BARRIERS AND FACILITATORS TO BUPRENORPHINE PRESCRIBING AMONG NURSE PRACTITIONERS WORKING IN PRIMARY CARE SETTINGS IN EASTERN NORTH CAROLINA

by

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The opioid crisis has disproportionately impacted rural areas such as eastern North Carolina. Buprenorphine is an evidenced-based treatment for individuals experiencing opioid use disorder that is well suited for rural areas because it can be prescribed in primary care settings. Providers must have a specialized Drug Enforcement Agency prescribing waiver to prescribe buprenorphine. Nurse practitioners were granted the right to apply for these waivers in 2016. However, few NPs have obtained prescribing waivers. Literature to date has focused on barriers and facilitators to physician prescribing. Nurse practitioners are educated, regulated, and reimbursed differently than physicians, thus it was important to explore nurse practitioners' potentially unique experiences.

This qualitative, descriptive study used semi-structured interviews with nurse practitioners to address the research question: what are the barriers and facilitators to buprenorphine prescribing among nurse practitioners working in primary care settings in eastern North Carolina? The Theoretical Domains Framework, a comprehensive framework to address implementation problems among health care professionals, guided data collection and analysis. Analysis identified barriers and facilitators in eight domains: beliefs about capability, beliefs about consequences, emotion, environmental context and resources, reinforcement, skills, social influences, and social and professional role identity.

This study is significant because it is the first qualitative study of nurse practitioner buprenorphine prescribing. Findings extend and clarify existing literature on buprenorphine prescribing. Analysis found that nurse practitioners face similar, though more pronounced, environmental barriers than physicians. Other striking barriers included those in the social influences domain: NPs expressed, had witnessed, or had experienced negative attitudes toward buprenorphine, individuals living with opioid use disorder, and providers who prescribe buprenorphine. Notable facilitators included developing skills to meet buprenorphine prescribing challenges and the sense of reward nurse practitioners experienced when patients were successful on buprenorphine therapy. Addressing the research question within the Theoretical Domains Framework laid groundwork for theory-informed intervention studies. This study also provides information for policymakers as they work to provide a regulatory environment amenable to buprenorphine prescribing and for educators as they prepare nurse practitioners to meet the treatment challenges presented by the opioid crises.

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cartographer, and my best friend: without your support, I could not have finished this degree. For my children, Andrew Speight Griggs and Anna Beth Griggs, I love you will all my heart and I promise to be in front of my “puter” less in the coming months.

Finally, thank you to the nurse practitioners who generously agreed to participate in this study. I hope this study honors your work and helps other practitioners who wish to provide treatment to individuals living with opioid use disorder.

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CHAPTER 1: INTRODUCTION

Background and Significance

Opioid use disorder (OUD) constitutes a public health crisis in the United States (US) (National Institute on Drug Abuse [NIDA], 2019b). The disorder is characterized by physical and psychological opioid dependence. The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), outlines 11 diagnostic criteria for OUD, at least two of which should be observed in a 12-month period (American Psychiatric Association [APA], 2013). These criteria include taking opioids in larger amounts or over a longer period than intended, craving opioids, continuing to misuse opioids despite use related problems, and opioid tolerance and withdrawal (APA, 2013). The US Department of Health and Human Services Substance Abuse and Mental Health Services Administration (SAMHSA) describes OUD as a type of substance use disorder that occurs when drug use "causes clinically significant impairment, including health problems, disability, and failure to meet major responsibilities at work, school, or home" (SAMHSA, 2015).

The prevalence and effects of OUD are profound. Prescription opioid related disorders affect more than two million Americans, and nearly 600,0000 Americans have heroin related disorders (American Society of Addiction Medicine [ASAM], n.d.-b). Nearly 30% of individuals prescribed opioids for chronic pain misuse them, and nearly 80% of those who use heroin misused prescription opioids before using heroin (NIDA, 2018; NIDA 2019b). Approximately 130 Americans die each day from opioid overdoses (NIDA, 2019b). The Centers for Disease Control and Prevention (CDC, 2018a) attribute recent declines in life expectancy to increases in drug related overdose and suicide. OUD increases the spread of infectious disease (Ochalek, Heil, Higgins, Badger, & Sigmon, 2018) and is associated with criminal activity and

incarceration (Winkelman, Chang, & Binswanger, 2018). The opioid crisis cost over 500 billion dollars in 2015 alone (Council of Economic Advisors, 2017).

Opioid Crisis in North Carolina

Despite national gains in efforts to curb OUD, the opioid crisis is intensifying in North Carolina (NC). The South is home to more individuals with OUD than any other region in the US (Knopf, 2017). Twenty-two of the 25 cities with the most opioid misuse are in the South, and four, Wilmington, Hickory, Jacksonville, and Fayetteville, are in NC (Knopf, 2017). NC experienced an over 30% increase in opioid related deaths from 2016-2017 (CDC, 2018b), and five North Carolinians died every day from opioid overdoses in 2017 (North Carolina Area Health Education Center [NCAHEC], 2018). Naloxone, an emergency drug that treats opioid overdose, was administered by NC Emergency Medical Services personnel over 15,000 times in 2017 (NCDHHS, 2019c). NC emergency departments treated nearly 7,000 individuals for opioid overdoses in 2018, and nearly half of North Carolinians hospitalized for OUD do not have health insurance (NC Office of the Governor, 2019). Neonatal drug withdrawal in NC increased more than 900% from 2004 to 2017, 15% of NC high school students have misused prescription drugs, and over 40% of NC's foster children have a parent with substance use disorder (North Carolina Department of Health and Human Services [NCDHHS], 2018a). Opioid overprescribing remains widespread in NC: there were 72.0 opioid prescriptions per 100 residents in 2017 compared to a national average of 58.7 (CDC, 2018c).

Medication-Assisted Treatment

Medication-assisted treatment (MAT), also called medications for opioid use disorder (MOUD), treats individuals living with OUD with medications that mitigate or eliminate opioid cravings and withdrawal. MAT is widely recognized as the most effective evidence-based OUD

treatment (Jones, Campopiano, Baldwin, & McCance-Katz, 2015; Madden, 2019). MAT increases abstinence adherence, decreases illicit drug use, decreases opioid related HIV and hepatitis C transmission, increases individuals' abilities to gain employment and function successfully in society, and decreases OUD and non-OUD related mortality among those with OUD (Connery, 2015; Volkow, Frieden, Hyde, & Cha, 2014). The United States Food and Drug Administration (USFDA) has approved three medications for OUD treatment: methadone, naltrexone, and buprenorphine (USFDA, 2019).

Methadone

Methadone, a full opioid agonist, binds to μ-opioid receptors to eliminate opioid withdrawal symptoms, reduce or eliminate cravings, and block the euphoric effects of other opioids. Methadone can only be prescribed in specially regulated treatment centers by providers granted methadone prescribing privileges by the Drug Enforcement Administration (DEA) (Connery, 2015). Typically, methadone is taken daily and individuals must present to treatment centers each day to receive medication (SAMSHA, 2019b). Disadvantages of methadone for OUD treatment include limited number of treatment centers, concentration of centers in urban areas, treatment waitlists, stigma of daily presentation to treatment centers, and the financial and time burden of daily travel to treatment centers (Haffajee, Bohnert, & Lagisetty, 2018). Because individuals can achieve a "high" by taking increased doses of methadone, the drug has been associated with diversion and misuse (Haffajee et al., 2018).

Naltrexone

Naltrexone, an opioid antagonist that blocks opioid binding and thus negates opioids' effects, can be prescribed by any provider licensed to prescribe medication in any setting but has significant drawbacks. Individuals must have withdrawn from opioids, a 7-10-day process,

before beginning naltrexone, which complicates treatment initiation. Naltrexone also decreases opioid tolerance, thus if relapse occurs and an individual consumes a similar or even smaller amount of opioid than before naltrexone treatment initiation, the likelihood of overdose is very high (SAMHSA, 2019c). Finally, because naltrexone blocks μ-opioid receptors, patients with pain disorders receive no pain-relieving opioid effects (Connery, 2015). The FDA no longer recommends oral naltrexone for treating individuals with OUD but continues to recommend long-acting intramuscular naltrexone injections for treatment (USFDA, 2019). Naltrexone is the least commonly used FDA approved MAT therapy (Alanis-Hirsch et al., 2016; Kelly, Reilly, Quiñones, Desai, & Rosenheck, 2018).

Buprenorphine

Buprenorphine, a partial opioid agonist, can be prescribed for OUD treatment in primary care, outpatient settings by prescribers who have received a DEA buprenorphine prescribing waiver (SAMHSA, 2019a). Buprenorphine's misuse potential is low, and lower than that of methadone. While methadone doses can be increased to achieve a high, buprenorphine's partial agonist pharmacology decreases the potential for euphoric effects with increased dosage (Haffajee et al., 2018; Moore, 2019). Because there is a risk of misuse if buprenorphine is crushed and injected, buprenorphine is combined with naloxone, an opioid receptor antagonist, in a 4:1 ratio and sold as brand names including Bunavil, Suboxone, and Zubsolv (SAMHSA, 2019a). This combination reduces misuse potential because naloxone counteracts the potential euphoric effect of buprenorphine if the combination drug is crushed and administered intravenously (Chen, Chen, & Mao, 2014). Buprenorphine and combinations are available in oral, transmucosal, implantable, and monthly injectable forms; the monthly injectable recently received FDA approval for OUD treatment for those on a stable buprenorphine dose for one

week (USFDA, 2017). Buprenorphine can be prescribed in primary care settings, has low misuse potential, and has no pre-initiation detoxification requirements. Together, these qualities make buprenorphine-based MAT therapy particularly appropriate for treating OUD in rural settings (SAMHSA, 2019a).

Buprenorphine prescribing restrictions. Beginning in 2000 with the passage of the Drug Addiction Treatment Act (DATA), legislation has permitted an increasingly diverse group of providers to prescribe medications for OUD, which initially could only be prescribed by physician addiction specialists (SAMSHA, 2019d). Buprenorphine was approved for OUD treatment in 2002 (SAMSHA, 2019a). DATA allows all physicians who complete eight hours of addiction training to apply to the DEA for buprenorphine prescribing waivers (SAMSHA, 2019d). The legislation specifically prohibited nurse practitioners (NPs) and physician assistants (PAs) from prescribing buprenorphine (SAMSHA, 2019d). The Comprehensive Addiction and Recovery Act (CARA) of 2016 allows NPs and PAs to apply for DEA buprenorphine prescribing waivers, and the Substance Use-Disorder Prevention that Promotes Opioid Recovery and Treatment (SUPPORT) for Patients and Communities Act of 2018 extends waiver application privileges to all advanced practice registered nurses (APRNs) with medication prescribing privileges (Moore, 2019). NPs who wish to apply for a waiver must be licensed by their state to prescribe Schedule III, IV, and V medications for pain and must complete at least 24 hours of addiction training (ASAM, n.d.-a). In states that require physician supervision of NPs, NP applications must include the name and DEA number of the supervising physician, who must already hold a buprenorphine prescribing waiver (Moore, 2019). All providers may treat a maximum of 30 patients with buprenorphine therapy in their first year of buprenorphine prescribing. Physicians, NPs, and PAs can apply to treat up to 100 patients after one year. NPs

and PAs are currently capped at 100 patients; physicians may apply to treat up to 275 patients after holding a 100-patient waiver for one year and demonstrating they have received additional addiction training or they practice in a qualified setting (ASAM, n.d.-a).

Treatment Demand and Treatment Access

People living with OUD experience under-treatment and often lack access to treatment. A study of the commercially insured found that OUD rates increased 493% over a 6-year period while MAT treatment rates rose just 65% (Blue Cross Blue Shield, 2017). Approximately one million Americans need access to MAT, but only about 10% of individuals who seek treatment for OUD can find a MAT prescriber (NCAHEC, 2018). Despite legislation liberalizing buprenorphine prescribing, few providers complete requirements for buprenorphine prescribing, and many waivered providers do not prescribe buprenorphine or prescribe to far fewer patients than legislation permits (Jones & McCance-Katz, 2018). Thus, substantial gaps exist between prescriber availability and demand for buprenorphine therapy, especially in rural areas (Andrilla, Patterson, Moore, Coulthard, & Larson, 2018; Jones et al., 2015; Rosenblatt, Andrilla, Catlin, & Larson, 2015). Twenty million Americans live in a county with no waivered provider, and 69.7% of these Americans live in rural counties; almost a third of rural Americans live in a county with no waivered prescriber (Andrilla, Moore, Patterson, & Larson, 2019). Rural-urban disparities in access are particularly important because rural communities are disproportionately impacted by the opioid crisis: opioid overdose rates are 45% higher in rural than urban communities (Weintraub, Greenblatt, Chang, Himelhoch, & Welsh, 2018). Only 34% of rural Americans report that they could somewhat or very easily access treatment for substance use disorders, and less than half believe they could find substance use disorder treatment that is convenient, effective, or affordable (American Farm Bureau Federation, 2017).

Barriers and Facilitators to Buprenorphine Prescribing

Because buprenorphine therapy is essential to the treatment of OUD, researchers have begun inquiry into barriers and facilitators to obtaining and utilizing buprenorphine prescribing waivers. Inquiry to date has focused on barriers and facilitators faced by physicians. Barriers include regulation, inadequate reimbursement, insufficient education and training, limited access to specialty provider referrals, poor organizational support, perceived lack of patient demand, and addiction stigma (Andrilla, Coulthard, & Larson, 2017; Hutchinson, Catlin, Andrilla, Baldwin, & Rosenblatt, 2014; Madden, 2019; Mendoza, Rivera-Cabrero, & Hansen, 2016; White, 2018). Facilitators include prescribing mentorship, limiting the number of patients treated, requiring patients to sign contracts, setting clear patient-provider boundaries, minimizing diversion and DEA intrusion, and focusing on the reward of helping patients overcome addiction (Andrilla, Moore, & Patterson, 2019; Mendoza et al., 2016; White, 2018). Jones and McCance-Katz (2018) conducted a national survey of MDs, PAs, and NPs who had recently received buprenorphine prescribing waivers. The study described the providers and the buprenorphine prescribing barriers and facilitators they perceived (Jones & McCance-Katz, 2018). Yet, the study offers limited insight into NPs: the survey was developed from literature on physician experiences; NP and PA results were grouped, not stratified; and NP characteristics, such as certification area, were not reported. The education, experiences, regulation, reimbursement, and practice of NPs differ from MDs and differ from PAs (Kurtzman & Barnow, 2017; MedPAC, 2019). Thus, little is known about barriers and facilitators to NP buprenorphine prescribing, and studies that capture NPs' potentially unique experiences are essential for understanding NP buprenorphine prescribing.

Statement of the Problem

MAT with buprenorphine is currently the evidence-based OUD treatment option most suitable for rural areas because it can be prescribed in primary care settings, detoxification prior to treatment initiation is not required, and patients who experience relapse are not at higher risk of overdose compared to those prescribed naltrexone therapy. Though legislation has increased the ability of physicians and now NPs, other APRNs, and PAs to prescribe buprenorphine, deep gaps persist between buprenorphine demand and buprenorphine prescribers. Nationally, only 5.57% of physicians, 3.17% of NPs, and 1.66% of PAs have buprenorphine prescribing waivers (Spetz, Toretsky, Chapman, Phoenix, & Tierney, 2019). Of those waivered prescribers, many do not prescribe or prescribe to fewer patients than legislation permits (Jones & McCance-Katz, 2018). NPs are essential to the provision of primary care in rural settings (Barnes, Richards, McHugh, & Martsolf, 2018; Buerhaus, DesRoches, Dittus, & Donelan, 2015; Xue, Smith, & Spetz, 2019). Thus, NPs are uniquely positioned to combat the opioid crisis by treating individuals living with OUD with buprenorphine (Andrilla, Patterson, Moore, et al., 2018; Moore, 2019). However, harnessing this potential workforce requires understanding the barriers and facilitators and to buprenorphine prescribing among NPs. With such an understanding, interventions to increase the number of NPs who are waivered to prescribe and who utilize and maximize their prescribing waivers can be developed.

Purpose

The purpose of this qualitative descriptive study was to explore the barriers and facilitators to NP buprenorphine prescribing using the theoretical domains framework (TDF) (Cane, O'Connor, & Michie, 2012; Michie et al., 2005). Semi-structured interviews were conducted with NPs serving North Carolinians living in eastern North Carolina's 41 counties.

Inductive content analysis of the interview transcripts was used to identify themes (Braun & Clark, 2006). These themes were then deductively mapped to the domains of the TDF. This study laid a foundation for later work that will develop and implement interventions to support change behavior related to buprenorphine prescribing.

Research Question

What are the barriers and facilitators to buprenorphine prescribing among NPs working in primary care settings in eastern NC?

Theoretical Framework

The TDF provides a framework for identifying barriers and facilitators to implementing change and for building interventions to support behavior change among health care professionals (Atkins et al., 2017). A group of health psychology theorists, implementation scientists, and health psychologists developed the TDF (Michie et al., 2005). The developers recognized evidence-based practice recommendations often are unimplemented or under-implemented (Michie et al., 2005). They also recognized successful implementation of evidence-based practices requires understanding barriers and facilitators to health care professionals' behavior (Michie et al., 2005). The TDF development group noted that interventions informed by behavior change theory are more effective than atheoretical interventions (Cane et al., 2012). However, they identified an overwhelming number of behavioral change theories, most of which are difficult to understand and adopt (Cane et al., 2012). They found no guides to support behavior change theory selection and were concerned that researchers who select a single behavior change theory to guide their work would lose valuable elements of other behavior change theories (Atkins et al., 2017; Cane et al., 2012; Michie et. al, 2005)

Considering these concerns, the TDF development group gathered, synthesized, and simplified behavioral change theories to build a comprehensive theoretical model to guide inquiry into implementation science and behavior change. The group first identified 33 behavior change theories most relevant to health professionals' behavior. They reviewed the 33 theories and identified 12 behavior domains encompassing 112 theoretical constructs applicable to professional behavior change (Michie et al., 2005). The TDF was later validated and refined, resulting in 14 domains reflecting 84 constructs believed to influence behavior:

1. *Knowledge*: An awareness of the existence of something
Constructs: Knowledge, Procedural knowledge, Knowledge of task environment

2. *Skills*: An ability or proficiency acquired through practice
Constructs: Skills, Skills development, Competence, Ability, Interpersonal skills Practice, Skill assessment

3. *Social/Professional Role and Identity*: A coherent set of behaviors and displayed personal qualities of an individual in a social or work setting
Constructs: Professional identity, Professional role, Social identity, Identity, Professional boundaries, Professional confidence, Group identity, Leadership, Organizational commitment

4. *Beliefs about Capabilities*: Acceptance of the truth, reality, or validity about an ability, talent, or facility that a person can put to constructive use
Constructs: Self-confidence, Perceived competence, Self-efficacy, Perceived behavioral control, Beliefs, Self-esteem, Empowerment, Professional confidence

5.*Optimism*: The confidence that things will happen for the best or that desired goals will be attained
Constructs: Optimism, Pessimism, Unrealistic optimism, Identity

6. *Beliefs about Consequences*: Acceptance of the truth, reality, or validity about outcomes of a behavior in a given situation
Constructs: Beliefs, Outcome expectations, Characteristics of outcome expectancies, Anticipated regret, Consequences

7. *Reinforcement*: Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus
Constructs: Rewards, Incentives, Punishment, Consequents, Reinforcement, Contingencies, Sanctions

8. *Intentions*: A conscious decision to perform a behavior or a resolve to act in a certain way
Constructs: Stability of intentions, Stages of change model, Transtheoretical model and stages of change

9.*Goals*: Mental representations of outcome or end states that an individual wants to achieve
Constructs: Goals, Goal priority, Goal/target setting, Goals (autonomous/controlled), Action planning, Implementation intention

10. *Memory, Attention and Decision Processes*: The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives
Constructs: Memory, Attention, Attention control, Decision making, Cognitive overload/stress

11.*Environmental Context and Resources*: Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behavior
Constructs: Environmental stressors, Resources/material resources, Organizational cultural/climate, Salient events/critical incidents, Person x environment interaction, Barriers and facilitators

12. *Social influences*: Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviors
Constructs: Social pressure, Social norms, Group conformity, Social comparisons, Group norms, Social support, Power, Intergroup conflict, Alienation, Group identity, Modeling

13. *Emotion*: A complex reaction pattern involving experiential, behavioral, and physiological elements by which the individual attempts to deal with a personally significant matter or event
Constructs: Fear, Anxiety, Affect, Stress, Depression, Positive/negative affect, Burn-out

14. *Behavioral Regulation*: Anything aimed at managing or changing objectively observed or measured actions
Constructs: Self-monitoring, Breaking habit, Action planning
(Cane et al., 2012, pp. 13-14).

