER Online Database. Data are from the Multiple Cause of Death Files, 1999-2021, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at http://wonder.cdc.gov/mcd-icd10.html on April 7, 2022.

Kolak, M. A., Chen, Y.-T., Joyce, S., Ellis, K., Defever, K., McLuckie, C., Friedman, S., & Pho, M. T. (2020). Rural risk environments, opioid-related overdose, and infectious diseases: A multidimensional, spatial perspective. *International Journal of Drug Policy*, *85*, 102727.

Kosten, T. R., & George, T. P. (2002). The neurobiology of opioid dependence: Implications for treatment. *Science & Practice Perspectives*, *1*(1), 13.

Kuczyńska, K., Grzonkowski, P., Kacprzak, \Lukasz, & Zawilska, J. B. (2018). Abuse of fentanyl: An emerging problem to face. *Forensic Science International*, *289*, 207–214.

Kuszler, P. C., Banata-Green, C. J., Beletsky, L., Schoeppe, J. A., & Coffin, P. O. (2011). *Police Officers' and Paramedics' Experiences with Overdose and Their Knowledge and Opinions of Washington State's Drug Overdose–Naloxone–Good Samaritan Law*.

Lai, J. T., Goldfine, C. E., Chapman, B. P., Taylor, M. M., Rosen, R. K., Carreiro, S. P., & Babu, K. M. (2021). Nobody wants to Be Narcan'd: A pilot qualitative analysis of drug users' perspectives on naloxone. *Western Journal of Emergency Medicine*, *22*(2), 339.

Lancaster, K. E., Cooper, H. L., Browning, C. R., Malvestutto, C. D., Bridges, J. F., & Young, A. M. (2020). Syringe service program utilization, barriers, and preferences for design in

rural Appalachia: Differences between men and women who inject drugs. *Substance Use & Misuse*, *55*(14), 2268–2277.

Latimore, A. D., & Bergstein, R. S. (2017). "Caught with a body" yet protected by law? Calling 911 for opioid overdose in the context of the Good Samaritan Law. *International Journal of Drug Policy*, *50*, 82–89.

Lavonas, E. J., & Dezfulian, C. (2020). Impact of the opioid epidemic. *Critical Care Clinics*, *36*(4), 753–769.

Lengerich, E. J., Tucker, T. C., Powell, R. K., Colsher, P., Lehman, E., Ward, A. J., Siedlecki, J. C., & Wyatt, S. W. (2005). Cancer incidence in kentucky, pennsylvania, and west virginia: Disparities in appalachia. *The Journal of Rural Health*, *21*(1), 39–47.

Lewanowitsch, T., & Irvine, R. J. (2002). Naloxone methiodide reverses opioid-induced respiratory depression and analgesia without withdrawal. *European Journal of Pharmacology*, *445*(1–2), 61–67.

Lister, J. J., Weaver, A., Ellis, J. D., Himle, J. A., & Ledgerwood, D. M. (2020). A systematic review of rural-specific barriers to medication treatment for opioid use disorder in the United States. *The American Journal of Drug and Alcohol Abuse*, *46*(3), 273–288.

Macias-Konstantopoulos, W., Heins, A., Sachs, C. J., Whiteman, P. J., Wingkun, N.-J. G., & Riviello, R. J. (2021). Between emergency department visits: The role of harm reduction programs in mitigating the harms associated with injection drug use. *Annals of Emergency Medicine*, *77*(5), 479–492.

Macmadu, A., Batthala, S., Gabel, A. M. C., Rosenberg, M., Ganguly, R., Yedinak, J. L., Hallowell, B. D., Scagos, R. P., Samuels, E. A., & Cerdá, M. (2021). Comparison of characteristics of deaths from drug overdose before vs during the COVID-19 pandemic in Rhode island. *JAMA Network Open*, *4*(9), e2125538–e2125538.

Mahat-Shamir, M., Neimeyer, R. A., & Pitcho-Prelorentzos, S. (2021). Designing in-depth semi-structured interviews for revealing meaning reconstruction after loss. *Death Studies*, *45*(2), 83–90.

Mamdani, Z., Loyal, J. P., Xavier, J., Pauly, B., Ackermann, E., Barbic, S., Buxton, J. A., & Greer, A. (2022). 'We are the first responders': Overdose response experiences and perspectives among peers in British Columbia. *Drugs: Education, Prevention and Policy*, 1–14.