Development and refinement of the TDF continued, and the 14 domains of the revised TDF were mapped to a three prong, interactive framework for understanding behavior called the COM-B, representing capability, opportunity, motivation, and behavior (Michie, van Stralen, &

West, 2011). See Table 1 for details on the COM-B components and see Figure 1 for details on the COM-B framework. Capability is "the individual's psychological and physical capacity to engage in the activity;" motivation is "all those brain processes that energize and direct behavior;" and opportunity is "all the factors that lie outside the individual that make the behaviour possible or prompt it" (Michie et al., 2011, p. 4). Capability and opportunity interact with motivation, which influences behavior and in turn influences capability, motivation, and opportunity.

Table 1

COM-B Components and TDF Domains (Cane et al., 2012)

COM-B Component		TDF Domain
Capability	Psychological	Knowledge
		Skills
		Memory, Attention and Decision Processes
		Behavioral Regulation
	Physical	Skills
Opportunity	Social	Social Influences
	Physical	Environmental Context and Resources
Motivation	Reflective	Social/Professional Role & Identity
		Beliefs about Capabilities
		Optimism
		Beliefs about Consequences
		Intentions
		Goals
	Automatic	Social/Professional Role & Identity
		Optimism
		Reinforcement
		Emotion

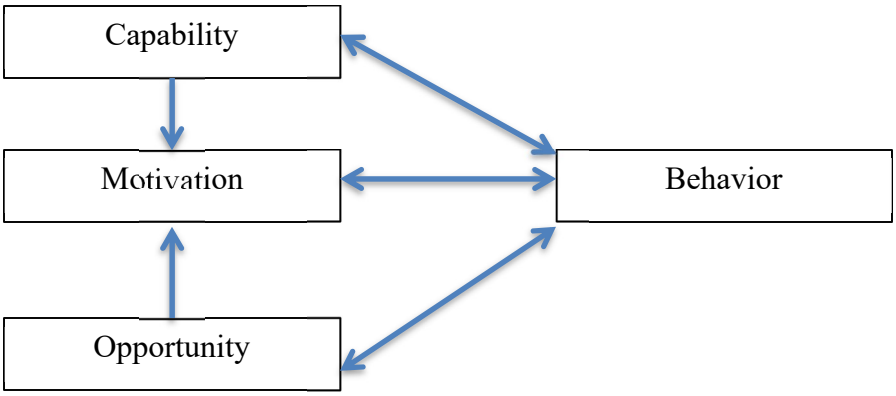

Figure 1: The COM-B framework (Michie et al., 2011)

TDF developers recommend a stepwise process for studying behavior change and developing interventions. After a behavior is targeted, facilitators and barriers to the behavior are identified using the 14 TDF domains. The identified domains are then linked to capability, motivation, and opportunity and finally linked to a behavior change wheel introduced in later iterations of the TDF (Michie, Johnston, Francis, Hardeman, & Eccles, 2008; Michie et al., 2011). The behavior change wheel helps researchers understand what interventions might be most appropriate for the behavior change under consideration. After a theory-based intervention is developed and implemented, the behavior change is evaluated (French et al., 2012)

The TDF has been used widely in studies of barriers and facilitators to evidence-based practice and professional behavior change. Studies include antimicrobial stewardship (Fisher et al., 2018), blood transfusion (Islam et al., 2012), post-surgical opioid prescribing (Lee et al., 2018), pressure ulcer prevention (Lavallée, Gray, Dumville, & Cullum, 2018), and human papillomavirus vaccination counseling (McSherry et al., 2012). Researchers have also used the TDF in diverse health care settings including primary care (e.g., Yamada et al., 2018), long-term care (e.g., Smith et al., 2019), and acute care (e.g., Lee et al., 2018) and to study the

behaviors of distinct health care professionals including pharmacists (e.g., Sargent, McCullough, Del Mar, & Lowe, 2017), nurses (e.g., Fisher et al., 2018), and physicians (e.g., Lee et al., 2018). The TDF is also used to examine various stages in the behavior change process including exploring facilitators and barriers to change (e.g., Fisher et al., 2018) and designing interventions that promote change (e.g., Craig et al., 2017). A recently published guide to using the TDF noted that the TDF can be used with quantitative studies that use survey data collection techniques, but researchers using TDF most often collect qualitative data via semi-structured interviews or focus groups (Atkins et al., 2017).

Methodology

This study employed a qualitative descriptive design (Sandelowski, 2000; Sandelowski, 2010) using semi-structured interviews with data analysis guided by the TDF (Atkins et al., 2017; French et al., 2012). Interview questions designed to promote discussion of barriers and facilitators were developed and piloted with qualitative research experts and practicing NPs. NPs working in primary care settings in eastern North Carolina were the study population. Recruitment methods were purposive and included snowball sampling (Noy, 2008), professional networking, social media (Head, Dean, Flanigan, Swicegood, & Keating, 2016), and an email list generated by the North Carolina Board of Nursing.

Summary

Understanding barriers and facilitators to NP buprenorphine prescribing is a first step to developing interventions that will encourage and support NP prescribing. This inquiry laid essential theoretical groundwork for facilitating prescribing buprenorphine, the most widely recommended evidence-based intervention to treat individuals living with OUD. Effective OUD

treatment is critical to improving health outcomes in rural communities, where significant death, disability, and economic and social devastation are linked to the opioid crisis.

CHAPTER 2: LITERATURE REVIEW

The purpose of this study was to examine barriers and facilitators to buprenorphine prescribing among nurse practitioners (NPs) working in primary care settings in eastern North Carolina (NC). Given a lack of inquiry into this research area, this literature review will first address eastern NC socioeconomics and health disparities before considering the opioid crisis in the region. A critical evaluation of existing literature on buprenorphine prescribing follows. The evaluation focuses on provider prevalence, access disparities, and previously identified barriers and facilitators to buprenorphine prescribing in office-based settings and identifies key gaps in the literature related to NP prescribing.

Eastern North Carolina

Eastern NC is a rural, economically distressed region. While NC is one of the 10 most populous states in the United States (US), the proportion of its population that is classified as rural is second only to that of Texas (Tippett, 2016). Approximately three million people live in the 41 counties of eastern NC in an area larger than the state of New Jersey (IndexMundi, n.d.; North Carolina Budget and Management, 2018; see Figure 2). Eastern NC is economically disadvantaged compared to other areas of the state. Twenty-eight of eastern NC's 41 counties (68%) are ranked among the most economically distressed in the state, eight (20%) are moderately distressed, and only five (12%) eastern NC counties are among the least distressed in the state (North Carolina Department of Commerce [NCDOC], 2018). Poverty rates exceed the state average in 75% of eastern NC counties (North Carolina Department of Health and Human Services [NCDHHS], 2018a). Almost half of eastern North Carolinians pay greater than 30% of their income in rent, and in 10 eastern NC counties more than 10% of households do not have access to a vehicle (NCDHHS, 2018b).

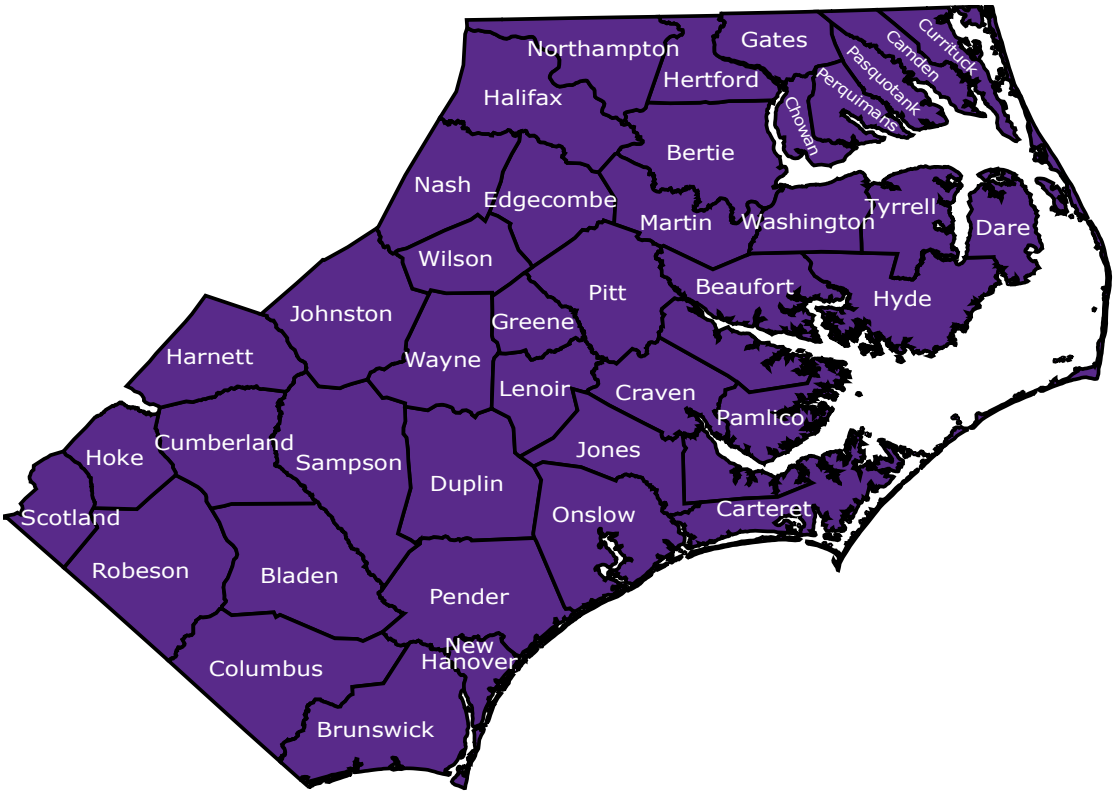

Figure 2: Eastern North Carolina

Eastern North Carolinians experience significant disparities in health care access. Health un-insured rates exceed the state average in 75% of eastern NC counties (NCDHHS, 2018b). All but three of eastern NC's 41 counties contain Medically Underserved Areas/Populations (United States Health Resources and Services Administration [USHRSA], 2019). The rate of NPs per 10,000 residents is lower than the state average in 93% of eastern NC counties, and the rate of primary care MDs is lower than the state average in 85% of eastern NC counties (NC Health Professions Data System, 2018).

Eastern North Carolinians' health perceptions, behaviors, and outcomes reflect these economic and health care disparities. Eastern North Carolinians are less likely than those living in other areas of the state to perceive themselves to be in good health and are more likely to be obese and to participate in risky health behaviors such as smoking (NC State Center for Health

Statistics, n.d.). Nationally, NC ranks 34th in premature mortality, measured as years lost before the age of 75; if only the 41 counties of eastern NC were used, NC would rank 43rd (East Carolina University Department of Public Health, 2016). Infant mortality rates in eastern NC are among the highest in the nation, with rates in some counties exceeding rates in low-income countries such as Vietnam and El Salvador (Cohen, 2019). Seventy-five percent of eastern NC counties rank in the lowest tier nationally for overall health factors, such as health behaviors and clinical care access, and almost 70% of eastern NC counties rank in the lowest tier nationally for overall health outcomes, such as length and quality of life (Robert Wood Johnson Foundation, 2018).

Opioid Crisis in Eastern North Carolina

The severity of the opioid crisis in eastern NC reflects the region's poor economic status, limited access to health care resources, and overall poor health. Two of the top 25 cities in the nation with the most opioid misuse, Jacksonville and Wilmington, are in eastern NC (Knopf, 2017). Of the 18 counties in NC ranked in the highest tier for unintentional opioid-involved poisoning death rates, eight (44%) are in eastern NC (NCDHHS, 2018c). Opioid overprescribing remains problematic in NC and especially in eastern NC. In 2017, the national average for opioid prescriptions per 100 persons was 58.7, the lowest in 10 years (National Institute on Drug Abuse [NIDA], 2019a). Yet in 2017, the NC average was 72 prescriptions per 100 persons while in eastern NC the average was 78 per 100 persons (Centers for Disease Control and Prevention [CDC], 2018c). In nine eastern NC counties, over 100 opioid prescriptions were written per 100 residents, with Scotland County having the highest rate at 168 opioid prescriptions per 100 residents (CDC, 2018c).

Buprenorphine and Opioid Use Disorder

This section of the literature review offers a critical analysis of the state of the science on buprenorphine prescribing. A review of scholarly literature was conducted using CINAHL, PubMed, ProQuest Research Library, and ProQuest Nursing & Allied Health Source databases. Searches were limited to peer-reviewed articles published in or after 2002, the year the United States Food and Drug Administration (USFDA) approved buprenorphine for opioid use disorder (OUD) treatment (Substance Abuse and Mental Health Services Administration [SAMHSA], 2019a). Primary search terms included "buprenorphine," "medication-assisted treatment," "substance use disorder," "opioid use disorder," "prescribing," "advanced practice registered nurse," "nurse practitioner," and "disparities or disparity or inequities." The reference lists of relevant studies identified in these searches and Google Scholar were also used to identify potential sources. Review was limited to studies about buprenorphine prescribing in the US and focused on provider prevalence, access disparities, and barriers and facilitators to buprenorphine prescribing in office-based settings. Policies affecting buprenorphine prescribing are described throughout to provide context for analysis. Analysis identifies key gaps related to barriers and facilitators for NP prescribing.

Buprenorphine Provider Prevalence

Limited access to medication-assisted treatment (MAT) drove early attempts to liberalize MAT prescribing policy (Fornili & Burda, 2009; Fornili & Fogger, 2017). In 2000, policymakers responded to increases in OUD and correlated increases in crime, unemployment, and infectious disease by passing DATA, the Drug Addiction Treatment Act (Fiellin & O'Connor, 2002a; Fiellin & O'Connor, 2002b; Jaffe & O'Keeffe, 2003). This act allows physicians not specialized in addiction medicine to obtain waivers to prescribe MAT for OUD in

office-based settings. To be eligible for a waiver, physicians must complete eight hours of addiction training and attest that they can refer patients for substance use disorder counseling (Fiellin & O'Connor, 2002a). Buprenorphine became the first office-based MAT when the United States Food and Drug Administration (USFDA) approved its use for OUD in October 2002 (Fiellin, 2007; Fiellin & O'Connor, 2002a; Fiellin & O'Connor, 2002b; Jaffe & O'Keeffe, 2003). The legislation prohibited NPs and physician assistants (PAs) from prescribing MAT (Fiellin, 2007).

Initial provider growth showed promise. By early 2005, almost 5,000 physicians had obtained buprenorphine prescribing waivers, and nearly 70% of them were actively prescribing buprenorphine (SAMHSA, 2006). By the end of 2006, there were almost 12,000 waivered providers, more than 50% of whom were not addiction specialists (Fiellin, 2007). However, among psychiatrists, only 10% of non-addiction specialists had received waivers by the beginning of 2006, though almost 90% of addiction psychiatry specialists had received waivers and nearly 70% of those were actively prescribing (Thomas et al., 2008). Federal policy initially limited each medical group, not each physician, to a maximum of 30 buprenorphine patients, which hindered multi-provider practices. The federal government revised DATA patient limits in December 2005 and again in January 2006. Beginning in 2005, each waivered physician could prescribe to up to 30 patients (Fiellin, 2007). In 2006, physicians who had treated 30 patients for at least one year could apply for waivers to treat up to 100 patients (Fiellin, 2007).

Despite these policy changes, buprenorphine prescriber supply could not keep pace with treatment demand, particularly with the unfolding opioid crisis affecting the nation. A national study of the impacts of the 2005 and 2006 legislation indicated that although the number of buprenorphine prescribers had increased, buprenorphine treatment gaps reached nearly 1.5

million individuals (Jones et al., 2015). By 2013 only about 20% of individuals living with OUD were receiving treatment (Saloner & Karthikeyan, 2015; Wu, Zhu, & Swartz, 2016). Moreover, no statistically significant difference was found in OUD treatment rates between 2004-2008 and 2009-2013 (Saloner & Karthikeyan, 2015). From 2003 to 2010, buprenorphine treatment rates were stable among Veterans Administration patients despite a 45% increase in OUD diagnoses (Oliva, Trafron, Harris, & Gordon, 2013). Buprenorphine distribution growth also decreased every year from 2006 to 2016 except 2012 despite increases in buprenorphine demand (Wakeman & Barnett, 2018).

Scholars began examining buprenorphine waivered physicians' prescribing practices because reports indicated most waivered physicians were not prescribing buprenorphine or were not prescribing to their patient limit (Hutchinson et al., 2014; Walley et al., 2008). Lack of prescribing raised questions about the potential efficacy of policies to increase access to buprenorphine. From 2010-2013, over one third of buprenorphine waivered physicians in California, Maine, and Ohio had never prescribed buprenorphine (Thomas et al., 2017). California, Maine, and Ohio physicians holding 30-patient waivers had an average monthly census of 13.5 buprenorphine patients, and those holding 100-patient waivers had an average monthly census of 42.9 patients (Thomas et al., 2017). A national examination of the impacts of the 2006 legislation indicated no statistically significant association between the amount of buprenorphine prescribed from 2004-2011 and the number of physicians holding 30 patient waivers; however, a statistically significant association was identified between more physicians holding 100-patient waivers and greater amounts of buprenorphine being prescribed (Stein et al., 2015). This finding led scholars to suggest increasing patient limits may have a greater impact

on buprenorphine availability than increasing the number of waivered buprenorphine prescribers (Stein et al., 2015).

Analysis also identified geographic disparities in buprenorphine access, which are detailed in the next section of the literature review. In 2012, only 3% of primary care physicians practicing in the US had a buprenorphine prescribing waiver (Rosenblatt et al., 2015). Rural regions lacked buprenorphine prescribers and experienced disproportionate rates of OUD and opioid related overdose deaths (Andrilla, Patterson, et al., 2018). Policymakers focused on increasing rural access by harnessing the potential prescribing power of NPs and PAs, providers critical to health care access in rural areas (Andrilla, Patterson, et al., 2018). In 2016, the Comprehensive Addiction and Recovery Act (CARA) granted NPs and PAs who had completed 24 hours of addiction training the right to apply for buprenorphine prescribing privileges. Waivered NPs and PAs could treat up to 30 patients in the first year and apply for 100-patient waivers after one year (Fornili & Fogger, 2017). In the same year, policymakers amended DATA to allow physicians to apply for 275-patient buprenorphine prescribing waivers (Fornili & Fogger, 2017; SAMHSA, n.d.-b).

Variations in state law complicate NP buprenorphine prescribing regulation. State, not federal, law determines NP autonomy and prescribing authority, thus state law determines NP buprenorphine prescribing eligibility (Fornili & Fogger, 2017). NPs living in states that allow independent prescribing can prescribe buprenorphine independently with a waiver. NPs living in states such as NC that require physician oversight must have a collaborative relationship with a buprenorphine prescribing physician to obtain a prescribing waiver. Tennessee is the only state that prohibits NPs from prescribing buprenorphine, though a task group is currently reconsidering NP prescribing laws in Tennessee (Fornili & Fogger, 2017; Moore, 2019). CARA

extended NP and PA prescribing rights until 2021, when the legislation will be evaluated. This deadline underscores the importance of inquiry into buprenorphine prescribing by NPs (Moore, 2019).

NP buprenorphine waivers and physician 275-patient waivers were issued beginning in February 2017. Given the recent implementation of DATA amendments and CARA, inquiry into their effects is limited. Researchers to date generally have focused on how the policies affect geographic access disparities. Scholars predicted the inclusion of NPs and PAs as buprenorphine prescribers would result in significant increases in rural access, but examination one year after CARA's passage indicated projections had not been reached (Andrilla, Moore, Patterson, & Larson, 2019). In a study comparing provider availability at the end of 2012 to the end of 2017, researchers identified increases in provider availability across all geographic settings; however, increases were greater in urban than rural regions, 10.7% compared to 4.4% (Andrilla, Moore, Patterson, & Larson, 2019). Andrilla, Moore, Patterson, and Larson (2019) described the inclusion of NPs as having a modest impact on provider supply, with 45.9% of urban counties having a waivered NP and 13.8% of rural counties having a waivered NP at the end of 2017. Review identified no studies assessing the impact of increasing physician treatment capacity to 275 patients.

Buprenorphine providers in eastern North Carolina. While the exact number of buprenorphine waivered providers currently practicing in eastern NC is unknown, supply can be estimated with the publicly available SAMHSA buprenorphine waivered provider lists. Providers must opt-in to be included on the list, and list examination finds inconsistencies, including multiple listings of the same provider. Duplicate provider listings were manually excluded from the online list to arrive at the figures presented here. In August 2019, the

SAMHSA (n.d.-a) NC buprenorphine provider list included approximately 1280 providers (NPs, PAs, MDs, and DOs), 274 of whom are NPs. As of October 31, 2018, 6,868 NPs were practicing in NC (NC Health Professions Data, 2018), thus approximately 4% of NC's NPs are buprenorphine waivered and listed. As of October 2018, approximately 1478 NPs were practicing in eastern NC (NC Health Professions Data, 2018), and SAMHSA (n.d.-a) listed 65 buprenorphine waivered NPs (4%) in eastern NC. Inclusion on the SAMHSA list does not indicate an individual actively prescribes or has ever prescribed buprenorphine. Scholars estimate 40% of waivered physicians never prescribe buprenorphine (American Society of Addiction Medicine [ASAM], 2018) and that nearly half of physicians who do prescribe are not accepting new buprenorphine patients (Andrilla, Coulthard, & Patterson, 2018). No such data are available for NPs, and the number of NC NPs waivered and actively prescribing buprenorphine is unknown.

North Carolina buprenorphine prescribing data are published quarterly as part of efforts to curb OUD. Data for national comparison are not available. Buprenorphine dispensing has increased 15% over the past two years, and NC Governor Roy Cooper announced a goal to increase dispensing by at least another 20% (NCDHHS, 2019b). Buprenorphine prescribing rates are lower in eastern NC compared to the rest of the state. In the first quarter of 2019, the NC Department of Health and Human Services reported an average of 2.01 buprenorphine prescriptions per 100 North Carolinians and an average of 1.67 per 100 eastern North Carolinians (NCDHHS, 2019a).

Buprenorphine Access Disparities, Early Years

Disparities in buprenorphine treatment emerged in early analysis of treatment access. Drug companies and buprenorphine prescribing providers targeted patients who found

methadone therapy unappealing or impractical due to stigma and burden associated with daily presentation to treatment centers (Sullivan, Chawarski, O'Connor, Schottenfled, & Fiellin, 2005). Those receiving buprenorphine therapy were more likely to have full time jobs, be younger, be White, be more well educated, and have been dependent on opioids for fewer years than those receiving methadone therapy (Sullivan et al., 2005; SAMHSA, 2006). Studies found mixed results on gender, with one study (Sullivan et al., 2005) finding men were more likely to receive buprenorphine therapy than methadone therapy and other studies (SAMHSA, 2006) finding women were more likely to receive buprenorphine therapy.

Payer-based disparities were also identified. Initially, state Medicaid programs restricted access to buprenorphine based on misconceptions about the safety and efficacy of the drug compared to methadone; such restrictions created significant disparities as Medicaid beneficiaries experience OUD at higher rates than individuals covered by private insurance (Clark, Samnaliev, Baxter, & Leung, 2011). In 2006, 28 states' Medicaid programs, including NC, included buprenorphine on OUD formularies, and Medicaid adoption of buprenorphine was found to predict treatment access across payer and facility type (Ducharme & Abraham, 2008). Adoption of buprenorphine in the Veterans Health Administration was also poor, with only 719 veterans treated with buprenorphine in 2005 despite almost 27,000 having an OUD diagnosis (Gordon et al., 2007; Gordon et al., 2008).

Some of the identified disparities were anticipated. Before the introduction of buprenorphine, employed individuals experiencing OUD were less likely than unemployed individuals to receive treatment for OUD (Becker et al., 2008). Many policymakers and clinicians hoped office-based buprenorphine would provide a mechanism for early OUD intervention and reach a population without a long history of addiction and failed treatment

(Kuehn, 2005; Sullivan et al., 2005). Buprenorphine's overwhelming use by better educated, employed individuals who had been addicted to opioids for a relatively short time indicated that buprenorphine had brought OUD treatment to a group that had been hard to reach (Kuehn, 2005; Sullivan et al., 2005).

Geographic disparities were also identified. Rural populations continued to have reduced access to OUD treatment compared to urban populations, a problem policymakers had hoped buprenorphine and its office-based distribution could mitigate (Kuehn, 2005). However, buprenorphine was reaching rural areas: from 2002-2011 the percentage of rural residents who lived in OUD treatment shortage areas decreased from almost 100% to 60% (Dick et al., 2015). The convenience of buprenorphine over methadone was appealing to rural providers and patients, and those living in rural communities were more likely than urban dwellers to be treated with buprenorphine than methadone (Stein et al., 2012).

Buprenorphine Access Disparities, 2012-present

Access disparities continued despite the liberalization of buprenorphine policy and the expansion of buprenorphine treatment. Disparities are overlapping and linked to geography, income, and ethnicity. Americans living in the South, Midwest, and West face access disparities compared to other Americans (Knudsen, Havens, Lofwall, Studts, & Walsh, 2017). One goal of CARA and of DATA revisions was to increase buprenorphine provider availability in rural areas. A comparison of geographic distribution of waivered buprenorphine providers from 2012 to the end of 2017 found that legislation including NPs and PAs in the buprenorphine workforce had increased provider availability in rural areas, though not by the percentage scholars predicted (Andrilla, Moore, Patterson, & Larson, 2019). Rural access remained problematic: in 2012, 67.1% of rural counties in the US had no waivered provider; by the end of 2017, the number had

decreased to 56.3% (Andrilla, Patterson, et al., 2018). Newly waivered NPs are more likely than newly waivered physicians to work in rural areas, 14.2% compared to 8.9% (Andrillla, Moore, Patterson, & Larson, 2019). As additional data about the number of buprenorphine waivered providers working in rural areas becomes available, meaningful provider increases linked to CARA provisions may be identified.

Increases in the number of providers in rural areas is encouraging, yet rural residents continue to experience buprenorphine access disparities. Researchers studying rural Medicaid enrollees in Pennsylvania illustrated access problems: most buprenorphine prescribers who are actively prescribing are not prescribing to their patient limits or are not accepting new patients (Cole et al., 2019). In 23 Pennsylvania counties, rural residents travelled a mean of 48.8 miles for buprenorphine treatment despite living a mean of 4.4 miles from a buprenorphine provider who accepts Medicaid and is actively prescribing (Cole et al., 2019). Patients travelling greater than 45 miles for treatment were less likely to receive continuous treatment than those travelling shorter distances, indicating the importance of receiving care close to home (Cole et al., 2019). Geographic disparities also exist within rural populations. Those living in rural South have limited access to buprenorphine prescribers compared to rural residents in other regions (Jones, 2018).

Inquiry has also begun into the effects of opioid overdose related deaths on buprenorphine provider access. While increasing numbers of OUD related deaths have been associated with more providers obtaining waivers, analysis finds a limited association between opioid overdose deaths and increased buprenorphine provider access in the South (Jones et al., 2018; Knudsen et al., 2017). Thus, it is not clear that the intensity of the South's opioid crisis has motivated providers to obtain waivers.

Geographic disparities in buprenorphine access are compounded and complicated by socio-economic disparities in buprenorphine access. Though nearly all states' Medicaid programs have covered buprenorphine therapy for individuals living with OUD since 2013, Medicaid patients continue to experience disparities in access: only 52% of buprenorphine prescribing physicians in a national survey accepted Medicaid patients (Knudsen & Studts, 2018). In 2015, 60% of counties in the US lacked access to a Medicare Part D buprenorphine prescriber though the number of Medicare prescribers had increased from 2010 to 2015 (Abraham, Adams, Bradford, & Bradford, 2019). Access to buprenorphine providers decreased as the percentages of African American and Latino Medicare enrollees increased compared to White Medicare enrollees (Abraham et al., 2019). Those receiving buprenorphine therapy continue to be mostly White, educated, privately insured, and less likely to have another psychiatric diagnosis than those receiving methadone therapy (Hansen et al., 2013; Hansen, Siegel, Wanderling, & DiRocco, 2016; Rhee & Rosenheck, 2019; Stein et al., 2012). Yet, findings from a national study (Krawczyk, Feder, Fingerhood, & Saloner, 2017) indicated Hispanic Americans and African Americans with OUD were more likely to receive MAT than Whites. While the researchers grouped rather than stratified buprenorphine and methadone treatment, the results suggested that Whites may be less likely than ethnic minorities to receive evidence-based treatment for OUD (Krawczyk et al., 2017).

Buprenorphine Prescribing: Barriers and Facilitators

Office-based, non-addiction physicians have historically been slow to offer evidence-based therapies for addiction (Lamb, Greenlick, & McCarty, 2002; Storholm et al., 2017). Scholars and policymakers began examining barriers and facilitators to physician buprenorphine prescribing shortly after the drug's approval (Fiellin, 2007). Such examination was also fueled

by the failure of levo-alpha-acetylmethadol (LAAM). The FDA approved this three times a week, rather than daily, methadone treatment alternative in 1993; it was so hindered by provider adoption that drug production ceased in 2003 (Ducharme & Abraham, 2008). Given NPs' recent eligibility for buprenorphine prescribing waivers, researchers to date have focused on physician barriers and facilitators. Discussion of barriers and facilitators is divided into those related to regulation, provider reimbursement and patient cost, organizational and external support, provider education and training, and provider attitudes. Consideration of the limited inquiry into NP barriers and facilitators closes the review.

Regulation. Physicians have cited regulation as a barrier to obtaining waivers and prescribing buprenorphine. As part of DATA legislation, SAMHSA's Center for Substance Abuse Treatment (CSAT) conducted national surveys of waivered and non-waivered providers in 2003 and 2005. Physicians ranked the 30-patient limit as a top five prescribing barrier (Fiellin, 2006; SAMHSA, 2006). As patient limits were revised, providers became less likely to cite them as a prescribing barrier (Arfken, Johanson, di Menza, & Schuster, 2010).

DATA authorized the FDA to regulate buprenorphine prescriptions; physicians are required to keep prescribing records and are subject to unannounced DEA office visits and audits ("How DEA," 2019). In a national survey of buprenorphine waivered prescribers conducted between 2004-2008, most did not report DEA oversight as a barrier (Arfken et al., 2010). Yet, in qualitative studies conducted between 2002-2005 (Barry et al., 2009), 2013-2014 (Mendoza et al., 2016), and 2016-2017 (Andraka-Christou & Capone, 2018) and in a national survey conducted in 2016 (Andrilla et al., 2017), physician respondents expressed concerns about DEA scrutiny, describing it as a prescribing barrier. Mendoza, Rivera-Cabrero, and Hansen (2016) speculated that the criminalization of opioid prescribers and public perceptions that doctors

caused the opioid crisis are leading many physicians to avoid treating patients experiencing OUD. Buprenorphine prescribing physicians reported being targeted by the DEA and treated like "criminals;" they also commented on the irony of strict buprenorphine oversight while physicians prescribe opioids for pain management with lower levels of scrutiny (Mendoza et al., 2016). One physician commented, "people just don't want more scrutiny . . . you're always worried that the government's going to come in and cause you problems" (as cited in Andraka-Christou & Capone, 2018, p. 13). Andrilla, Coulthard, and Larson (2017) found that rural physicians who had never prescribed buprenorphine or who no longer prescribed buprenorphine were more likely to cite DEA oversight as a barrier than rural physicians who were currently prescribing buprenorphine. In a qualitative study of how rural physicians prescribing buprenorphine at or near their patients limits overcame barriers, physicians recommended that those new to buprenorphine prescribing treat a small number of patients initially and slowly work toward their limits, in part to develop the record keeping skills required for DEA oversight and potential audits (Andrilla, Moore, & Patterson, 2019).

Physicians also expressed concern that prescribing to patients with OUD would entangle the physician with the criminal justice system and take valuable time from their practices and other patients. They felt buprenorphine patients were more likely to be on parole or in court ordered rehabilitation programs than their other patients (Andraka-Christou & Capone, 2018; Mendoza et al., 2016). Physicians expressed concern about being asked to communicate with parole officers, fill out forms, relinquish patient records, and/or be called to appear in court (Andraka-Christou & Capone, 2018; Mendoza et al., 2016).

Provider reimbursement and patient cost. Reimbursement was among the top five barriers physicians identified in early SAMHSA/CSAT physician surveys related to

buprenorphine prescribing (SAMHSA, 2006). Olsen, Bass, McCaul, and Steinwachs (2004) also found, in a survey of Massachusetts physicians, that providers willing to prescribe buprenorphine listed inadequate reimbursement as the main prescribing barrier. Policymakers responded to substance use disorder treatment coverage disparities with the 2008 Mental Health Parity and Addiction Equality Act, which required parity between medical-surgical and mental health benefits by most insurers that provided mental health benefits (Centers for Medicaid and Medicare Services, n.d.; Haffajee et al., 2018). The act also required insurers to offer providers comparable reimbursement for mental health and medical-surgical services (Peterson & Busch, 2018). The Patient Protection and Affordable Care Act extended mental health and addiction parity requirements to all insurers and required insurers to cover substance use disorder treatment (Abraham et al., 2017).

Despite these policy changes, physicians continue to report reimbursement as a primary prescribing barrier. Providers describe reimbursement regulations as onerous, citing prior authorization requirements and "first-fail" stipulations, where insurers require patients to fail drug-free treatment before qualifying for buprenorphine therapy (Andraka-Christou & Capone, 2018; Jones & McCance-Katz, 2018; Kermack, Flannery, Tofighi, McNeely, & Lee, 2017). In addition to being burdensome, physicians report reimbursement remains inadequate for the time required to treat patients with OUD (Andraka-Christou & Capone, 2018; Andrilla, Coulthard, & Larson, 2017; Andrilla, Moore, & Patterson, 2019; Huhn & Dunn, 2017). When interviewed about overcoming reimbursement barriers, some rural physicians prescribing at or near their patient limits recommended creating cash only policies with sliding scales while others described accepting inadequate reimbursement-related losses as an ethical responsibility to assure all patients receive treatment (Andrilla, Moore, & Patterson, 2019).

Patient cost was identified as a top five prescribing barrier in early national SAMHSA and SCAT sponsored surveys (Fiellin, 2007; SAMHSA, 2006). Massachusetts physicians (Walley et al., 2008) and Oregon physicians practicing in rural areas (McCarty, Rieckmann, Green, Gallon, & Knudsen, 2004) also cited patient cost as a primary prescribing barrier. Green et al. (2014) found that while some prescribers were reluctant to recommend buprenorphine if they felt the patient could not afford it, others viewed buprenorphine's cost as minimal compared to the costs of illicit drugs, leading them to initiate cost-benefit discussions with their patients on illicit v. licit drugs. In a qualitative study of physician barriers to prescribing, Andraka-Christou and Capone (2018) found patient cost remained a prescribing barrier. Andrilla, Coulthard, and Larson (2017) did not include patient cost in a survey addressing prescribing barriers rural physicians face. Similarly, Andrilla, Moore, and Patterson (2019) did not address cost in their study on overcoming barriers to buprenorphine prescribing among rural physicians. The Patient Protection and Affordable Care Act and Medicaid expansion have decreased buprenorphine costs for many patients, but the drug remains expensive for those without insurance and those under some insurance plans (Saloner, Levin, Chang, Jones, & Alexander, 2018).

Organizational and external support. Providers identified organizational support as critical for mitigating barriers related to buprenorphine prescribing (Gordon et al., 2011; Green et al., 2014; Jones & McCance-Katz, 2018; Mendoza et al., 2016; Olsen, Bass, McCaul, & Steinwachs, 2004; Thomas et al., 2008). Physicians did not perceive reimbursement as adequate for the time required to treat OUD patients with buprenorphine, but described organizational support as a facilitator that reduced time spent on buprenorphine prescribing (Andraka-Christou & Capone, 2018; Andrilla, Coulthard, & Larson, 2017; Andrilla, Moore, & Patterson, 2019; Huhn & Dunn, 2017). Having nursing and clerical staff specifically trained to provide

buprenorphine prescribing support reduced time requirements and facilitated prescribing (Green et al., 2014; Walley, 2008). Physicians commented that not having a colleague to support their buprenorphine patients if the physician were sick, on vacation, or otherwise unavailable posed a prescribing barrier (Green et al., 2014). Rural physicians who prescribed buprenorphine were less likely to work in solo practices than urban physicians who prescribed buprenorphine, suggesting that rural physicians need the support of a practice partner while urban physician who work alone have more readily available consult and referring resources (Lin & Knudsen, 2019). Hutchinson, Catlin, Andrilla, Baldwin, and Rosenblatt (2014) found that the presence of another provider in the practice who was actively prescribing buprenorphine facilitated prescribing, as providers had a colleague for backup and internal consults. Green et al. (2014) found that organizational buprenorphine champions also factored prominently in a provider's initial decision to prescribe.

External support also facilitates prescribing. Prescribers have described limited ability to refer patients for addiction counseling as a key prescribing barrier (Arfken et al., 2010; Fiellin, 2007; Green et al., 2014; Hutchinson et al., 2014; Netherland et al., 2009; Olsen et al., 2004). Such referral has been cited as especially important in the buprenorphine initiation process, when patients must be monitored for withdrawal (Green et al., 2014). Interventions to link primary care providers to specialty providers have been developed. Physicians interviewed by Hutchinson et al. (2014) did not indicate access to specialty providers was a prescribing barrier; however, these physicians had weekly access to telemedicine consults with addiction specialists, psychiatrists, and pain management physicians. Rural providers cited the "hub and spoke" model as a prescribing facilitator because it connects primary care providers to specialty providers (Andrilla, Moore, & Patterson, 2019). This model, which was first implemented in

Vermont in 2013 and is being adopted around the country, links rural clinics (spokes) to larger clinics (hubs) that can provide physician support and specialized consults and accept referrals for patients that pose treatment challenges (Rawson, Cousins, McCann, Pearce, & Van Donsel, 2019). Rural buprenorphine providers prescribing at or near their patient limits also recommend reducing or eliminating addiction counseling requirements as OUD patients stabilize, providing in-house counseling for patients, and/or referring patients to faith-based counseling (Andrilla, Moore, & Patterson, 2019).

Provider education and training. Many physicians who reported an unwillingness to prescribe buprenorphine did not believe OUD management is within the scope of the primary care physician (Barry et al., 2009; Green et al., 2017; Olsen et al., 2004). Nineteen out of 20 physicians practicing in four states did not feel medical school or their residency programs provided the training needed to treat individuals living with OUD (Andraka-Christou & Capone, 2018). Physicians cited the eight hour addiction training as a prescribing barrier but did not believe it should be eliminated, as it provided necessary training (Andraka-Christou & Capone, 2018). Similarly, Mendoza et al. (2016) found physicians did not believe eight additional hours of addiction training was sufficient to meet the demands of prescribing buprenorphine for OUD treatment. With increased experience prescribing, providers were less likely to report buprenorphine prescribing was outside of their scope (Green et al., 2014). Finding a prescribing mentor was identified as a facilitator to gaining the skills and confidence needed to prescribe buprenorphine (Andrilla, Moore, & Patterson, 2019; Huhn & Dunn, 2017). SAMHSA sponsors a national mentoring program to link experienced buprenorphine prescribers to novice prescribers (Eagen et al., 2010; Providers Clinical Support System, n.d.). However, Huhn and Dunn (2017) found that many physicians were unaware of the mentoring program.

Provider attitudes. Provider attitudes have consistently been associated with prescribing barriers. In a survey comparing providers willing and not willing to prescribe buprenorphine, over half of those unwilling believed addiction is a habit not a disease and nearly half of unwilling physicians did not want individuals with OUD to be patients in their practices (Olsen et al., 2004). Providers described OUD patients as difficult, manipulative, and demanding and expressed concern that prescribing buprenorphine would attract these undesirable patients to their practices (Andraka-Christou & Capone, 2018; Mendoza et al., 2016; Thomas et al., 2008). Green et al. (2014) found that providers with a moralistic view of addiction were less likely to prescribe buprenorphine than those who felt addiction was a disease. Some physicians worried buprenorphine worked "too well" and prevented patients from addressing underlying factors leading to OUD (Green et al., 2014). Other providers believed that primary care settings could not appropriately support addiction treatment and preferred to refer patients to programs that would provide daily monitoring and comprehensive substance use disorder treatment (Green et al., 2014).

Still other providers described the ability to prescribe buprenorphine as empowering. They diagnosed OUD in established patients and preferred to manage the illness themselves rather than send patients to a provider with whom the patient has no relationship (Green et al., 2014). Some physicians felt the primary care setting provided advantages for treating individuals with OUD and reasoned that patients with OUD would be less likely to interact with other patients with OUD (Mendoza et al., 2016). Providers who discussed facilitators to prescribing buprenorphine recommended making patient specific protocols and requiring patients to present daily until their commitment to recovery was established (Andrilla, Moore, & Patterson, 2019; Green et al., 2014). Rural physicians prescribing at or near their patient limit

cited patient contracts as a means to facilitate patient management (Andrilla, Moore, & Patterson, 2019).

Provider trust in the patient was also identified as a facilitator. Hutchinson et al. (2014) found providers were more willing to prescribe to existing patients and patients referred by other providers in their own communities. Many providers linked this trust to concerns about diversion: providers erroneously believed that buprenorphine diversion is dangerous and may lead to overdose (Andraka-Christou & Capone, 2017; Mendoza et al., 2016). Instead, studies have found that buprenorphine is typically diverted not to get high but to prevent withdrawal (Cicero, Ellis, & Chilcoat, 2018; Schuman-Olivier et al., 2013).