Mars, S. G., Bourgois, P., Karandinos, G., Montero, F., & Ciccarone, D. (2014). "Every 'never' I ever said came true": Transitions from opioid pills to heroin injecting. *International Journal of Drug Policy*, *25*(2), 257–266.

Marshall, B., Cardon, P., Poddar, A., & Fontenot, R. (2013). Does sample size matter in qualitative research?: A review of qualitative interviews in IS research. *Journal of Computer Information Systems*, *54*(1), 11–22.

Marshall, C., Perreault, M., Archambault, L., & Milton, D. (2017). Experiences of peer-trainers in a take-home naloxone program: Results from a qualitative study. *International Journal of Drug Policy*, *41*, 19–28.

MARTIN, W. R. (1976). Drugs five years later: Naloxone. *Annals of Internal Medicine*, *85*(6), 765–768.

McAuley, A., Munro, A., & Taylor, A. (2018). "Once I'd done it once it was like writing your name": Lived experience of take-home naloxone administration by people who inject drugs. *International Journal of Drug Policy*, *58*, 46–54.

McDonald, R., Campbell, N. D., & Strang, J. (2017). Twenty years of take-home naloxone for the prevention of overdose deaths from heroin and other opioids—Conception and maturation. *Drug and Alcohol Dependence*, *178*, 176–187.

Morrison, D. S. (2009). Homelessness as an independent risk factor for mortality: Results from a retrospective cohort study. *International Journal of Epidemiology*, *38*(3), 877–883.

Newcomer, K. E., Hatry, H. P., & Wholey, J. S. (2015). Conducting semi-structured interviews. *Handbook of Practical Program Evaluation*, *492*, 492.

Nguyen, T., & Buxton, J. A. (2021). Pathways between COVID-19 public health responses and increasing overdose risks: A rapid review and conceptual framework. *International Journal of Drug Policy*, *93*, 103236.

O'Donnell, J., Gladden, R., Matson, C., & Davis, N. (2020). Vital signs: Characteristics of drug overdose deaths involving opioids and stimulants – 24 states and the District of Columbia, January-June 2019. *CDC*, *59*, 1189-1197.

Otachi, J. K., Vundi, N., & Surratt, H. L. (2020). Examining factors associated with non-fatal overdose among people who inject drugs in rural appalachia. *Substance Use & Misuse*, *55*(12), 1935–1942.

Pauly, B. (2008). Harm reduction through a social justice lens. *The International Journal on Drug Policy*, *19*(1), 4–10.

Pauly, B. B., Mamdani, Z., Mesley, L., McKenzie, S., Cameron, F., Edwards, D., Howell, A., Knott, M., Scott, T., & Seguin, R. (2021). "It's an emotional roller coaster… But sometimes it's fucking awesome": Meaning and motivation of work for peers in overdose response environments in British Columbia. *International Journal of Drug Policy*, *88*, 103015.

Piper, T. M., Rudenstine, S., Stancliff, S., Sherman, S., Nandi, V., Clear, A., & Galea, S. (2007). Overdose prevention for injection drug users: Lessons learned from naloxone training and distribution programs in New York City. *Harm Reduction Journal*, *4*(1), 1–8.

Quinones, S. (2015). *Dreamland: The true tale of America's opiate epidemic*. Bloomsbury Publishing USA.

Razaghizad, A., Windle, S. B., Filion, K. B., Gore, G., Kudrina, I., Paraskevopoulos, E., Kimmelman, J., Martel, M. O., & Eisenberg, M. J. (2021). The effect of overdose education and naloxone distribution: An umbrella review of systematic reviews. *American Journal of Public Health*, *111*(8), e1–e12.

Rhodes, T. (2002a). Risk environments and drug harms: A social science for harm reduction approach. *International Journal of Drug Policy*, *13*, 18–24.

Rhodes, T. (2002b). The 'risk environment': A framework for understanding and reducing drug-related harm. *International Journal of Drug Policy*, *13*(2), 85–94.

Rhodes, T. (2009). Risk environments and drug harms: A social science for harm reduction approach. In *International Journal of Drug Policy* (Vol. 20, Issue 3, pp. 193–201). Elsevier.

Richert, T. (2015). Wasted, overdosed, or beyond saving–to act or not to act? Heroin users' views, assessments, and responses to witnessed overdoses in Malmö, Sweden. *International Journal of Drug Policy*, *26*(1), 92–99.

Rochester, E., & Graboyes, M. (2022). Experiences of people who use drugs with naloxone administration: A qualitative study. *Drugs: Education, Prevention and Policy*, *29*(1), 54–61.

Rudasill, S. E., Sanaiha, Y., Mardock, A. L., Khoury, H., Xing, H., Antonios, J. W., McKinnell, J. A., & Benharash, P. (2019). Clinical outcomes of infective endocarditis in injection drug users. *Journal of the American College of Cardiology*, *73*(5), 559–570.

Rummans, T. A., Burton, M. C., & Dawson, N. L. (2018). How good intentions contributed to bad outcomes: The opioid crisis. *Mayo Clinic Proceedings*, *93*(3), 344–350.

Samaritan, G. (2013). Survey of naloxone legal status in opioid overdose prevention and treatment. *Journal of Opioid Management*, *9*(5), 370.

Sandelowski, M. (1995). Sample size in qualitative research. *Research in Nursing & Health*, *18*(2), 179–183.

Schlosser, A., Habecker, P., & Bevins, R. (2022). Harm reduction in the Heartland: Public knowledge and beliefs about naloxone in Nebraska, USA. *Harm Reduction Journal*, *19*(1), 1–7.

Shearer, D., Fleming, T., Boyd, J., & McNeil, R. (2019). Naloxone distribution, trauma, and supporting community-based overdose responders. *The International Journal on Drug Policy*, *74*, 255.

Shelley, L. (2020). Fentanyl, COVID-19, and public health. *World Medical & Health Policy*, *12*(4), 390–397.

Sisson, M. L., McMahan, K. B., Chichester, K. R., Galbraith, J. W., & Cropsey, K. L. (2019). Attitudes and availability: A comparison of naloxone dispensing across chain and independent pharmacies in rural and urban areas in Alabama. *International Journal of Drug Policy*, *74*, 229–235.

Slavova, S., Quesinberry, D., Hargrove, S., Rock, P., Brancato, C., Freeman, P. R., & Walsh, S. L. (2021). Trends in drug overdose mortality rates in Kentucky, 2019-2020. *JAMA Network Open*, *4*(7), e2116391–e2116391.

Snyder, S. H. (1977). Opiate receptors and internal opiates. *Scientific American*, *236*(3), 44–57.

Stein, C. (2016). Opioid receptors. *Annual Review of Medicine*, *67*, 433–451.

Strang, J., McDonald, R., Campbell, G., Degenhardt, L., Nielsen, S., Ritter, A., & Dale, O. (2019). Take-home naloxone for the emergency interim management of opioid overdose: The public health application of an emergency medicine. *Drugs*, *79*(13), 1395–1418.

Surratt, H. L., Otachi, J. K., McLouth, C. J., & Vundi, N. (2021). Healthcare stigma and HIV risk among rural people who inject drugs. *Drug and Alcohol Dependence*, *226*, 108878.

Synthetic Opioid Overdose Data. (2022). Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. https://www.cdc.gov/drugoverdose/deaths/synthetic/index.html

Tobin, K. E., Davey, M. A., & Latkin, C. A. (2005). Calling emergency medical services during drug overdose: An examination of individual, social and setting correlates. *Addiction*, *100*(3), 397–404.

Trappen, S. L., & McLean, K. J. (2021). Policing pain: A qualitative study of non-criminal justice approaches to managing opioid overdose during the COVID-19 pandemic. *Journal of Prevention & Intervention in the Community*, *49*(2), 136–151.

Tunnell, K. D. (2006). *OxyContin and crime in eastern Kentucky*.

Vahedi, H. S. M., Hajebi, H., Vahidi, E., Nejati, A., & Saeedi, M. (2019). Comparison between intravenous morphine versus fentanyl in acute pain relief in drug abusers with acute limb traumatic injury. *World Journal of Emergency Medicine*, *10*(1), 27.

Van Boekel, L. C., Brouwers, E. P., Van Weeghel, J., & Garretsen, H. F. (2013). Stigma among health professionals towards patients with substance use disorders and its consequences for healthcare delivery: Systematic review. *Drug and Alcohol Dependence*, *131*(1–2), 23–35.

van der Meulen, E., Chu, S. K. H., & Butler-McPhee, J. (2021). “That’s why people don’t call 911”: Ending routine police attendance at drug overdoses. *International Journal of Drug Policy*, *88*, 103039.