The attitudes of physician and health care providers to their colleagues who treat patients with OUD have also been identified as a prescribing barrier. Physicians identified resistance from practice partners as a barrier to prescribing (Hutchinson et al., 2014). Recent research considers stigma toward providers who provide OUD treatment such as buprenorphine therapy, comparing such stigma to that experienced by physicians who provide abortions, cosmetic procedures, and pain management (Madden, 2019). Madden (2019) proposed the term "treatment stigma" to describe stigma directed toward those who treat patients with addiction and theorizes that treatment stigma negatively affects addiction treatment access.

Nurse practitioner barriers and facilitators. At the time of this review, only two groups of researchers have addressed NP buprenorphine prescribing. In a research letter, Spetz, Toretsky, Chapman, Phoenix, and Tiervey (2019) noted a statistically significant relationship between state scope of practice regulations and the percentage of NP waivered to prescribe buprenorphine, with less restrictive states having more NP buprenorphine providers. Though statistically significant, the difference was minimal: in states requiring physician oversight of

NPs, 2.44% of NPs were waivered. In states not requiring oversight, 5.58% of NPs were waivered. Jones and McCance-Katz (2018) surveyed over 4,000 physicians, NPs, and PAs holding buprenorphine waivers after CARA was implemented and the most recent DATA amendments were made. NP and PA results were grouped, not stratified, and the survey primarily described practitioner characteristics. The study indicated NPs and PAs were more likely to prescribe to their patient limits than physicians (Jones & McCance-Katz, 2018).

Summary

This literature review demonstrates eastern NC health disparities, the scope of the opioid crisis in eastern NC, and the persistent problem of lack of access to buprenorphine providers, particularly in rural areas. Literature to date has focused on physician barriers and facilitators to buprenorphine prescribing. NPs are educated, reimbursed, and regulated differently than physicians. Given their potential to positively impact OUD treatment access, inquiry into the barriers and facilitators for this group of prescribers is needed. The next chapter details the methods that were used to answer the research question: What are the barriers and facilitators to buprenorphine prescribing among NPs working in primary care settings in eastern NC?

CHAPTER 3: METHODOLOGY

The purpose of this study was to describe barriers and facilitators to buprenorphine prescribing among nurse practitioners (NPs) working in primary care settings in eastern North Carolina (NC). The theoretical domains framework (TDF) guided the study and informed data collection and analysis (Atkins et al., 2017; Cane et al., 2012; Michie et al., 2005). This chapter describes the study's methodology including protection of human subjects and incentives, design, population, recruitment and sampling, data collection and management, data analysis, and research integrity.

Protection of Human Subjects and Incentives

A request for expedited study review was submitted to the University & Medical Center Institutional Review Board (UMCIRB) at East Carolina University (ECU) on October 16, 2019 as a no more than minimal risk study. The UMCIRB granted expedited study approval on November 12, 2019 (see Appendix A). Screening questionnaire respondents were required to review an expedited consent for survey research prior to completing the online screening questionnaire; consent was implied if participants completed the questionnaire. Those who were chosen to participate in the interview process were asked to electronically sign a no more than minimal risk consent form housed online at REDCap. Consent was collected electronically and stored on the secure REDCap platform. Recordings were destroyed after the transcripts were completed; transcripts are stored on PirateDrive, a secure drive managed by ECU. Participants selected a pseudonym to protect their identity. A UMCIRB amendment requesting to open screening questionnaire recruitment for an additional 14-days was submitted on February 6, 2020. Approval was granted on February 19, 2020 (see Appendix B).

Participants were offered an incentive of $50 via an Amazon gift card, which was delivered electronically to the participant's email address. Two participants declined the incentive. The PI took personal and financial responsibility for the purchase and distribution of the gift cards.

Design

A qualitative descriptive design using individual, semi-structured interviews was used to address the research question, *what are the barriers and facilitators to buprenorphine prescribing among NPs working in primary care settings in eastern NC?* Qualitative descriptive designs are appropriate for studying barriers and facilitators to human behavior (Neergaard, Olesen, Andersen, & Sondergaard, 2009). The design provides strong insight when little is known about a research topic and rich, straightforward descriptions are needed (Neergaard et al., 2009; Sandelowski, 2010). Qualitative descriptive designs require researchers to interpret data closely but do not preclude theoretically driven data analysis (Sandelowski, 2000; Sandelowski, 2010). Researchers may use a framework, such as the TDF, to collect and analyze data when conducting qualitative descriptive studies (Sandelowski, 2000; Sandelowski, 2010). Qualitative descriptive approaches have been paired with the TDF in numerous studies, e.g., Cassidy et al., 2019; Lynch, Luker, Cadihac, Fryer, & Hilier, 2017; and Nash, Garg, Brimble, & Markle-Reid, 2018.

Population

The population of interest for this study was NPs practicing in primary care settings in eastern NC. *Nurse practitioners* of any certification except pediatrics and neonatology were included. Other advanced practice registered nurses (APRNs) including clinical nurse

specialists, nurse midwives, and certified registered nurse anesthetists were excluded unless they were also certified NPs and practicing in an included NP role. Similarly, NPs holding pediatric or neonatology certification who held an included certification and practiced in that role were included, though no respondents met that description.

Primary care setting refers to a community clinic setting (i.e., not acute or long-term care) that provides individual, non-specialty care such as private primary care offices, health departments, student health centers, and federally qualified health care centers. Clinics that sometimes provide primary and specialty care, such as Veterans Administration clinics, were included. NPs who provide in-home primary care were included. Specialty care offices such as cardiology practices, addiction treatment centers, addiction medicine practices, and pain clinics were excluded. Urgent care clinics were excluded though primary care clinics that provide urgent and scheduled care were included.

Eastern North Carolina refers to 41 counties in eastern NC (see Figure 3). Of those 41 counties, one (New Hanover) is classified urban, defined as a population density of 750 people per square mile; two (Pitt and Cumberland) are suburban, with a population density of 250-750 people per square mile (NC Rural Center, 2019). The remaining 38 counties are classified rural, with population densities of 250 or fewer people per square mile (NC Rural Center, 2019). Given the overwhelming rurality of eastern NC, NPs practicing in any of the 41 eastern NC counties were included.

Other inclusion criteria were that participants were over the age of 18 and could speak and read English. Those who declined participation or withdrew consent at any time were excluded.

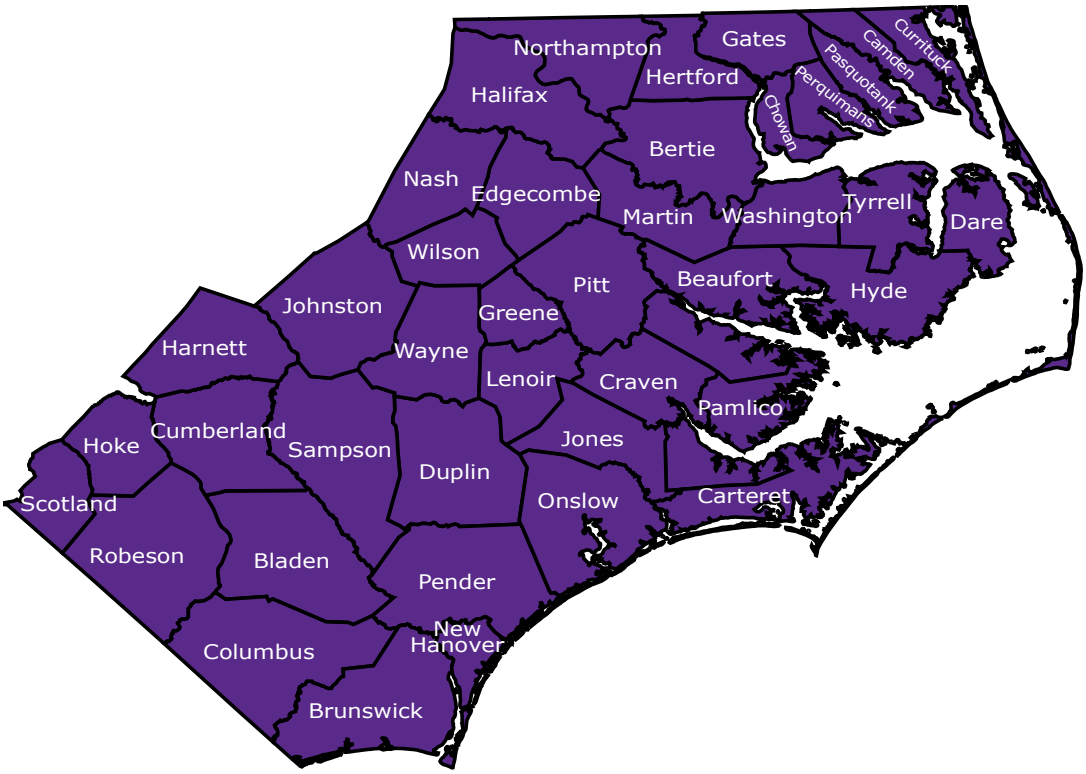

Figure 3: Eastern North Carolina inclusion counties

Recruitment and Sampling

The North Carolina Board of Nursing (NCBON) has contact information for all NPs practicing in NC that can be purchased for research purposes. However, the NCBON contact database does not allow for stratification based on this study's inclusion criteria. Thus, the PI first had to identify NPs who met inclusion criteria and then invite a sample of those NPs to participate in interviews. A two-phased recruitment process was developed. First, NPs were recruited to complete a screening questionnaire to determine if the NP met inclusion criteria. This recruitment phase was called "screening questionnaire recruitment." Next, based on screening questionnaire responses, a pool of NPs who met inclusion criteria was created. A sample of nurse practitioners from this pool was invited to participate in the interview portion of the study. This recruitment phase was called "interview recruitment." This section describes

screening questionnaire recruitment and then describes the interview recruitment and sampling process.

Screening Questionnaire Recruitment

Screening questionnaire recruitment involved recruiting NPs to complete a screening questionnaire (see Appendix C) that collected information about a respondent's certification(s), practice location, practice setting, buprenorphine familiarity, and buprenorphine prescribing status. At the end of the screening questionnaire, respondents were asked if they were interested in being considered for the interview portion of the study. Gathering this information allowed the principal investigator (PI) to identify potential interview participants and to describe the sample from which the interview participants were drawn. The questionnaire was piloted with two practicing NPs who were asked to review it for clarity, bias, and presence of needed response options. The NPs reported clarity, no bias, and presence of needed response options. Thus, no substantive changes were made to the questionnaire based on their review.

Recruitment strategies. Recruiting clinicians such as NPs is often a lengthy process complicated by barriers including participant time constraints and reluctance to participate in research (Hysong et al., 2013; Leysen, van den Eynden, Janssens, & Wens, 2019; McRobert, Hill, Smale, Hay, & van der Windt, 2018). Little is known about facilitating clinician recruitment (Broyles, Rodriquez, Price, Bayliss, & Sevick, 2011), but emerging research suggests multi-modal approaches are most effective (Leysen et al., 2019; Luck, Chok, & Wilkes, 2017; Marks, Wilkes, Blythe, & Griffiths, 2017). This study used a multi-modal recruitment approach including professional networking, social media, email, snowball recruiting, and reminders.

Professional networking. Recruiting via professional networking, also called convenience or opportunistic sampling, is recommended when recruiting participants is difficult (Holloway & Galvin, 2016) and is effective for recruiting clinicians (Broyles et al., 2011; Hysong et al., 2013). The PI identified 10 professional contacts, including nursing faculty, practicing NPs, and health system administrators, who might have access to potential participants. The PI sent these professional contacts a letter introducing the study (see Appendix D), research flyers (see Appendix E), and a Facebook study page link (see Appendix F). All of these resources included links to the online consent and screening questionnaire that was housed on REDCap, a secure HIPAA compliant data collection platform managed by ECU. Professional contacts were asked to share the information with individuals or groups that might be interested in the study or might know others who would be interested in the study. A potential drawback of recruiting via professional networking is that samples may be overly homogenous (Patton, 2015; Polit & Beck, 2017). Strategies used to mitigate these potential biases are addressed in the sampling discussion.

Social media. Social media has been found effective for clinician recruitment (Child, Mentes, & Pavlish, & Phillips, 2014; McRobert et al., 2018). This study employed Facebook, used by over 70% of Americans (Perrin & Anderson, 2019). The PI developed a Facebook page (see Appendix F) that featured study information, the study flier (see Appendix E), and an embedded link to the REDCap online screening questionnaire (see Appendix C). The PI shared the Facebook page through professional networking contacts and an online professional support group for advanced practice providers working in eastern NC. A brief statement (see Appendix G) introduced the study and encouraged users to share the Facebook study page.

Email. The NCBON maintains an Advanced Practice Registered Nurse (APRN) data set that includes information about NC's APRNs. Using the NCBON (2019) data request process, the ECU College of Nursing purchased the data set in September 2019 and maintained it on a secure university drive. The NP list was current as of September 16, 2019 and contained 8,882 entries including licensee name, home address, email address, and primary and secondary specialty. Information is self-reported, and licensees are asked to update their information annually; thus, information may not be current. Because the study excluded neonatologist and pediatric nurse practitioners, NPs who listed neonatology or pediatrics as their primary specialty were removed, leaving 8,097 entries. Home address was not used for exclusion, as the licensee may live in an exclusion county but practice in an inclusion county. Practice setting was also not used for inclusion, as it may not have been up to date and the categories used by the BON did not provide enough information about the setting to determine if it met inclusion criteria. Email addresses were uploaded into REDCap and questionnaire invitations (see Appendix H) were distributed via REDCap.

Snowball recruiting. Snowball recruiting is useful when populations, such as clinicians, are known to pose recruitment challenges (Hysong et al., 2013; Leysen et al., 2019; Patton, 2015; Polit & Beck, 2017). Participants may know individuals with similar characteristics who could provide rich data (Patton, 2015; Polit & Beck, 2017); thus, participants were asked to share the research flyer (see Appendix E) and Facebook page (see Appendix F) with other potential participants (Noy, 2008). Informed consent documents (see Appendices C and I) clarified that sharing recruiting tools was voluntary and not a participation requirement. A potential drawback of snowball recruiting is that samples may be overly homogenous (Patton, 2015; Polit & Beck, 2017). Strategies to mitigate this potential bias are addressed in the sampling discussion.

Reminders. Issuing participation reminders has been found to increase response rates (Dillman, Smyth, & Christian, 2014). Thus, email and social media recruiting included bi-weekly reminders (see Appendices J, K, L, M, N). A follow-up email reminder was sent at week four to professional contacts who had not responded to the PI (see Appendix O). When sending reminders via the BON email list, the PI employed the REDCap distribution option that excluded emails that had replied via the survey link. This reduced the email burden on respondents and helped prevent duplicate responses. During the recruitment period, approximately 30 potential participants who received a REDCap generated invitation contacted the PI and asked not to receive further communication about the study. The PI manually removed those individuals' emails from the REDCap distribution list so they would not receive email reminders.

Screening recruitment timeline. Screening questionnaire recruitment was conducted in fall 2019 over a six-week period. Dillman, Smyth, and Christian (2014) recommend that surveys not be conducted during times, such as holidays, that are likely to be busy for the targeted population. A timeline was developed that permitted screening recruitment to close before the Christmas and New Year's holiday. Regrettably, a REDCap email distribution flaw delayed recruitment initiation, resulting in the six-week screening recruitment period spanning the Thanksgiving, Christmas, and New Year's Eve holiday. While a number of factors affect recruiting, recruiting during the holiday season is generally compromised because participants are busier than usual (Dillman, Smyth, & Christian, 2014). The PI and dissertation chair had multiple conversations about the screening survey timeline and the resulting responses. After the screening questionnaire window closed, the PI received communication from several respondents who had missed the questionnaire window but wished to participate in the study. The PI and dissertation chair decided to submit an UMCIRB amendment requesting to re-open

the survey for two weeks. The amendment was approved in mid-February 2020 and the screening survey was opened for a second wave in late February 2020.

Interview Recruitment and Sampling

The screening questionnaire allowed the PI to identify NPs who met inclusion criteria and could be recruited to participate in the interview portion of the study. This section describes interview recruitment initiation delays, establishing an interview recruitment pool, sampling interview participants, and recruiting interview participants.

Interview recruitment initiation delays. Screening questionnaire recruitment data were used to identify potential interview participants. The original data collection plan included inviting respondents to participate in interviews during the initial six-week screening recruitment process. To explore the previously discussed issues with holiday period recruitment, in the week before Christmas, the PI invited three respondents to participate in the interview portion of the study. No responses were received. Thus, a decision was made to delay interview recruitment initiation until the end of the initial screening period when the holiday season would be over.

Establishing an interview recruitment pool. At the conclusion of the first screening questionnaire recruitment period, the PI exported the questionnaire data from REDCap to Excel. The PI then began the process of cleaning the data and organizing respondents by characteristics. The initial screening period resulted in 229 responses. After removing 27 incomplete entries and one duplicate entry, 201 entries remained. Of those 201, five were excluded (four practiced out of state, and one was a neonatal NP), leaving 196 responses. The second screening period resulted in 185 responses. After removing 16 incomplete entries, 169 entries remained. Of those 169, 10 were removed (two practiced out of state, and eight were pediatric or neonatal NPs), leaving 159 responses. The 196 responses obtained in screening period one and the 159

responses obtained in screening period two were combined to total 355 responses. Because the number of NPs working in primary care settings in NC at large and in eastern NC is unknown, a response rate cannot be calculated.

Although the questionnaire introductory material indicated the study was limited to NPs working in primary care settings in eastern NC, most of the 355 respondents (64.4%) did not work in inclusion counties. Respondent data were used to compare eastern NC respondents to NC respondents at large and eastern NC respondents who met inclusion criteria to eastern NC respondents who did not meet inclusion criteria. The data were organized into subsets including NPs who worked in inclusion counties, NPs who worked in inclusion counties and settings, NPs who did not hold waivers, NPs who held waivers, NPs who held waivers and prescribed, and NPs who held waivers, prescribed, and worked in inclusion settings. At the conclusion of the second screening wave, data were again exported to Excel and were organized into the same subsets. Fourteen respondents completed the screening questionnaire but asked not to be considered for the interview portion of the study. Their screening data are included in composite results but are not included in results for respondents meeting interview inclusion criteria. Descriptive statistics including percentages, means, frequencies, and ranges were used to describe the sample. Screening questionnaire findings are described in Chapter 4.

Sampling and sample size. Analyzing the screening questionnaire results allowed the PI to create a pool of respondents who met inclusion criteria. Potential interview participants were sampled from this pool. Sampling was guided by a sampling method (Francis et al., 2010) recommended by TDF developers (Atkins et al., 2017). Francis et al. (2010) recommended beginning with an established minimum sample size, which is determined by the number of primary stratification factors researchers identify *a priori*. Stratification factors are elements the

research team considers when selecting a sample of maximum variation that will provide rich and diverse insight into the research question (Francis et al., 2010; Polit & Beck, 2017; Schreier, 2018). Stratification factors for this study were buprenorphine wavier status (waivered/not waivered) and practice location within eastern NC, as the PI sought to interview participants working in diverse locations (Palinkas et al., 2015; Patton, 2015; Polit & Beck, 2017). Francis et al. (2010) recommend a minimum sample size of 10 when two to three primary stratification factors are used and recommend using at least three cases over the minimum sample size. Thus, the minimum sample size for this study, which had two primary stratification factors, was 10 and the initial sample size was 13. Maximum variation sampling, which purposefully selects diverse participants, readily pairs with this sampling method and can counteract potential drawbacks of recruiting via professional contacts and snowballing, which can sometimes produce overly homogenous samples (Palinkas et al., 2015; Patton, 2015; Polit & Beck, 2017). Participants were chosen to represent diverse counties and NPs with both waivered and non-waivered status.

Screening period one sampling. Thirty-four participants meeting inclusion criteria completed the screening questionnaire during the initial 6-week period. The PI and dissertation chair met several times to review the pool and select a sample. Only five respondents were waivered and met inclusion criteria, so all waivered respondents were invited for interview. The remaining 29 respondents were evaluated, and the PI and chair randomly selected 10 respondents from varying counties as the preferred sample. If potential interviewees did not respond to the interview invitation, they were generally contacted one additional time. As these potential preferred interviewees were contacted and interviews were conducted, the PI and dissertation chair met frequently to discuss interview content and reconsider the preferred sample.

Maximum variation sampling guided the initial sampling process. However, as the PI and dissertation chair met and conducted initial analysis of interview content, they began to approach sampling using a purposive approach (Palinkas et al., 2015). Because little was known about the research question, as the PI and dissertation chair reviewed interviews and gained additional insight, they began to understand which respondents might offer the richest information. They targeted non-waivered participants who reported in the screening questionnaire that they had worked in pain management, with addiction medicine providers, or in clinics where buprenorphine was prescribed to individuals experiencing OUD. Ultimately, 25 of the 34 potential respondents from the first screening questionnaire period were contacted and asked to participate in the interview. Twelve were interviewed, eleven did not respond, and one responded but later withdrew consent, citing time constraints.