Van Zee, A. (2009). The promotion and marketing of oxycontin: Commercial triumph, public health tragedy. *American Journal of Public Health*, *99*(2), 221–227.

Vearrier, L. (2019). The value of harm reduction for injection drug use: A clinical and public health ethics analysis. *Disease-a-Month*, *65*(5), 119–141.

Wagner, K. D., Davidson, P. J., Iverson, E., Washburn, R., Burke, E., Kral, A. H., McNeeley, M., Bloom, J. J., & Lankenau, S. E. (2014). “I felt like a superhero”: The experience of responding to drug overdose among individuals trained in overdose prevention. *International Journal of Drug Policy*, *25*(1), 157–165.

Whiting, L. S. (2008). Semi-structured interviews: Guidance for novice researchers. *Nursing Standard (through 2013)*, *22*(23), 35.

Wolitski, R. J., & Group, P. S. W. (2006). Relative efficacy of a multisession sexual risk–reduction intervention for young men released from prisons in 4 states. *American Journal of Public Health*, *96*(10), 1854–1861.

Woolhouse, S., Brown, J. B., & Thind, A. (2011). ‘Meeting people where They’re At’: Experiences of family physicians engaging women who use illicit drugs. *The Annals of Family Medicine*, *9*(3), 244–249.

World Health Organization. (2014). Community management of opioid overdose.

Wyatt, R. J., Julian, B. A., Baehler, R. W., Stafford, C. C., McMorrow, R. G., Ferguson, T., Jackson, E., Woodford, S. Y., Miller, P. M., & Kritchevsky, S. (1998). Epidemiology of IgA nephropathy in central and eastern Kentucky for the period 1975 through 1994. Central Kentucky Region of the Southeastern United States IgA Nephropathy DATABANK Project. *Journal of the American Society of Nephrology*, *9*(5), 853–858.

Zhang, X., Marchand, C., Sullivan, B., Klass, E. M., & Wagner, K. D. (2018). Naloxone access for Emergency Medical Technicians: An evaluation of a training program in rural communities. *Addictive Behaviors*, *86*, 79–85.

Zibbell, J. E., Iqbal, K., Patel, R. C., Suryaprasad, A., Sanders, K. J., Moore-Moravian, L., Serrecchia, J., Blankenship, S., Ward, J. W., & Holtzman, D. (2015). Increases in hepatitis C virus infection related to injection drug use among persons aged≤ 30 years—Kentucky, Tennessee, Virginia, and West Virginia, 2006–2012. *Morbidity and Mortality Weekly Report*, *64*(17), 453.

Tables and Figures

Table 1: Description of Sample

N=29	Frequency	Percentage
Gender		
male	11	37.93
female	18	62.07
Education		
Less than high school	10	34.48
High school diploma or GED	10	34.48
Some college	8	27.59
Associates degree/trade or technical school	1	3.45
Race		
White	28	96.55
Other	1	3.45
Current drug of choice for getting high		
Heroin	11	37.93
Opiate painkillers	2	6.90
Buprenorphine	2	6.90
Benzodiazepines	1	3.45
Methamphetamine	12	41.38
Gabapentin	1	3.45
Ever used naloxone on someone to reverse overdose		
No	9	31.03
Yes	17	58.62
Did not answer	3	10.34
***Baseline:* Have naloxone with them or at home at any point in past 90 days**		
No	1	3.45
Yes	19	65.52
Did not answer	9	31.03
***3-months:* Have naloxone with them or at home at any point in past 90 days**		
No	5	22.73
Yes	17	77.27

Table 2: Interview Guide naloxone/Narcan Questions

Question	Probes	
When you were offered Narcan, did you accept it?	*If not:* Why not?	
Was this your first time you received Narcan?	*If first time:* Had you heard of Narcan before? → Did you know where to get it?	*If received Narcan before C2H:* Where had you gotten Narcan in the past? → How often had you used it before C2H? → Did this experience make you more/less likely to carry Narcan in the future? → Can you tell me more about that?
Did the C2H training teach you anything new about Narcan	What did you learn about Narcan? → Did you feel like you knew what to do with Narcan if you'd needed to administer it? → What more would you have liked to learn from us?	
Do you carry the Narcan with you? Why/why not?	Is there anything that makes you nervous about carrying Narcan with you? → Stigma/judgement? → Criminal justice involvement?	
Have you used the Narcan we gave you?	*If not:* Why not?	*If used:* Please tell me more about your experience → Who was overdosing? → How did you know this person? → How did you know they were overdosing? → What did you do? → Did you or anyone call 911? → Did police arrest or charge anyone? → Were you nervous about being arrested or charged?
Have you had Narcan used on you?	*If yes:* How did that experience change your opinion of Narcan?	
How did having Narcan or having the training change your behavior?	How did it change how you use drugs? → Did you share information about overdosing that you learned from us with others? → Did you give away/sell any of the Narcan to others?	
Did you ever worry that someone would be upset if you administered Narcan on them?	*If yes:* Can you tell me more about that? → Have you had past experiences where someone got upset with you for using Narcan → What did you do?	
Has your opinion of Narcan changed at all since you started the intervention?	How?	