Screening period two sampling. As discussed, the PI and dissertation chair were concerned about the effect of the holiday season on recruiting. The PI was contacted by several NPs who missed the screening recruitment window but wished to participate in the study. Two were of particular interest to the PI and dissertation chair: one held a buprenorphine waiver and stated she was eager to discuss policies that impeded prescribing. The other was not waivered but had worked with a buprenorphine prescriber. In order to interview these NPs and recruit other NPs, the PI and dissertation chair submitted an amendment to reopen the screening study. Two respondents were invited to participate in interviews before the PI and dissertation chair decided to halt data collection, as explained below. One of those respondents replied and was interviewed, making the 13th interview, and the other respondent did not reply to the interview request. The PI who held a waiver and reported eagerness to discuss policies inhibiting prescribing did not respond to the screening questionnaire invitation.

Data saturation. Scholars debate how to determine adequate sample size for qualitative research studies. Data saturation, the point at which researchers identify no new themes or findings in the data, is one indication an adequate sample size has been reached; however, determining what constitutes data saturation poses challenges (Francis et al., 2010; Schreier, 2018). Francis et al. (2010) recommend analyzing data as it is collected and conducting at least three additional interviews after the minimum sample size, in this study 10, has been reached. Data collection and analysis should continue until no new themes are identified in three successive interviews. The identification of no new themes is the point at which saturation has been achieved and is termed the *stopping criterion*. The stopping criterion is tested after each successive interview over the minimum sample size plus three, i.e., 11, 12, 13, test the stopping criterion; 12, 13, 14, test the stopping criterion; 13, 14, 15, test the stopping criterion, and so on. Determining the stopping criterion has been met can be subjective, thus independent coders and transparent reporting are required to reduce subjectivity and add robustness to the process (Francis et al., 2010).

Using Francis et al.'s (2010) method, a minimum sample size of 10 and an initial sample size of 13 was set for this study. The PI and dissertation chair discussed emerging interview themes as interviews were being conducted. However, because the PI decided to transcribe interviews herself, conducting in-depth analysis during the interview process as described by Francis et al. (2010) was not possible unless several days passed between each interview. To further complicate matters, as the PI was conducting interviews, news about the global COVID-19 pandemic was rapidly emerging (Wiseman, Cain, & Vaughan, 2020). Health care providers were occupied with preparing for and responding to the pandemic, and media accounts suggested health care workers were experiencing significant stress (Cotiaux, 2020). The PI and dissertation

chair had multiple conversations about the ethics of continuing data collection with a population on the frontlines of the COVID crisis. As this was an unprecedented public health crisis, there was no guidance on how to proceed. If data were to continue to be collected during the public health crisis, there was concern for a historical threat to internal validity/credibility (Polit & Beck, 2017). Nurse practitioners' worldviews were likely changing due to COVID-19, and the PI questioned whether data collected before the crisis could be compared with data collected during the crisis. Thus, on March 16, 2020 the PI and dissertation chair made the decision not to continue recruiting participants.

Information power. The initial plan for determining data saturation was complicated by recruitment delays and the COVID crisis. The PI and dissertation chair decided to consider the concept of information power as they reviewed the interview transcripts and considered whether an adequate sample had been obtained (Malterud, Siersma, & Guassora , 2016). Information power is determined by where a study lies on five dimensions: the narrowness or broadness of the study aim, the sample specificity, whether established theory informs the study, the quality of interview dialogue, and the analysis strategy (Malterud et al., 2016). The more information power a study has, the smaller the sample needed to address the research question. Table 2 lists the five information power domains and assesses each for this study.

Table 2

Information Power Dimensions for Current Study

Item	Dimensions		Assessment
	Smaller *N*	Larger *N*	
Study aim	Narrow	Broad	Narrow: one research question addressing a specific experience, buprenorphine prescribing (Malterud et al., 2016)
Sampling specificity	Dense	Sparse	Dense: participants' characteristics (nurse practitioner in primary care setting) highly specific to study aim; study sample included individuals who provide insight into experiences not previously described (Malterud et al., 2016)
Use of established theory	Applied	None	Applied: study applied a well established theory, the Theoretical Domains Framework (Malterud et al., 2016)
Dialogue quality	Strong	Weak	Strong: Principal Investigator, a nurse practitioner in eastern North Carolina, had insider status with participants, which contributed to trust, resulting strong quality of dialogue and higher information power (Malterud et al., 2016)
Analysis strategy	Case	Cross-case	Coding conducted in two phases: case coding used to develop rich descriptions of identified themes, cross-case analysis used when mapping subtheme to theoretical domains (Malterud et al., 2016)

Our assessment of the five dimension of information power suggested strong information power: four of the dimensions suggest a small sample size was needed (Malterud et. al, 2016). The study fell on the smaller *N* aspect of each dimension except analysis strategy. However, since the study used both case and cross-case analysis strategies, large numbers of cases were not required. Thus, based on Malterud, Siersma, and Guassora (2016), a smaller sample size was

justified for this study. In addition to considering the adequacy of the sample in light of the tenants of information power, as the PI and dissertation chair coded and analyzed the transcripts, they considered the sample with respect to the saturation criteria they had established in the study-planning phase. By the analysis of interview 10, new themes were not being identified, suggesting stopping criterion had been met. No new themes were identified in the analysis of the final three interviews, confirming stopping criterion had been met. Thus, the dissertation chair and PI determined that an adequate sample has been obtained to answer the study's research question.

Data Collection and Management

Screening Questionnaire Data

Screening questionnaire data were collected online via REDCap, a data management platform managed by ECU. Respondents were first directed to an online consent form and consent was implied if they completed the questionnaire. Screening data will be stored on REDCap for a period of seven years following the study's completion. Though identifying information was not downloaded from REDCap to Excel, data removed from REDCap will be stored on PirateDrive, a secure drive maintained by ECU, for a period of seven years from the study's completion. This data was used to describe the sample from which the interview participants were drawn and compared eastern NC NPs with NPs from the rest of the state.

Interview Data

Informed consent. Individuals selected to participate in interviews were contacted by phone, text, and/or email, depending on the preference they expressed in the screening questionnaire. They were invited to participate in the interview and asked to review their email for a message from the PI (see Appendix P) that linked to an online consent form housed on the

secure REDCap platform (see Appendix I). The PI requested that respondents review the consent form and contact the PI via email or telephone should they have questions. After reading the consent and addressing any questions, those who wished to participate signed the consent form electronically. REDCap provides a secure platform for storing consents and allows for those signing consents to download a portable document format (PDF) copy and/or have a copy of the consent emailed to an address the respondent provides to REDCap.

Data collection. Data were collected via telephone interview. Researchers have challenged the assumption that conducting interviews face-to-face is preferable over telephone interviews, offering evidence of overlapping convenience and methodological advantages to interviewing by telephone (Cachia & Millward, 2011; Drabble, Trocki, Salcedo, Walker, & Korcha, 2016). Telephone interviews offer greater convenience for participants because participants may more easily choose a time and space convenient for them (Drabble et al., 2016). In the case of clinicians, clinicians may prefer to interview off-hours and select a place where they feel comfortable. These advantages confer benefits beyond convenience. The increased sense of privacy and anonymity a telephone interview offers may lead to increased participant openness and collection of richer data; furthermore, respondents are not distracted by the interviewer's note taking, a common complaint in face-to-face interviews (Cachia & Millward, 2011).

Researchers have also found participants perceive phone interviews as less burdensome than face-to-face interviews, participants are more likely to participate in telephone versus face-to-face interviews, and participants are more willing to reschedule missed telephone interviews (Cachia & Millward, 2011). In this study, six of the 13 interviewees texted the PI to adjust the interview time in order to meet domestic obligations. Others requested to text the PI when they

were ready to interview. For example, one asked to text once her children had gone to bed. From the perspective of the PI, phone interviews appeared to fit this population's busy schedules and conflicting demands. Participants were able to reschedule interviews easily and the PI could be flexible with interview times.

Telephone interviews were scheduled as early as 7 am and as late as 9:30 pm. The PI conducted the telephone interviews from a quiet, secure location. The 13 interviews lasted an average of 36 minutes (range 21-54 minutes). After the PI and the participant made contact, the PI asked if there were any questions before recording began and reminded the participant that the interview was being audio recorded but that no one could hear the interview being conducted and that no one else would hear the interview recording. Once the PI and participant were ready to begin, the PI began recording and offered a short overview of the study's purpose. The PI then collected additional demographic data including the respondent's gender, level of NP education, and years of NP practice (see Appendix Q). The PI confirmed the individual's area(s) of certification, practice setting and location, and buprenorphine prescribing status. After collecting demographic data, the semi-structured interview (see Appendix Q) began. All interviews were completed in one phone call.

A semi-structured interview guide (see Appendix Q) was used to direct the interviews. The semi-structured interview guide contained a list of open-ended questions or statements (Neergaard et al., 2009). The guide for this study included questions geared toward those who did not hold buprenorphine wavier, for those who held waivers but did not prescribe, and for those who held waivers and prescribed. Statements such as "could you describe that in more detail" and "could you please share an example" were used to clarify responses or elicit more

information. The semi-structured interview guide was piloted with seven NPs, one of whom held a buprenorphine waiver. The NPs were asked to review the document for clarity and bias.

Interviews were recorded for later transcription. Once the interview was complete, the PI took field notes about the experience. The PI made notes about the participant's assumed location, the participant's perceived tone and attitude, and the participant's overall mood. The notes also included the PI's feelings about the tone and course of the interview. Field notes can be useful to provide context to interviews and help researchers understand their biases (Polit & Beck, 2017). The PI discussed these field notes with the dissertation chair and one member of the dissertation committee.

The PI personally transcribed the audio-recorded telephone interviews. Interviews were audio-recorded on two portable recording devices, in case one malfunctioned. The audio files were immediately uploaded onto PirateDrive and deleted from the portable recording devices. The PI transcribed the interviews verbatim into a Microsoft Word document and imported them into NVivo 12, a qualitative data management software application. All documents were saved on PirateDrive. Recording files were deleted after transcription was complete and verified. The PI verified the transcripts by re-listening to the recordings and comparing them to the transcripts. Transcription records will be kept for seven years following the publication of the results.

Data Analysis

Data were analyzed in an inductive to deductive process that integrated data driven and theory driven analytic processes (Fereday & Muir-Cochrane, 2006; Lynch et al., 2017). First, Braun and Clark's (2006) inductive thematic content analysis process was used to code the interview transcripts (Braun & Clark, 2006). The PI, the dissertation chair, and a member of the dissertation team, read and re-read two transcripts to ensure familiarity with the data. This three-

member team independently generated initial codes from the data contained in these two transcripts. The team then met to discuss the transcripts and reach consensus on initial codes. After the meeting, the PI created a report that organized the codes into themes and subthemes. The team checked the codes against the data and confirmed consensus on initial codes. The PI then coded the additional transcripts. When coding uncertainty arose, it was discussed with the dissertation chair and resolved with the third team member if consensus was not achieved. Throughout this process, themes were reviewed and checked against the data; a thematic map was developed to guide checking and organizing the themes. Finally, final themes and subthemes were identified and presented to and confirmed with the coding team.

After inductive data analysis was completed, the deductive analytic phase began. Following a process recommended by TDF developers, the PI and the dissertation chair independently mapped the inductively derived subthemes deductively to the TDF domains (Atkins et al., 2017). They then met to compare mapping and resolve inconsistencies. The TDF deductive coding process allows for the discovery and inclusion of themes that do not map to the 14 domains of the TDF; no such themes were identified. While the objective is to map themes to the most relevant domains, themes can be mapped to more than one domain. After subthemes were mapped to the relevant TDF domains, the PI generated belief statements for each subtheme and each mapped domain. If a subtheme mapped to more than one domain, more than one belief statement was generated. Belief statements distill the essence of the views underlying the themes and clarify barriers and/or facilitators to target behaviors, in this study buprenorphine prescribing (Atkins et al., 2017). The PI and dissertation chair compared the belief statements to the data and refined and confirmed the statements. The PI and dissertation chair then reviewed the subthemes, domains, and belief statements and categorized each as a buprenorphine

prescribing barrier, facilitator, or both. Consistent with TDF analysis and reporting recommendations (Atkins et al., 2017), data were presented in tables that included participant quotations from the transcriptions and belief statements. These data are presented in Chapter 4.

Research Integrity

Qualitative research theorists recommend employing the trustworthiness framework to develop and assure the quality of qualitative inquiry. Framework components include credibility, dependability, confirmability, transferability, and authenticity (Guba and Lincoln, 1994; Lincoln & Guba, 1985; Polit & Beck, 2017). This section briefly describes these components and the strategies used in this study to promote framework components and the overall trustworthiness of the study.

Credibility in qualitative research is analogous to internal validity in quantitative research and refers to the "truth" of the data and how it is interpreted (Polit & Beck, 2017). Dependability is similar to the quantitative research concept of validity; dependable qualitative study findings are accurate and consistent over time (Holloway & Gavin, 2016). Confirmability involves assuring that findings represent the data, not researchers' biases, and is similar to the quantitative research concept of objectivity (Holloway & Gavin, 2016; Polit & Beck, 2017). Transferability refers to the ability of the findings to be transferred to another context (Holloway & Gavin, 2016). Finally, authenticity captures the extent to which research findings allow readers to develop deep and accurate insight into the lived experiences under investigation (Holloway & Gavin, 2016; Polit & Beck, 2017).

Several strategies were employed to ensure the qualities of trustworthiness were achieved to the greatest degree possible. First, the PI considered the importance of reflexivity in the research process. Researchers play a role in shaping data collection, data interpretation, and

knowledge construction (May & Perry, 2014). Such reflexivity was particularly important for this study, as the PI is a NP and thus this is *insider research,* or research "concerned with the study of one's own social group or society" (Greene, 2014). However, the NP community is diverse, and thus even this *insider* status is subjective. One key strategy for addressing reflexivity is journaling (Polit & Beck, 2017). The PI began a reflexive journal concurrent with this study's inception and has written about her assumptions, conceptions, and potential biases about addiction, addiction treatment, and provider responsibility. Consultation, in the form of dialogue with the dissertation advisor and research team, helped the PI manage the biases she discovered through journaling and to undercover latent biases that may affect data interpretation and analysis (Buetow, 2019; Yin, 2018). For example, the PI and dissertation chair discussed their own experiences caring for and interacting with individuals experiencing substance use disorder, both in clinical and personal settings, and reflected on how these experience might affect their interpretation of the data. This conversation was continued with a second committee member who assisted with data coding.

Investigator triangulation was also used to support the study's trustworthiness. This refers to using two or more coders, as described in the data analysis portion of this chapter, to code and interpret data (Polit & Beck, 2017). Member checking, or the process of providing research participants the opportunity to review and comment on interview summaries and interpretations, is sometimes advised as a means to ensure trustworthiness (Holloway & Gavin, 2016). However, given the population under consideration in this study, busy primary care clinicians, this strategy was not employed. Rather, peer debriefing and multiple coders helped ensure trustworthiness of data interpretation (Holloway & Gavin, 2016). The PI and dissertation chair asked a dissertation committee member to individually code the data and compare coding

with the PI and dissertation chair. This committee member also engaged in conversation about biases and their potential effect on coding. This strategy served to moderate potential conflicts about data analysis and interpretation and mitigate the impact of bias on data interpretation. Finally, an audit trail supported many of the aspects of trustworthiness. A detailed journal of sampling processes and decisions and challenges encountered was kept. Some of these challenges and decisions are detailed in this chapter. The codification of these findings or experiences may support future researchers who wish to repeat the study and assess the study's dependability (Polit & Beck, 2017). Furthermore, since interviews were conducted via telephone, notes were taken about not just what the participants said, but how they said it; these observations were discussed with and co-interpreted by the dissertation chair with assistance from the dissertation committee. The PI also recorded the assumed location of the participant during the interview (e.g., home, work, car) and background noise or distractions noticed. Finally, preliminary data analysis, which involves inductive coding of responses, was conducted, and participant quotations were used to elucidate coding. This strategy helped support the authenticity of the study and give life to participants' voices (Holloway & Gavin, 2016).

Summary

This study used a qualitative descriptive design and semi-structured interviews to examine the research question: what are the barriers and facilitators to buprenorphine prescribing among NPs working in primary care settings in eastern NC. This chapter discussed design; population; recruitment and sampling; data collection, management, and analysis; protection of human subjects and incentives; and research integrity.

CHAPTER 4: RESULTS

The purpose of this study was to describe barriers and facilitators to buprenorphine prescribing among nurse practitioners (NPs) working in primary care settings in eastern North Carolina (NC). The theoretical domains framework (TDF) guided the study and informed data collection and analysis (Atkins et al., 2017; Cane et al., 2012; Michie et al., 2005). A screening questionnaire was used to identify potential interview participants. First, this chapter presents screening questionnaire results. Respondent characteristics are considered, the sampling pool is described, and interview participants' characteristics are presented. Data collected via interviews are then considered. Themes and subthemes inductively identified with thematic content analysis are described and deductively mapped to the domains of the TDF. Barriers and facilitators within the TDF domains found to be relevant to this study are then considered.

Screening Questionnaire Results

The screening questionnaire indicated the study was seeking participants who worked in primary care settings in eastern NC's 41 counties. However, NPs from across the state who worked in diverse clinical settings responded. Respondents practiced in 74 (74.00%) of NC's 100 counties. Two hundred and twenty-five (63.38%) of the 355 respondents practiced in counties outside of eastern NC. Figure 4 displays NC's counties; at least one screening questionnaire respondent practiced in each darkly shaded county. Table 3 presents the buprenorphine waiver status of respondents from NC and from eastern NC.

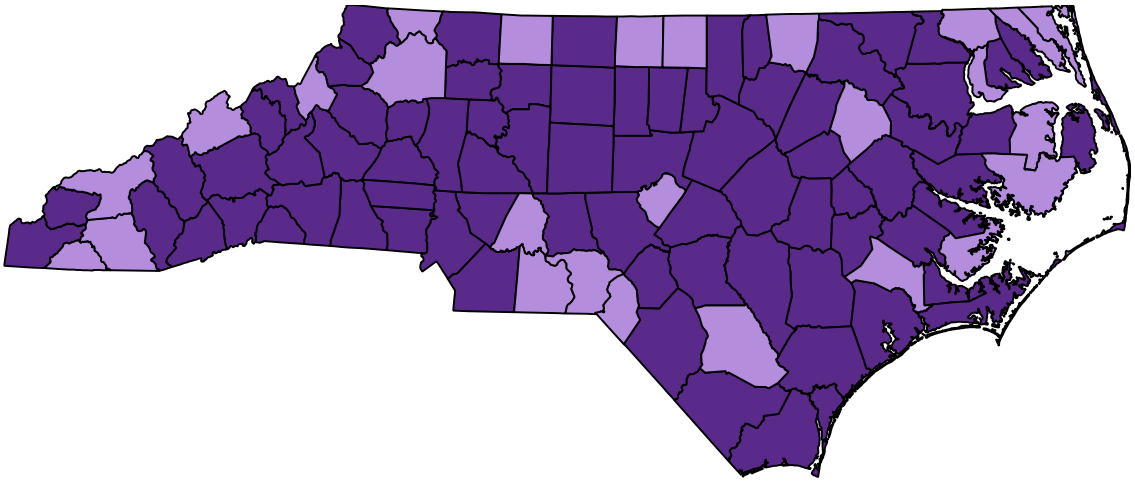

Figure 4: Practice Counties of Screening Respondents

Table 3

Waiver Status of Screening Questionnaire Respondents

Respondent Characteristic	North Carolina N=355	Eastern North Carolina n=130
Non-waivered	263 (74.08%)	100 (76.92%)
Waivered	73 (20.56%)	25 (19.23%)
Reported not knowing if waivered	19 (5.35%)	5 (3.85%)

Waivered Respondents

The screening questionnaire gathered information about buprenorphine waivered NPs, including whether they were currently prescribing buprenorphine and in what setting they practiced. These results are summarized in Table 4.

Table 4

Buprenorphine Waivered Nurse Practitioners

Respondent Characteristic	North Carolina n = 73	Eastern North Carolina n = 25
Waivered and prescribed	53 (72.60%)	17 (68.00%)
Waivered and did not prescribe	20 (27.40%)	8 (32.00%)
Waivered and practiced in primary care	36 (49.32%)	11 (44.00%)
Waivered, prescribed, and practiced in primary care	25 (34.25%)	4 (16.00%)
Waivered, did not prescribe, and practiced in primary care	11 (15.07%)	7 (28.00%)

Non-waivered Respondents

Of the 263 non-waivered providers who responded to the questionnaire, 123 (46.77%) practiced in primary care settings. When considering the eastern NC subset, 100 non-waivered NPs responded and 57 (57.00%) practiced in primary care settings. The questionnaire asked non-waivered respondents (n=263) to describe their willingness to obtain a waiver. These data are presented in Table 5.

Table 5

Non-waivered Respondents' Willingness to Obtain a Buprenorphine Waiver

Respondent Willingness	North Carolina n = 263	North Carolina Primary Care n = 146	Eastern North Carolina n = 100	Eastern North Carolina Primary Care n = 57
Very willing	53 (20.15%)	27 (18.50%)	30 (30%)	15 (26.3%)
Somewhat willing	81 (30.80%)	46 (31.51%)	30 (30%)	11 (19.3%)
Somewhat unwilling	61 (23.19%)	39 (26.71%)	19 (19%)	13 (22.8%)
Very unwilling	68 (25.86%)	34 (23.29%)	21 (21%)	18 (31.6%)

Respondents Meeting Interview Inclusion Criteria

The screening questionnaire was administered over two periods. Screening period one resulted in 34 respondents who met inclusion criteria, and screening period two resulted in 22 respondents who met inclusion criteria. Twelve of the 13 interview participants were drawn from screening period one. Table 6 presents overall results and respondent waiver status, stratified by screening period.

Table 6

Respondents Meeting Inclusion Criteria

Respondent Characteristic	Screening 1 n = 34	Screening 2 n = 22	Combined n = 56
Non-waivered	28 (82.35%)	18 (81.82%)	46 (82.14%)
Waivered	5 (14.71%)	4 (18.18%)	9 (16.07%)
Waivered and prescribed	2 (5.88%)	2 (9.09%)	4 (7.14%)
Waivered and did not prescribe	3 (8.82%)	2 (9.09%)	5 (8.93%)
Reported not knowing if waivered	1 (2.94%)	0 (0%)	1 (1.79%)

Geographic distribution. Respondents who met inclusion criteria practiced in 23 (56.10%) of the 41 inclusion counties. Many respondents worked in multiple counties. Figure 5 illustrates the counties of eastern NC. Inclusion respondents practiced in the more darkly shaded counties.

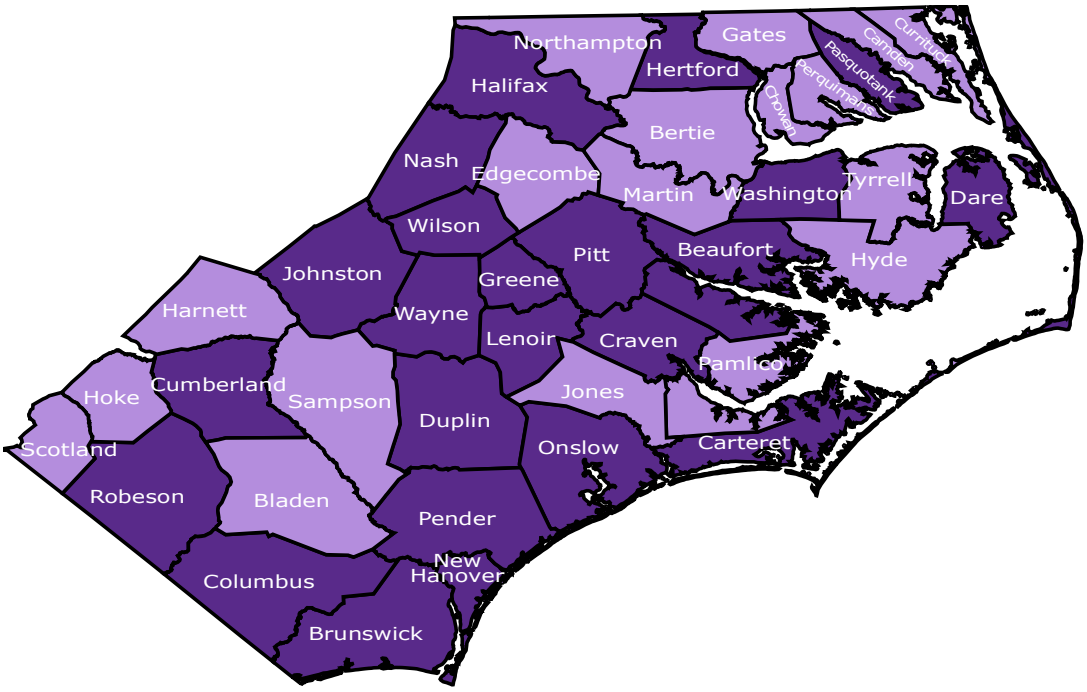

Figure 5: Practice counties of respondents meeting inclusion criteria

Other characteristics. Respondents were asked to describe their familiarity with buprenorphine and how they learned about buprenorphine. Data on familiarity are presented in Table 7 and stratified by wavier status. Respondents (n=56) described how they learned about buprenorphine and could select multiple response categories. The most common responses were continuing education credits (n=32, 57.14%), professional journals (n=22, 39.29%), colleagues (n=22, 39.29%), drug company representatives (n=5, 8.93%), NP degree program (n=10, 17.86%), and media (n=6, 1.10%). Non-waivered respondents were asked to describe their willingness to obtain a waiver. These data are presented in Table 8.

Table 7

Inclusion Respondents' Buprenorphine Familiarity

Familiarity	Waivered n = 9	Non-waivered n = 46	Don't know if waivered n = 1	Combined n = 56
Very familiar	3 (33.33%)	7 (15.22%)	0 (0%)	10 (17.86%)
Familiar	6 (66.67%)	22 (47.83%)	0 (0%)	28 (50.00%)
Not very familiar	0 (0%)	15 (32.61%)	1 (100%)	16 (28.57%)
Not at all familiar	0 (0%)	2 (4.35%)	0 (0%)	2 (3.57%)

Table 8

Willingness of Non-Waivered Respondents Meeting Inclusion Criteria to Obtain a Buprenorphine Waiver

Respondent Willingness	n = 46
Very willing	12 (26.09%)
Somewhat willing	10 (21.74%)
Somewhat willing	10 (21.74%)
Very unwilling	14 (30.43%)

Interview participant characteristics. Thirteen NPs were interviewed; all were women. Eight interview participants did not have buprenorphine prescribing waivers, and five interview participants had waivers. Of the five waivered participants, two were actively prescribing buprenorphine. Most (n=12) were certified family nurse practitioners (FNPs), three held dual certification as FNPs and psychiatric mental health nurse practitioners (PMHNPs), and one held dual certification as an adult geriatric primary care nurse practitioner (AGPCNP) and a PMHNP. The 13 NPs had an average 11.8 years of NP experience (range 5-26). The NPs interviewed practiced in 11 of eastern NC's 41 counties (see Figure 6, included counties are shaded more

darkly). Four participants (30.77%) practiced in private primary care settings, four (30.77%) practiced in settings that integrated primary and psychiatric care, two (15.38%) practiced in federally qualified health care centers, two (15.38%) practiced in health departments, and one (7.7%) practiced in a student health setting.

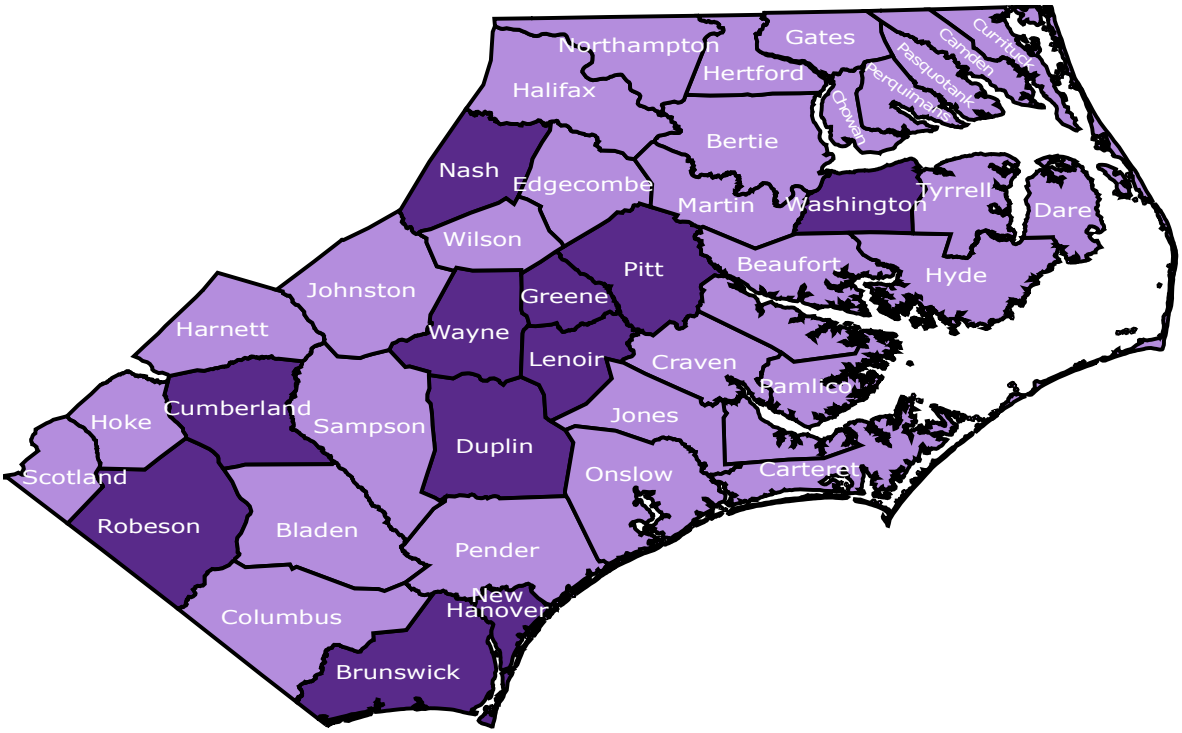

Figure 6. Practice counties of interview participants

Four (30.77%) participants described themselves as very familiar with buprenorphine, seven (53.85%) were familiar, and two (15.39%) were not very familiar. Respondents reported their primary sources of information about buprenorphine as continuing education activities (n=8, 61.54%), professional journals (n=5, 38.46%), colleagues (n=3, 23.08%), their NP degree program (n=2, 15.39%), and previous work experiences (n=3, 23.08%). Of those participants without a buprenorphine prescribing waiver, one (12.50%) was very unwilling to obtain a

waiver, three (37.50%) were somewhat unwilling, one (12.50%) was somewhat willing, and three (37.50%) were very willing.

Thematic Content Analysis and Theoretical Domains

Using thematic content analysis as described in Chapter 3, themes and subthemes in the interview transcripts were identified. Subthemes were then mapped to the theoretical domains framework (TDF). Eight of the 14 TDF domains were found to be relevant to this study: beliefs about capabilities, beliefs about consequences, emotion, environmental context and resources, skills, reinforcement, social influences, and social and professional role identity. Table 9 presents themes, subthemes, illustrative quotations, and the TDF domain(s) mapped to each subtheme.

Table 9

Themes, Subthemes, Illustrative Quotations, and Theoretical Domains

Theme Subtheme	Illustrative quotation(s)	Theoretical domain
Education & Training		
Experiential learning	"In watching his practice . . . I sort of like got to see what worked and what didn't work."	Environmental context & resources
Perceived capability	"I don't know that I would have the knowledge base to be able to treat with that [buprenorphine]."	Beliefs about capabilities
OUD Treatment Challenges		
Diversion	"You know people are selling it [buprenorphine] on the streets."	Beliefs about consequences
Social complexity	"Being able to pay for it – in various ways, it could be paying for the transportation, it could be paying for the treatment."	Beliefs about consequences
	"I know nurses, I know lawyers, I mean I know doctors who have been on Suboxone. They don't want to just go to a regular place and everybody see them."	
OUD Treatment Strategies		
Being flexible & fostering trust	"Yeah so it's a lot of work but my results show that if you kind of nurture them [patients] a little bit it's very successful, they stick with it."	Skills
Providing resources	"So, what I did is I made an agreement with one of the pharmacies . . . so anybody who comes into my clinic now who wants to do the Suboxone they have to agree to have their Suboxone delivered to me initially. So initially I will give them two days and they have to come back."	Skills
Separating patient populations	"You don't want to mix and mingle."	Skills

Setting boundaries	"So after they figured out they weren't going to bully me or I wasn't scared or wasn't going to back down then the attitude changed."	Skills
<u>Policy Environment</u>		
Legal concerns	"There's a lot of damn liability. You know there's a lot of liability because nowadays if something happens, you're writing somebody's Suboxone and for whatever reason you didn't do a drug test and that person is taking a benzo [benzodiazepine] and they die, guess who they're going to come after?"	Beliefs about consequences
Waiver requirements	"Ok, why are there so many freaking steps? . . . . Just to get the X onto my DEA?"	Environmental context & resources
<u>Provider Motivation</u>		
Reward	"Women that got their children back. I think that's huge. Women *got their children back*."	Reinforcement
Role identity	"Suboxone is a specialty. It is a pain management, addiction management specialty. People go to school 7, 8 years for that."	Social and professional role identity
	"And if nurse practitioners really want to make a difference [they should prescribe buprenorphine], and I think it's up to us because we work with the underserved more than the doctors."	
<u>Resource Environment</u>		
Access to specialty support	"The number of therapists in the area is *one* [laughs]. And that therapist does not have a specialty in substance use disorder."	Environmental context & resources
Ancillary staff support	"Very rarely would you have a receptionist in a primary care office who knows what that [buprenorphine induction] is."	Environmental context & resources
	"When I walk in to see the patient, if you have a UTI, I already know you have a UTI. I already know you got strep. I already know you got the flu."	
Mentorship	"I think it would be good to have an individual who could kind of serve as a mentor. Somebody I could call if I had questions."	Environmental context & resources

Reimbursement	"If you are primarily doing primary care and you're focused on those numbers – 25 patients a day – you can't do Suboxone."	Environmental context & resources
Burnout	"Primary care people are overwhelmed and already have enough to do."	Emotion
<u>Stigma</u>		
Medication stigma	"There's a stigma out there that it's drug to drug. They [providers] think it's just one opioid for another."	Social influences
	"It's like a two edged sword. You put someone on it but when do you get them off?"	Beliefs about consequences
Provider to patient stigma	"This is a rough bunch."	Social influences
	"I'm sure you've worked a lot of substance abuse people – they are like, they are a trip. You've got to follow them like a hawk. They will lie and lie."	
Provider to provider stigma	"Those *drug people* are taking a lot of your time."	Social influences

Note: OUD=Opioid Use Disorder

Buprenorphine Prescribing Barriers and Facilitators

After mapping the inductively derived subthemes to the TDF domains, belief statements for each subtheme within each domain were generated. These statements capture the essence of the beliefs underlying the themes and help clarify whether subthemes are barriers, facilitators, or both. Table 10 presents the theoretical domains; subthemes and belief statements; and barrier, facilitator, or combination designation. Barriers were found in six of the eight domains relevant to this study: beliefs about consequences, beliefs about capabilities, emotion, environmental context and resources, social influences, and social and professional role identity. Facilitators were found in four of the eight domains relevant to this study: environmental context and resources, reinforcement, skills, and social and professional role identity.

Table 10

Theoretical Domains, Subthemes, and Belief Statements Designated as Barriers or Facilitators

Theoretical Domain	Subtheme: Belief Statement	Barrier, Facilitator, or Both
Beliefs about capabilities	Perceived capability: *Prescribing buprenorphine requires competencies I do not have.*	Barrier
Beliefs about consequences	Diversion: *Prescribing buprenorphine contributes to medication diversion.*	Barrier
	Legal concerns: *Prescribing buprenorphine places practitioners at high risk for liability.*	Barrier
	Medication stigma: *Prescribing buprenorphine contributes to opioid use disorder.*	Barrier
	Social complexity: *Patients' socio-economic situations inhibit buprenorphine prescribing.*	Barrier
Emotion	Burnout: *I am too overwhelmed to prescribe buprenorphine for opioid use disorder.*	Barrier
Environmental context and resources	Access to specialty support: *Providers lack access to specialty referral resources needed to support buprenorphine prescribing.*	Barrier

	Ancillary staff support: *Staff lacks expertise to support buprenorphine prescribing (barrier).* OR *Staff has expertise to support buprenorphine prescribing (facilitator).*	Barrier or Facilitator
	Experiential learning: *Experiential learning develops prescribing skills.*	Facilitator
	Mentorship: *Mentors would facilitate prescribing by serving as a resource.*	Facilitator
	Reimbursement: *Reimbursement is not sufficient to sustain profitability when prescribing buprenorphine.*	Barrier
	Waiver requirements: *Waiver requirements are burdensome.*	Barrier
Reinforcement	Reward: *Patient success on buprenorphine reinforces prescribing.*	Facilitator
Skills	Being flexible and fostering trust: *Being flexible and fostering trust support prescribing.*	Facilitator
	Providing resources: *Providing resources supports prescribing.*	Facilitator
	Separating patient populations: *Separating patient populations supports prescribing.*	Facilitator
	Setting boundaries: *Setting boundaries supports prescribing.*	Facilitator
Social influences	Medication stigma: *Buprenorphine is an opioid replacement not an opioid use disorder treatment.*	Barrier
	Provider to patient stigma: *Individuals with opioid use disorder are undesirable patients who do not want or do not deserve treatment.*	Barrier
	Provider to provider stigma: *Providers treating opioid use disorder are engaging in less valuable work.*	Barrier
Social and professional role identity	Role identity: *Prescribing buprenorphine in primary care settings is outside of the role of the nurse practitioner (barrier).* OR *Prescribing buprenorphine in primary care settings is within the role of the nurse practitioner (facilitator).*	Barrier or Facilitator

Identified TDF Barriers

Analysis found barriers to buprenorphine prescribing across six TDF domains: *beliefs about capabilities, beliefs about consequences, emotion, environmental context and resources, social influences, and social and professional role identity*. In this section, barriers are discussed in relation to these domains.

Beliefs about capability. The subtheme perceived capability was identified as a barrier in the beliefs about capability domain. This domain refers to the "acceptance of the truth, reality or validity about an ability, talent, or facility that a person can put to constructive use" (Cane, O'Connor, & Michie, 2012, p. 13). Participants perceived that they did not have the capability to prescribe buprenorphine for OUD. One non-waivered participant stated, "I don't know that I would have the knowledge base to be able to treat with that [buprenorphine]." Another non-waivered participant explained, "a couple of nurse practitioners [in her practice] are talking about doing psych mental health nurse practitioner . . . and so if they go that sort of training they would be prepared to handle that [prescribe buprenorphine for OUD]." A waivered prescriber who had never prescribed the medication stated, "It's more than just writing a script – you have to be knowledgeable about what you're doing or else you are going to hurt somebody."

Beliefs about consequences. The beliefs about consequences domain refers to the "acceptance of the truth, reality, or validity about outcomes of a behavior in a given situation" (Cane et al., 2012, p. 13). Barriers identified within this domain spanned four subthemes: diversion, legal concerns, medication stigma, and social complexity.

Diversion. Participants believed that prescribing buprenorphine would result in buprenorphine diversion. One waivered participant who had not prescribed the medication explained, "Because, Subutex, Suboxone, buprenorphine, I mean people can be addicted to that.

There's a lot of . . umm . . diversion – I mean they [patients] are selling it!" A non-waivered participant referenced buprenorphine diversion, stating "You've got to follow them [individuals living with OUD] like a hawk." A waivered and prescribing participant explained that she monitored patients for diversion closely because, "the street value for Suboxone is higher than that of any other drug."

Legal concerns. Similarly, participants expressed the perception that buprenorphine prescribing places providers at risk for litigation. A waivered provider who was not currently prescribing buprenorphine stated, "so much documentation is required, you have to make sure you're getting the drug screens and you're checking the PMP [Prescription Monitoring Program]. I mean it's just a lot." Another non-waivered participant stated, prescribers have to be very careful about liability: "you're writing somebody's Suboxone and for whatever reason you didn't do a drug test and that person is taking a benzo [benzodiazepine] and they die – guess who they're going to come after?" Another non-waivered participant also cited liability concerns. When considering new graduate NPs prescribing she stated, "I feel like that [prescribing buprenorphine] would put a new graduate with no pain management and no addiction medicine experience at high risk of legal issues."

Medication stigma. Aspects of the medication stigma subtheme mapped to the beliefs about consequences domain. Some participants believed buprenorphine contributes to, not treats, OUD. One waivered but not actively prescribing participant explained, "Now the problem with Suboxone in the brief period that I worked with it – it's like a two-edged sword. You put someone on it but when do you get them off?" Another non-waivered provider stated that buprenorphine "feels like a contradiction in terms – prescribing an opioid to treat opioid use disorder." Some participants viewed buprenorphine as a recreational drug: "I do a lot of drug

screens and what I see in my practice is people that have it [buprenorphine] in their urine -- they are buying it off the street. They say, 'oh I'm not getting high.' But then I'm like, well then why are you taking it?" Two other participants, one waivered and prescribing and one non-waivered, stated that patients often conceal buprenorphine use from providers because they fear being stigmatized as drug addicts and denied treatment for pain. Patients who disclose they are taking buprenorphine for OUD "don't get what they need [for pain] because they [providers] think they [buprenorphine patients] are drug seeking about everything."