Table 3: Sub-set of Codebook Pertaining to naloxone/Narcan

Code name	Definition	Example
Receiving Narcan	Refers to participant's experience receiving Narcan from C2H staff	"It really helped me, talking to [them]. [They] gave me Narcan."
Carrying Narcan	Refers to participants' storage of Narcan including whether they opt to carry Narcan on their person	"I haven't had to use it yet. It's in the cabinet at the house that I usually stay at. I can't use it because I'm allergic to it."
Utilizing Narcan	Refers to participant's experience utilizing Narcan. If highlighting non-C2H Narcan, cross-code with "before C2H"	"I would have lost those two a couple of times because they were[...] Just a squirt to get them to wake up, so that video that I watched up there probably saved their lives."
Narcan used on participant	Refers to participant's experience having Narcan used on them	"It wasn't that I was upset that I was being resuscitated. It was the feeling that the Narcan gave me. It made my whole body go ice cold, and I started shaking. Because Narcan reverses the effects of the heroin, which made you go in sudden, rapid withdrawal times 50."
Narcan perceptions/feelings	Refers to participant's feelings, opinions, and perceptions of Narcan	"Even if you don't need it, it's a good, people see it as a good thing to have."
Narcan knowledge, existence	Refers to participant's prior knowledge or learning of what Narcan is	"I didn't know what it was"
Narcan knowledge, effectiveness	Refers to participant's prior knowledge or learning of Narcan's effectiveness in reversing overdose	"At first I was like… ain't no way it saves somebody's life. Yeah, it does. It works good"
Narcan knowledge, amnesty	Refers to participant's knowledge or learning of Good Samaritan or medical amnesty laws/policies	"you can be arrested, you can be charged, but they can't prosecute you and make it stick if you're having Narcan in your pocket."
Narcan, social obligation	Refers to participant's self-imposed social role as a community helper, regarding Narcan	*"I can't walk by somebody laying on the ground and not try to help… That's somebody's daddy or mother or daughter or son… I won't walk by."*
Narcan, "safer"	Refers to participant feeling "safer with Narcan" than without it	"I feel a lot safer with Narcan"
Narcan, unpredictable nature of overdose	Refers to participants perception of community overdose as unpredictable or chaotic, regarding Narcan	"I know when I have [Narcan] on me, because you can't ever tell in wherever you're at, what kind of situations going on, anything can happen in the spur of a moment. And I know as long as I've got that on me, if something like

		that ever happens around me, it could save somebody's life."
Narcan, stigma	Refers to participants perceived stigma from law enforcement and/or community members regarding Narcan	"if I'm carrying Narcan, then that's going to make [police] judge me or question me more and wonder why I have that."
Narcan, recipient reaction	Refers to participant recounting or anticipating instances a person's physiological or emotional reaction to receiving Narcan	"He says that you feel rough after you get Narcan…for a day or two."
Narcan, loss of high	Refers specifically to a Narcan recipient being frustrated that they can no longer feel effect of drugs	"They didn't want their high to go away. They were so high that it could kill them, but they didn't want to lose their high."
Narcan, economic loss	Refers specifically to Narcan recipient being frustrated that they spent limited funds on drugs they can no longer feel the effect of	"You don't want to lose that feeling that you paid for"
Narcan, prior communication	Refers to participant recounting conversations they have had with network members regarding Narcan, prior to overdose events	"'If you nod out, and if you don't respond to me… I will Narcan you.' Even before they [use drugs], I'm like, 'I do have Narcan. I will Narcan you.'"