Social complexity. The subtheme social complexity also mapped to the beliefs about consequences domain. Non-prescribing participants voiced beliefs that their patients' socio-economic complexity precluded buprenorphine prescribing. Many participants cited patients' ability to pay for buprenorphine and treatment related expenses as a prescribing barrier. One non-waivered provider who had worked in a clinic where buprenorphine was prescribed stated, "Monetary – being able to pay for it – in various ways, it could be paying for the transportation, it could be paying for the treatment." Greater patient affluence also impacted beliefs about consequences. Participants believed that individuals with OUD who held jobs and/or had high social status (e.g., physicians, nurses, lawyers) may be reluctant to present for urine screens and follow up visits during normal clinic hours because they would fear being seen in the clinic and/or may have trouble leaving work for appointments.

Social complexity also included patient transience and patient transportation issues. Participants believed patients would not present to clinic for follow-up. One waivered participant who was not actively prescribing explained, "[patients'] phone numbers change with frequency. People move with frequency." Another non-waivered participant stated, "a lot of them [patients] are transient and they travel from one clinic to the other and I never see them

again. And sometimes it's a year or two before they come back by here." Another waivered participant who did not prescribe reported patient transportation as a substantial prescribing barrier: "the area is a rural population. So they don't have buses. So a lot of patients just in general they miss appointments . . . they couldn't get a ride or they didn't have enough money for a cab or an Uber."

Emotion. The subtheme burnout mapped to the emotion domain of the TDF and was identified as a prescribing barrier. Emotion is defined as "a complex reaction pattern involving experiential, behavioural, and physiological elements, by which the individual attempts to deal with a personally significant matter or event" (Cane et al., 2012, p. 14). NPs working in primary care settings expressed reluctance to add an additional role to their already overwhelmed clinic life. They described fast-paced working environments that afforded little time to manage complex patients. A non-waivered participant stated, "primary care people are overwhelmed and already have enough to do." A waivered provider who was not actively prescribing said, "it's [prescribing buprenorphine] just a lot." Another non-waivered participant stated:

> time is the biggest issue and I think that is a reflection of primary care in general and why a lot of providers want to get out of primary care. You know if I am expected to see a patient every 15 minutes and address X amount of problems that is hard enough but then you add in psychological issues which take a long time, you have to ask a lot of questions, do a lot of work for it, chronic pain, same thing. Substance use disorder, same thing. It's just there's a lot to unpack in a short period of time. I don't think anybody wants to throw medication at somebody and hope for the best. I kind of feel like that is kind of what we are put in the position of doing.

Environmental context and resources. Barriers in the environmental context and resources domain included access to specialty support, ancillary staff support, reimbursement, and waiver requirements. This domain refers to, "Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behavior" (Cane et al., 2012, p. 14).

*Access to specialty support***.** Access to specialty support refers to participants' view that they had insufficient referral support. Participants were primarily concerned with access to substance use therapists. One waivered prescriber who was not currently prescribing explained, "Yeah, I think first having the right kind of therapy is a problem. You know, having a substance abuse counselor." Another non-waivered provider shared that the nearest counselor was more than 25 miles away: "And to get to my clinic they [patients] probably rode their bike. So to have them go 25 miles away – well, that's just not possible for a lot of them." A waivered, prescribing participant stated, "The biggest problem I had in the beginning to do the Suboxone was the therapy component that is required." Another non-waivered provider stated, "there is such a push to get it [buprenorphine] out to primary care but I think you have to have a relationship with some sort of counseling system so that your patient – I mean – you want them to be successful." A non-waivered participant who practiced with a substance use counselor provided insight into therapy access issues. The practice routinely refused therapy referrals for buprenorphine patients. When a patient was referred, "she [the substance use therapist] is like, oooohhhh no. NO. NO. NO. We don't do Suboxone here and we are NOT doing your therapy here . . .and she gets rid of them [the patients]."

Ancillary staff support. Non-prescribing participants viewed strong ancillary staff support as essential for buprenorphine prescribing and cited lack of such staff as a prescribing

barrier. Participants expressed that staff need specialized knowledge to triage buprenorphine patients. One non-waivered participant who had worked with a physician who prescribed buprenorphine stated, "So a person coming in to be started on Methadone or Suboxone- it's called induction. And very rarely would you have a receptionist in a primary care office who knows what that is." Buprenorphine patients were perceived as needy and thus demanding of staff time. One waivered provider who was not currently prescribing buprenorphine but who had worked in a clinic where buprenorphine was prescribed stated, "they [buprenorphine patients] are just so needy . . . maybe they are running out [of medication], maybe they've had a bad day, or just, you name it, they are calling for whatever reason, they just call to the office a lot."

*Reimbursement***.** Participants identified service payment as a barrier to buprenorphine prescribing. Reimbursement is tied to time, and participants described having to see patients quickly to maintain profitability. One participant explained, "the time consumption of this [prescribing buprenorphine] is not conducive to running something that is really, really profitable." Another participant stated that those prescribing buprenorphine in primary care settings, "don't have enough time and you [they] don't make enough money." Another participant stated that in primary care settings, "you have to push them [patients] through, push them through, you've got 15 minutes, in and out in and out." She elaborated, "you're focused on those numbers – 25 patients a day – you can't do Suboxone."

*Waiver requirements***.** Waiver requirements were viewed as a barrier. One non-waivered provider who expressed she was very willing to obtain a waiver and who had worked with a waivered physician expressed frustration about the mandatory 24-hour waiver training. She stated, "Twenty-four hours. So that's three solid days of me sitting in front of a computer that I don't have right now." Another waivered provider stated, "Ok, why are there so many freaking

steps? . . . . Just to get the X onto my DEA. And finally I am able to take care of these patients. Holy crap." Several participants discussed challenges with finding a waivered collaborating physician, a requirement in NC. One stated, "Because if you are a NP who wants to prescribe Suboxone you have to have a collaborating physician who wants to do that also and unfortunately a lot of physicians don't want to do it [prescribe buprenorphine]." Some NPs have a second physician as their buprenorphine collaborating physician. In such instances, as one participant explained, "now as a nurse practitioner you're paying two collaborating physicians. Which in my opinion is ridiculous."

Social influences. Social influences posed buprenorphine prescribing barriers. The social influences domain is described as "those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviors" (Cane et al., 2012, p. 14). In this study, social influences included medication stigma, provider to patient stigma, and provider to provider stigma.

Medication stigma. Analysis identified multi-layered stigmas toward buprenorphine. Some doubted the efficacy of buprenorphine treatment for opioid use disorder. One NP described an interaction with a Suboxone drug representative, whom she told, "I don't believe in your crappy drug, so don't try to talk to me about it." A waivered participant who did not prescribe stated:

> It feels like to me you are trading one bad decision for another. And, of course, you can say the lesser of the two evils is the Suboxone but still they are still on Suboxone and it's still a narcotic in itself. I don't know. I don't think it's the answer.

Participants also expressed the perception that buprenorphine is an opioid substitute. A prescribing participant explained, "There's a stigma out there that it's [buprenorphine] drug to

drug. They [providers] think it's just one opioid for another. It's not." She noted that some patients also express this stigma and resist buprenorphine treatment for fear of "addiction" to buprenorphine. She stated, "I explain [to patients] if you had high blood pressure, if you had diabetes, if you had thyroid issues, would you *ever* say to me – I am only going to take the medicine for two years? I say it's the same thing. We are treating a brain chemical that predisposes you to be addicted to substances." A non-waivered participant who had worked in a pain management clinic stated, "there's such a negative connotation to the medicine that they [patients] are scared to take it [buprenorphine] but will take oxycodone and other opioids everyday."

Medication stigma also included participants' view that buprenorphine is a recreational drug: "I do a lot of drug screens and what I see in my practice is people that have it [buprenorphine] in their urine -- they are buying it off the street. They say, 'oh I'm not getting high.' But then I'm like, well then why are you taking it?" Two other participants, one waivered and one non-waivered, stated that patients often conceal buprenorphine use from providers because they fear being stigmatized as drug addicts and thus denied treatment for pain. One responded that in emergency departments buprenorphine patients "don't get what they need because they [providers] think they [patients] are drug seeking about everything. So I think generally society just has a certain perception and I think buprenorphine suffers for that."

Provider to patient stigma. Provider to patient stigma refers to stigma providers expressed or had encountered toward patients with opioid use disorder. One non-waivered provider stated, "you know this is a rough bunch." Another echoed, "substance abuse people- they are like, they are a trip. You've got to follow them like a hawk. They will lie and lie." Another shared that fellow providers express stigma about opioid use disorder patients, stating

some providers have "a barrier in the sense of, I mean it sounds bad, but I just don't want to have to deal with these people." A non-waivered participant explained that she tries to help colleagues address their own stigma toward patients with OUD: "some people have been ED nurses and they know all about drug seeking behavior and things like that and they kind of get cynical. And I would just say don't be that person and if you are that person try to find a way around it." A prescribing participant shared her patients' accounts of stigma: "my patients report that even pharmacists are nasty to them because they come for buprenorphine, even though it's a treatment drug!" Another, non-waivered participant stated, "yeah, there is definitely a stigma with patients that are on it [buprenorphine]. Oh, this patient's just a drug addict." Additionally, providers perceived that patients with OUD are not interested in treatment: "you know they don't want to get off of their opioid, they don't want to get off their benzo [benzodiazepine]. So they are not really interested in getting off." Yet both prescribing participants described having a full patient panel without advertising. One shared, "I didn't solicit a single patient."

*Provider to provider stigma***.** Provider to provider stigma refers to negative views providers experienced themselves or expressed toward other providers. One prescribing participant explained that she had experienced stigma: "so she [a colleague] comes to me and she says, 'you know, um boy, those *drug people* are taking a lot of your time.' That's what she said to me, the doc. She *said that* to me!" Many providers who were interviewed expressed biases toward those who prescribe buprenorphine. A non-waivered nurse practitioner interrupted the interview to ask, "Well, first of all I'm interested in the people that prescribe Suboxone that you have met. They are nurse practitioners? Are they working at an agency that's kind of forcing them to do it?" Another waivered participant who was not prescribing stated, "It just seems like everybody's trying to do that [prescribe buprenorphine] now. It's a huge money market. I don't

know what the answer to that is . . . but it bothers me to know that they are doing it. And it's become a lucrative business."

Social and professional role identity. This domain refers to "a coherent set of behaviors and displayed personal qualities of an individual in a social or work setting" (Cane et al., 2012, p. 13). Role identity captured participants' perceptions that treating OUD with buprenorphine is not in the primary care NP's scope. One NP stated, "substance use disorder is a piece that I would want to farm out to someone else." Another participant stated, "there are a couple of NPs who are talking about doing psych mental health NP. . . And so if they got that sort of training they would be prepared to handle that [buprenorphine prescribing]." One participant echoed, "Suboxone is a specialty. It is a pain management, addiction management specialty. People go to school seven, eight years for that."

Identified TDF Facilitators

Analysis found facilitators to buprenorphine prescribing across four TDF domains: *environmental context and resources, reinforcement, skills, and social and professional role identity*. In this section, facilitators are discussed in relation to these domains.

Environmental Context and Resources. Buprenorphine prescribing facilitators were identified in the environmental context and resources domain and included ancillary staff support, experiential learning, and mentorship.

Ancillary staff support. Both waivered prescribers described their ancillary staff as critical to supporting buprenorphine prescribing. In one clinic, ancillary staff assisted the provider with refills, which the provider described as more burdensome than refilling other medication. Patients were often given short duration, 5-14-day, prescriptions to facilitate follow up, discourage diversion, and/or accommodate patients who could not afford to fill a 30-day

prescription at one time. Ancillary staff were critical to managing refills, as patients could experience opioid withdraw and potentially relapse if they experienced refill delays.

In both prescribers' clinics, ancillary staff provided support in managing diversion. Ancillary staff flagged buprenorphine patients for urine screens. One prescriber explained that her staff covertly monitored patient diversion: "They [patients] think you don't know what's going on. But you know, the lady who works my front desk lives over there in the community so she knows a lot of the people." The same participant, who treated buprenorphine patients during designated times, described the role of staff in supporting "walk-ins," patients who presented with acute medical needs during the provider's designated buprenorphine patient clinics. She stated, "my office staff will do as much as they can . . . so when I walk in to see the patient if you have a UTI, I already know you have a UTI. I already know you got strep."

Experiential learning. Experiential learning was also a prescribing facilitator identified in the environmental context and resources domain. The participants who prescribed buprenorphine prepared for prescribing by seeking additional work experiences. One worked with a waivered provider in a private clinic, and the other worked with buprenorphine patients in a rehabilitation facility. One prescriber explained, "in watching his practice . . . I sort of like got to see what worked and what didn't work. What patients were successful and what patients weren't successful."

Mentorship. Finally, mentorship was a facilitator identified in the environmental context and resources domain. Participants perceived a mentor could fill knowledge gaps related to buprenorphine prescribing. One stated, "I think it would be good to have an individual who could kind of serve as a mentor. Somebody I could call if I had questions." Another stated, "I think the 24 hours [required training] is good, but I would need someone to call in real-time."

One of the waivered providers who did not actively prescribe explained that she serves as a prescribing mentor: "so he [a waivered physician assistant] will call me and ask me [about buprenorphine] even though I'm not actively prescribing."

Reinforcement. The reinforcement domain was identified as a strong prescribing facilitator. This domain refers to "the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus" (Cane et al., 2012). While only two waivered and prescribing participants were interviewed, both spoke at length and passionately about the personal satisfaction and gratification they found in treating OUD with buprenorphine. One prescriber stated:

> The faces have filled out, you know, a lot of them have bad dental issues – I mean, it's like a complete change once they are stable in the program, they put perfume on, they are like a different person. A lot of these guys, they come in *scrawny* and just looking horrible for a few appointments. And then when they come back, now they've been in the program 6 or 8 months, I don't see them for a month, and they come in and I'm totally surprised at how well they look, they are eating better, they are happier, there is not that stress, they are on the right medication. So it's a very gratifying thing to do.

The other prescribing participant similarly described receiving gratification from prescribing buprenorphine: "Well, it's a community thing. It's a level of community. So, yeah, for me this goes a little bit deep."

Skills. The skills domain of the TDF refers to "an ability or proficiency acquired through practice" (Cane et al., 2012). Using skills to manage the challenges of treating individuals living with OUD emerged as a prescribing facilitator. These skills included being flexible and fostering trust, providing resources, separating patient populations, and setting boundaries.

*Being flexible and fostering trust***.** Participants emphasized the importance of being flexible with patients experiencing OUD while maintaining boundaries. While boundary setting was an important prescribing facilitator, so was flexibility. One prescribing participant stated, "you can't punish . . . some programs dump them . . . they just kick them out!" She elaborated, "and when you punish them you take a risk of them dying, you know?" She reflected that the patients experience a lot of instability and that instability must be anticipated and accommodated: "the [phone] numbers keep changing [laughs] and like, the next time, oh this is John, and I'm like - I thought I had John's number - they – everything is so unstable, even phone numbers, you know? So, I think you have to be aware of that, make accommodations for them." The importance of flexibility was also discussed with relapse. Both participants who prescribed buprenorphine discussed the importance of not removing patients who relapse from buprenorphine programs but instead initiating closer monitoring.

Flexibility built trust between the provider and the patient and prescribing providers identified this flexibility and trust a prescribing facilitator that fostered patient success. A prescribing participant described success with patients who had relapsed repeatedly in other treatment programs. She stated that patients report, "I'm treated like a real person, I'm not treated like an addict." This prescriber credited treatment success to developing a trusting relationship between patient and provider: "just somebody who cares about them, because there is really no addiction therapy per se to deal with the addiction. It's about brain chemicals, you know what I mean?" The other prescribing participant stated, when asked about whether she had built trust between her and her patients, said, "Yes, they know I will do what I can for them."

*Providing resources***.** Providing resources was a skill that facilitated prescribing. One participant stated that her organization had created a patient transportation program in

anticipation of initiating buprenorphine prescribing. Another participant held buprenorphine prescriptions at her office in part to prevent patients from having to travel to a pharmacy. In response to stigma, neither waivered, prescribing participants routinely referred patients to retail pharmacies to fill their prescriptions. One provider held the medication in her office and patients purchased it directly from her. The other advised patients to purchase medication from a pharmacy located inside a drug treatment center, stating that the medication was cheaper there and patients were treated with respect.

Separating patient populations. Another skill was providing separate clinic hours to facilitate prescribing, to make both patients receiving buprenorphine comfortable and patients not receiving the therapy comfortable. One participant explained, "One place was doing separate hours because a lot of people don't want people to know they have a drug problem. They are embarrassed. So that person who's working. . . I mean, I know nurses, I know lawyers, I mean I know doctors who have been on Suboxone. They don't want to just go to a regular place and everybody see them. So that sometimes is a barrier." A participant prescriber held separate office hours for buprenorphine patients, stating: "Yeah, so you don't want to mix and mingle, ok."

Setting boundaries. Many participants described setting boundaries as an important part of buprenorphine prescribing. One prescribing participant explained:

> And they come in there and they're loud and I say you can either calm yourself down or I can call the police -- it makes me no difference. And yes I have called the police and had people removed out of my clinic. And that happened to me maybe my first two to three weeks of doing this [prescribing buprenorphine] and every week I found myself having to call the police because somebody was in there saying what I got to do for them and I was

like I don't have to do anything for you. I really, really don't. You know so after they figured out they weren't going to bully me or I wasn't scared or wasn't going to back down then the attitude changed.

This same provider further stated that "word travelled, and it travelled fast" in reference to upholding her efforts to set boundaries to help her patients be successful with treatment. Both waivered participants described the importance of urine drug screens to set boundaries with patients.

Social and professional role identity. Analysis found polarized views on whether prescribing buprenorphine was within the role of the NP working in primary care settings. While some felt strongly that buprenorphine prescribing was not the role of the NP in the primary care setting, other participants felt strong it was part of the NP role. One participant stated, "and if nurse practitioners really want to make a difference [in the opioid crisis], and I think it's up to us because we work with the underserved more than the doctors."

Summary

This chapter described results from the screening questionnaire, described the characteristics of the screening pool, and described interview participants' characteristics. Themes and subthemes identified in the interview transcripts were presented and mapped to the TDF domains. Barriers and facilitators to buprenorphine prescribing were identified and described in the content of the TDF domains.

Chapter 5: Discussion and Conclusions

The purpose of this study was to describe barriers and facilitators to buprenorphine prescribing among nurse practitioners (NPs) working in primary care settings in eastern North Carolina (NC). The theoretical domains framework (TDF) guided the study and informed data collection and analysis (Atkins et al., 2017; Cane, O'Connor, & Michie, 2012; Michie et al., 2005). NPs were interviewed regarding buprenorphine prescribing and inductively derived interview subthemes were deductively mapped to the TDF domains. In this chapter, the theoretical domains and associated barriers and facilitators relevant to this study are discussed in light of the existing literature on buprenorphine prescribing, opioid use disorder (OUD), and the current opioid crisis. Strengths and limitations of the study are considered. The chapter concludes with a discussion of implications for research, policy, and education and practice.

The 2016 Comprehensive Addiction and Recovery Act (CARA) granted NPs the right to apply for buprenorphine prescribing privileges. Researchers studying the opioid crisis have been hopeful that NPs could address gaps in buprenorphine access (Andrilla, Patterson, Moore, Coulthard, & Larson, 2018). However, recent data suggest that, nationally, just over 3% of NPs have buprenorphine prescribing waivers (Spetz, Toretsky, Chapman, Phoenix, & Tierney, 2019). Furthermore, not all waivered providers prescribe buprenorphine (American Society of Addiction Medicine [ASAM], 2018; Andrilla, Coulthard, & Patterson, 2018). Because the education and regulation of NPs differs from other providers, it was important to understand whether NPs perceived unique buprenorphine prescribing barriers and facilitators. Considering buprenorphine prescribing within the TDF, a comprehensive framework of behavior change, laid theoretical groundwork for developing behavior change interventions to support buprenorphine prescribing.

Barriers

Environmental context and resources

NP prescribing barriers identified in the environmental context and resources domain paralleled barriers identified in the literature on physician buprenorphine prescribing. Consistent with this study's findings, studies of physician prescribing found waiver requirements posed prescribing barriers (Mendoza, Rivera-Cabrero, & Hansen, 2016) and found reimbursement presented a prescribing barrier (Andraka-Christou & Capone, 2018; Andrilla, Coulthard, & Larson, 2017; Andrilla, Moore, & Patterson, 2019; Huhn & Dunn, 2017). Also, like NPs in this study, physicians reported that a lack of access to specialty support inhibited prescribing (Arfken, Johanson, di Menza, & Schuster, 2010; Fiellin, 2007; Green et al., 2014; Hutchinson, Catlin, Andrilla, Baldwin, & Rosenblatt, 2014; Netherland et al., 2009; Olsen, Bass, McCaul, Steinwachs, 2004). Physicians also identified lack of ancillary staff as a prescribing barrier (Green et al., 2014; Walley, 2008).