Figure 1: Results Visual Model

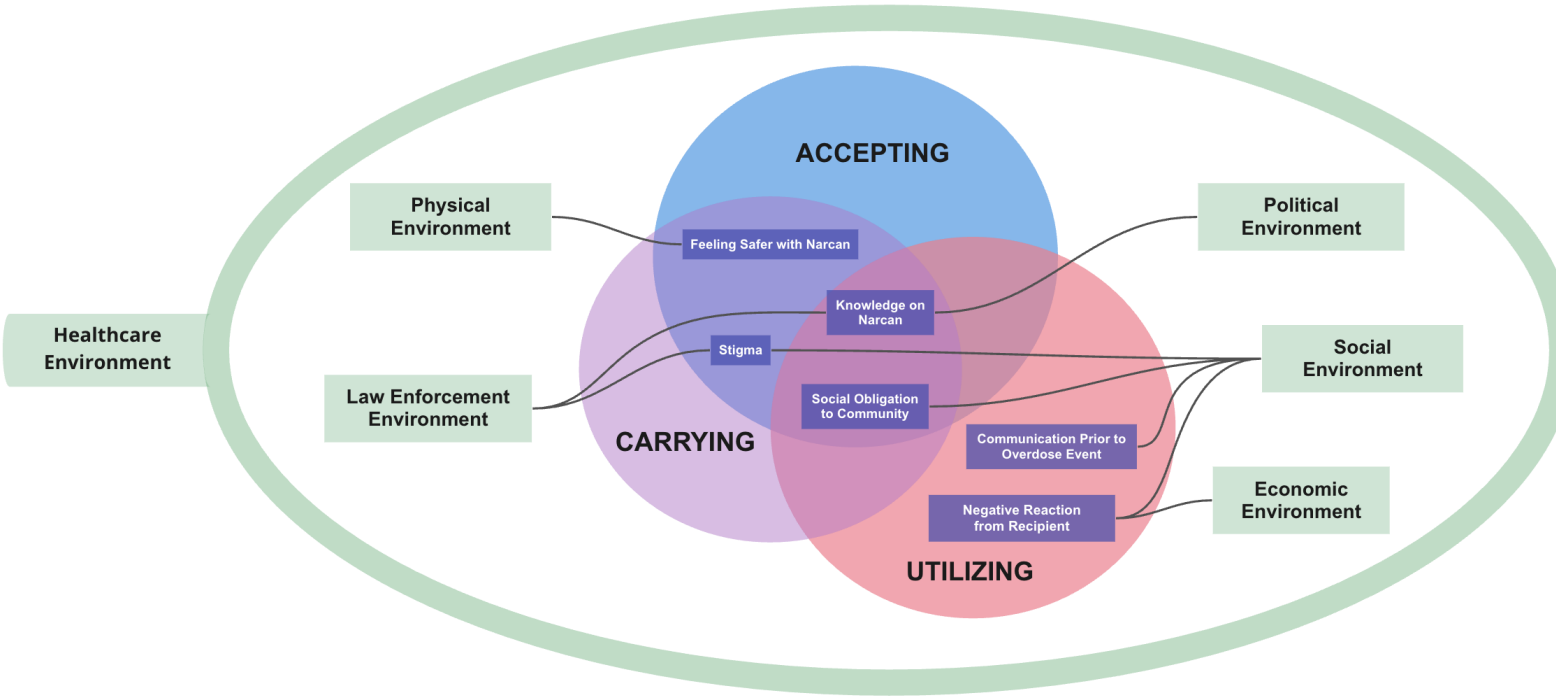

Table 4: Intervention component mapped to participant experience & impact

C2H Intervention Component	Participant Experience	Impact on Accessing/Accepting, Carrying, & Administering Narcan
Narcan distribution	Increased knowledge on Narcan existence	Direct impact: Accessing/Accepting, Carrying, Administering
	Enhanced perceived safety	
	Ability to possess Narcan	
Education on Narcan effectiveness	Increased knowledge	Direct impact: Accessing/Accepting Indirect impact: Carrying, Administering
	Increased favorable perceptions of Narcan	
Education on medical amnesty policies and Narcan legality	Increased knowledge	Direct impact: Accessing/Accepting, Carrying Indirect impact: Administering
	Reduced fear of law enforcement	
	Increased confidence in carrying and administering Narcan	
Training on Narcan administration	Increased knowledge	Direct impact: Accessing/Accepting, Administering Indirect impact: Carrying
	Increased confidence in Narcan administration	
	Increased ability to respond to community overdose	