While studies of physician prescribing identified similar environmental context and resources domain barriers, these barriers may be more profound among NPs. Reimbursement was a barrier for both groups, but physician reimbursement for services exceeds NP reimbursement by 15% (MedPAC, 2019). Both physicians and NPs cited waiver training as a prescribing barrier, but NPs are required to complete 24 hours of training compared to physicians' eight hours (Substance Abuse and Mental Health Services Administration [SAMSHA], 2019d). Though not a theme, this discrepancy between physician and NP training requirements was noted as an area of concern by one non-waivered participant who expressed strong willingness to obtain a waiver. Additionally, NPs practicing in a regulatory environment like NC, which requires NPs to work with a collaborating physician, face a unique waiver

barrier. NPs who wish to prescribe buprenorphine must identify a waivered physician willing to collaborate with the NP prescriber (Fornili & Fogger, 2017; Moore, 2019). Identifying such a collaborator may prove difficult, as nationally only 5.6% of physicians have buprenorphine prescribing waivers (Spetz et al., 2019). Furthermore, if the physician is not the NP's primary collaborating physician, the NP must employ an additional collaborating physician, which can cost several thousand dollars a year (Buppert, 2019). This finding supports a recent study that identified fewer buprenorphine waivered NPs in states that require physician supervision (Spetz et al., 2019).

Social influences

Barriers within the social influences domain were striking in this study. NPs expressed, had witnessed, or had experienced negative attitudes toward buprenorphine, individuals living with OUD, and providers who prescribe buprenorphine for OUD. The use of pejorative language to describe patients with substance use disorders suggested group norms around the stigmatization of this vulnerable group. Stigma toward buprenorphine, patients with OUD, and buprenorphine prescribers were also barriers identified in the literature on physician prescribing (Andraka-Christou & Capone, 2018; Green et al., 2014; Mendoza et al, 2016; Olsen et al., 2004). These attitudes among NPs and physicians reflect broader stigma toward individuals living with substance use disorders, which has been well documented among health care professionals and the general public (Madden, 2019; Mendiola, Galetto, & Fingerhood, 2018; Yang, Wong, Grivel, & Hasin, 2017).

Beliefs about consequences

Medication diversion was a barrier within the beliefs about consequences domain that was also described in the physician literature (Andraka-Christou & Capone, 2017; Mendoza et

al., 2016). The persistence of this barrier is troubling because buprenorphine diversion is attributed to insufficient prescribing capacity and buprenorphine is usually diverted to treat opioid withdrawal not to achieve a "high" (Carroll, Rich, & Green, 2018; Cicero, Ellis, Chilcoat, 2018; Schuman-Oliver et al., 2013). Narratives from NPs interviewed in this study offer insight into why patients conceal buprenorphine use and divert buprenorphine. One participant explained that many patients initiate their own detoxification with diverted "street" buprenorphine because they cannot find a buprenorphine prescriber. This statement is consistent with a study that found a positive association between seeking treatment for OUD and using diverted buprenorphine (Carroll, Rich, & Green, 2018). Other participants reported patients conceal taking buprenorphine from providers because they fear being stigmatized and denied treatment for pain. Recent studies of physician prescribing found that those physicians who prescribe buprenorphine are less likely to express concern about medication diversion (Huhn & Dunn, 2017; Kermack, Flanner, Tofighi, McNeely, & Lee, 2017). Similarly, in this study, both participants who prescribed buprenorphine employed mechanisms to detect and mitigate diversion but did not identify diversion as a prescribing barrier.

Consistent with findings in this study, legal concerns and social complexity have been identified as prescribing barriers for physicians (Andraka-Christou & Capone, 2018; Andrilla, Coulthard, & Larson, 2017; Green et al., 2014; Mendoza et al., 2016). One study of physicians found that those who had never prescribed buprenorphine or who no longer prescribed buprenorphine were more likely to identify Drug Enforcement Agency (DEA) oversight as a barrier than those actively prescribing the medication. In this study, neither of the waivered and actively prescribing participants identified legal concerns or DEA intrusion as a prescribing

barrier. Physicians have also identified patient socio-economic barriers and complexity as prescribing barriers (Andraka-Christou & Capone, 2018), as found in this study.

Medication stigma was another barrier identified in the beliefs about consequences domain. Some participants believed treatment for OUD with buprenorphine was ineffective and contributed to OUD. Studies of physician barriers echoed these concerns, with physicians expressing skepticism about buprenorphine treatment efficacy (Green et al., 2014; Louie, Assefa, & McGovern, 2019). Pharmacists have also been found to doubt the drug's efficacy (Haelle, 2019). A review of literature about physician prescribing found that not prescribing buprenorphine and having limited knowledge about the medication contributed to providers' views that the medication is ineffective (Louie et al., 2019). However, prescribing buprenorphine was associated with a change in providers' beliefs about the medication's efficacy (Louie et al., 2019). Similarly, in this study, the two waivered and actively prescribing participants did not express the belief that buprenorphine is ineffective.

Other TDF barriers

In this study, barriers in the beliefs about capabilities domain included NPs' perceptions that they did not have the capability to prescribe buprenorphine. Physicians expressed similar sentiments about lack of preparedness to treat individuals with OUD in primary care settings (Andraka-Christou & Capone, 2018). This study also found a barrier in the emotion domain related to experiencing burnout in the rushed primary care environment, where providers must allot 10 to 15 minutes per patient to maintain profitability. This finding was not represented in the physician literature specifically on buprenorphine prescribing. However, physicians have identified caring for OUD in primary care settings as requiring too much time to support profitability (Andraka-Christou & Capone, 2018; Andrilla, Coulthard, & Larson, 2017; Andrilla,

Moore, & Patterson, 2019; Huhn & Dunn, 2017). Moreover, while not specifically linked to treating individuals experiencing OUD with buprenorphine, studies have identified burnout among physicians managing complex medical and psychological diagnoses in primary care settings (Whitebird et al., 2017). Additional examination of the literature on physician prescribing may identify parallels between the experiences of both NPs and physicians who are considering prescribing buprenorphine in primary care settings. The barrier social and professional role identity found in this study also emerged in studies of physicians who did not believe OUD management with medications such as buprenorphine was within the role of the primary care physician (Barry et al., 2009; Green et al., 2017; Olsen et al., 2019).

Facilitators

Environmental context and resources

Facilitators identified within the environmental context and resources domain in this study included ancillary staff support, experiential learning, and mentorship. Like NPs, physicians identified strong ancillary staff as a prescribing facilitator but also linked such staff to decreased reimbursement barriers (Green et al., 2014; Walley, 2008). The experiential learning facilitator was not found in literature on physician prescribing, though physicians, like NPs, doubted their preparedness to safely and effectively prescribe buprenorphine (Andraka-Christou & Capone, 2018). Mentorship was also a facilitator identified in the literature on physician prescribing (Huhn & Dunn, 2017). SAMHSA sponsors a national mentoring program to link experienced with novice buprenorphine prescribers (Eagen et al., 2010; Providers Clinical Support System, n.d.). Huhn and Dunn (2017) found that many physicians were unaware of the mentoring program. Whether NPs are aware of the mentoring program is unknown but should be explored.

Skills

Setting boundaries was identified as a facilitator in the skills domain in this study and in physician studies. Researchers considering physician prescribing have suggested boundary setting may be more important in rural areas where word travels fast and inconsistent or lackadaisical providers are quickly identified by those who seek buprenorphine prescriptions for illegitimate purposes (Andrilla, Moore, & Patterson, 2019). This sentiment was reflected by the prescribers in this study, who described boundary setting as contributing to individual patient treatment success and protecting the provider and practice from individuals seeking buprenorphine for suspicious reasons.

Separating patient populations and providing resources were also facilitators found within the skills domain of this study and in the literature on facilitators to physician prescribing (Andrilla, Moore, & Patterson, 2019). Creating a relationship with a pharmacy emerged as a theme in Andrilla, Moore, and Patterson's (2019) qualitative study of 43 physicians who prescribed buprenorphine in rural areas. Both prescribing participants interviewed for this study stressed the importance of providing buprenorphine for patients or referring patients to pharmacies that specialize in substance use treatment. Scholars have suggested that barriers related to pharmacists' stigmatization of patient with OUD have not received sufficient consideration (Haelle, 2019). In a forthcoming study described in a published research note, scholars identified pharmacist and pharmacy staff stigma as prescribing barriers and found that many rural pharmacies do not stock buprenorphine or buprenorphine-naloxone combinations due to pharmacists' doubts in the drug's efficacy and stigma toward patients with OUD (Haelle, 2019). Thus, this and other studies suggest providers must develop skills to overcome barriers posed by other health care providers' stigmatizing attitudes.

Finally, within the skills domain, being flexible and fostering trust was identified as a prescribing facilitator. Flexibility is also described as a facilitator in the physician literature (Andrilla, Moore, & Patterson, 2019). Like prescribing participants in this study, physicians emphasized the importance of anticipating and accommodating relapse (flexibility) while maintaining patient boundaries. While trust was described in the physician literature, trust referred to provider trust in the patient, not reciprocal patient-provider trust (Hutchinson et al., 2019). Both prescribing participants in this study stressed the importance of building trusting relationships with their patients and ensuring their patients felt genuinely cared for. One participant attributed this reciprocal trust to her patients' successes. This finding is consistent with emerging research that highlights the importance of treating substance use disorder patients genuinely and with flexibility rather than authoritarianism (Solberg & Naden, 2020).

Other TDF facilitators

In this study, NPs expressed polarized views about whether prescribing buprenorphine was within the role of the NP in the primary care setting. Physicians have been found to be similarly divided in their views of the role of the primary care physician in prescribing buprenorphine (Green et al., 2014; Mendoza et al., 2016). Consistent with NPs who prescribed buprenorphine and were interviewed for this study, many prescribing physicians described treating OUD with buprenorphine as rewarding work (Andrilla, Moore, & Patterson, 2019; White, 2018).

Strengths and Limitations

Based on the literature review presented in Chapter 2, this is the first qualitative study to consider barriers and facilitators to buprenorphine prescribing among NPs. As such, it provides the first scholarly insight into NP perceptions of buprenorphine prescribing. This study focuses

on NPs in primary care settings in eastern NC, where residents experience significant health disparities and OUD is highly prevalent (North Carolina Department of Health and Human Services [NCDHHS], 2018a; Robert Wood Johnson Foundation, 2018). This study's narrow focus potentially limits the transferability of the findings to NPs working in other areas. However, similarities between buprenorphine prescribing barriers and facilitators identified in this study and those identified in national studies of physician prescribers in urban, rural, and mixed environments suggest results may be transferable.

Another potential limitation of this study was the small sample size, 13. Yet analysis of the research question and target sample characteristics indicated this sample held sufficient information power (Malterud, Siersma, & Guassora, 2016). Data analysis did not identify additional themes after the tenth interview and identification of no new themes was confirmed after the thirteenth interview, per the technique suggested by Francis et al. (2010). Nonetheless, interviewing additional NPs that meet this study's inclusion criteria or interviewing NPs working in other geographical areas may add nuance to the barriers and facilitators identified in this study or uncover additional barriers and facilitators. The inclusion of only two waivered and actively prescribing participants could also be identified as a limitation. Yet few NPs hold buprenorphine waivers (Spetz et al., 2019). Thus, the small number of waivered and prescribing respondents highlights the criticality of the research question.

Despite these limitations, this study extends and adds nuance to the existing literature on buprenorphine prescribing, which has focused on physician prescribing. NPs face similar, but arguably more intense, barriers in the environmental context and resources domain, including more extensive training requirements and physician oversight requirements in states like NC. This study's findings offer insight into why some patients divert buprenorphine and conceal

buprenorphine use. Findings also offer insight into emerging research into the therapeutic importance of treating patients with OUD with dignity and respect. The study also clarifies how stigma from other health care disciplines, such as pharmacy, impacts prescribing. Perhaps the strongest potential contribution of this study is its examination of the research question within the TDF. This is a well known framework for implementation problems that has been validated in multiple health care settings and with diverse health care providers (Cane et al., 2012; Michie et al., 2005). Findings from this study can be used to develop and test interventions that aim to increase access to buprenorphine prescribers.

Implications

Research

This study's use of the TDF prepares researchers for next steps in a research trajectory aimed at reducing barriers to buprenorphine prescribing and increasing access to and knowledge of prescribing facilitators. The TDF provides a theoretically-driven framework for understanding barriers and facilitators to behavior change. After relevant domains to a behavior change problem have been identified, as in this study, the TDF provides a framework to develop and test interventions. A next step would be to map the domains found to be relevant to buprenorphine prescribing to the TDF Behavior Change Wheel (Michie, Johnston, Francis, Hardeman, & Eccles, 2008; Michie, van Stralen, & West, 2011). This will allow for the development of theoretically based interventions to address the barriers and facilitators identified in this study. It would also allow for mapping and testing of previously developed interventions (Michie et al., 2008).

Before or with intervention testing, given the immediacy of the opioid crisis, researchers may also focus on interactions between domains. Domains found to be relevant to this study can

be mapped to the Capability, Opportunity, Motivation, Behavior model introduced in Chapter 1 (see Figure 1), which provides a model for exploring domain interactions. Additional analysis of the interviews conducted for this study or analysis of new interviews might elucidate domain relationships. For example, researchers might consider to what extent applying a behavior with the skills domain, like being flexible and promoting trust, affects a provider's belief about consequences. The identification of such relationships can be helpful in understanding the potential impact of interventions designed to increase buprenorphine prescribing. Such relationships can also be considered in light of physician literature. For instance, physician burnout when treating patients with complex, overlapping medical and psychological diagnoses in primary care settings has been linked to resource availability (Whitebird et al., 2017). Interventions might test to what extent providing resources identified as facilitators in the environmental context and resources domain impact NPs' perception of burnout and subsequent motivation to prescribe buprenorphine therapy to individuals living with OUD.

Policy

The Comprehensive Addiction and Recovery Act of 2016 extended the right for NPs to apply for buprenorphine prescribing privileges for five years and is scheduled for review in 2021 (Moore, 2019). Given that this is the first qualitative study of NP buprenorphine prescribing, policymakers should consider these findings when reviewing waiver application requirements. This study found that NPs were often discouraged by waiver requirements, a sentiment also reflected in studies of physician prescribing. Especially as NPs and their physician colleagues perceived the required, online training as burdensome, policymakers might consider whether the education requirements are necessary given the urgency of the opioid crisis. While not a theme, some participants referenced the irony of requiring online training to treat OUD but not requiring

specialized training to prescribe the medications that contribute to OUD. This is a sentiment that has also been expressed in the physician literature (Mendoza et al., 2016).

Moreover, even participants who had completed the training voiced concerns about their capability to treat OUD with buprenorphine and valued mentorship for developing prescribing competencies. Physicians have been found to be unaware of the SAMHSA mentorship program, thus SAMHSA mentorship program advertising might be expanded (Huhn & Dunn, 2017). Policymakers might also develop local mentoring programs to partner novice with experienced providers and to connect those interested in prescribing with prescribing resources. However, the rural environments in which these NPs are practicing and their already demanding schedules might make identifying a mentor willing and able to provide guidance difficult. Incentive programs might facilitate individuals with expertise in prescribing to invest their time in nurturing new providers.

Finally, this study offers additional support to the existing literature about how state laws requiring physician oversight impede consumer access to care (DesRoches, Clarke, Perloff, O'Reilly-Jacob, & Buerhaus, 2017; Kuo, Loresto, Rounds, & Goodwin, 2013; Kurtzman, Barnow, Johnson et al., 2017; Oliver, Pennington, Revelle, & Rantz et al., 2014). NP groups advocating for patient access and removal of regulatory barriers such as physician oversight requirements should follow studies comparing NP buprenorphine prescribing rates in states with differing regulatory environments. The unique prescribing barriers NPs working in states like NC describe in this study offer more evidence of how physician supervisory requirements limit patient access to care.

Education and practice

Approximately 20% of the respondents who met inclusion criteria identified their NP degree program as a key source of information about buprenorphine prescribing. This small percentage may be attributed to NPs' relatively recent ability to prescribe buprenorphine and the relative experience of NPs interviewed, as the least experienced NP interviewed had been working for five years. Programs that do not require waiver training might consider incorporating the training into their degree programs, especially given the depth and persistence of the opioid crisis in the United States. Additionally, NP educators should consider expanding education efforts aimed at decreasing stigma toward individuals with OUD, buprenorphine, and buprenorphine prescribers. Education initiatives might focus on stories of OUD treatment successes and the gratifying nature of treating patients with substance use disorder. This could be a potent motivator for NP students. As so few NPs are waivered to prescribe buprenorphine, continuing education for practicing NPs should likewise target stigma awareness and reduction and motivate practicing NPs with narratives about the rewards of treating OUD with buprenorphine.

Summary

This qualitative, descriptive study identified barriers and facilitators to NP buprenorphine prescribing in eight of the 14 TDF domains. The study captured novel barriers and facilitators to buprenorphine prescribing among NPs and added nuance to prescribing barriers and facilitators previously identified in the physician literature. Deaths from OUD remain a public health crisis, and buprenorphine is an effective but under-utilized treatment for OUD. By using the TDF to guide analysis, the study laid the groundwork for future studies that consider how interventions rooted in behavior change theory can facilitate buprenorphine prescribing.

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APPENDIX A: UMCIRB INITIAL STUDY APPROVAL

EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board
4N-64 Brody Medical Sciences Building· Mail Stop 682
600 Moye Boulevard · Greenville, NC 27834
Office **252-744-2914** · Fax **252-744-2284** · **rede.ecu.edu/umcirb/**

Notification of Initial Approval: Expedited

From: Social/Behavioral IRB

To: Chandra Speight

CC: Elaine Scott

Date: 11/12/2019

RE: UMCIRB 19-002611
Buprenorphine Prescribing Among Nurse Practitioners in Eastern NC Primary Care Settings

I am pleased to inform you that your Expedited Application was approved. Approval of the study and any consent form(s) occurred on 11/11/2019. The research study is eligible for review under expedited category # 6, 7. The Chairperson (or designee) deemed this study no more than minimal risk.

Changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. The investigator must submit a Final Report application to the UMCIRB prior to the Expected End Date provided in the IRB application. If the study is not completed by this date, an Amendment will need to be submitted to extend the Expected End Date. The Investigator must adhere to all reporting requirements for this s
Approved consent documents with the IRB approval date stamped on the document should be used to consent participants (consent documents with the IRB approval date stamp are found under the Documents tab in the study workspace).

The approval includes the following items:

Consent Letter for Expedited Survey Research

Consent Forms

ECU Buprenorphine Study Social Media Page Appendix D and

Recruitment Documents/Scripts

F .docx	
ECU Buprenorphine Study Social Media Page.docx	Recruitment Documents/Scripts
Interview No More than Minimal Risk Consent	Consent Forms
IRB Facebook Reminder Scripts 2 4 and 6 weeks Appendices G H I .docx	Recruitment Documents/Scripts
IRB Letter to those invited to participate in interview appendix O.docx	Recruitment Documents/Scripts
IRB NCBON Recruitment Emails and Reminders Appendices J K L M.docx	Recruitment Documents/Scripts
IRB Professional Networking Communication Email Script and Follow UP Appendix B and E.docx	Recruitment Documents/Scripts
IRB Research Flyer Appendix C .docx	Recruitment Documents/Scripts
IRB Survey	Surveys and Questionnaires
Letter to Those Invited to Participate in Interviews	Recruitment Documents/Scripts
Semi-Structured Interview Guide	Interview/Focus Group Scripts/Questions
Speight Dissertation Proposal	Study Protocol or Grant Application

For research studies where a waiver of HIPAA Authorization has been approved, each of the waiver criteria in 45 CFR 164.512(i)(2)(ii) has been met. Additionally, the elements of PHI to be collected as described in items 1 and 2 of the Application for Waiver of Authorization have been determined to be the minimal necessary for the specified research.

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

IRB00003781 East Carolina U IRB #2 (Behavioral/SS) IORG0000418

APPENDIX B: UMCIRB AMENDMENT APPROVAL

EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board
4N-64 Brody Medical Sciences Building· Mail Stop 682
600 Moye Boulevard · Greenville, NC 27834
Office **252-744-2914** · Fax **252-744-2284** · **rede.ecu.edu/umcirb/**

Notification of Amendment Approval: Expedited

From: Social/Behavioral IRB

To: Chandra Speight

CC: Elaine Scott

Date: 2/19/2020

RE: Ame1_UMCIRB 19-002611
UMCIRB 19-002611
Buprenorphine Prescribing Among Nurse Practitioners in Eastern NC Primary Care Settings

The overall risk/benefit ratio of the study and is appropriate for the population and procedures proposed.

Please note that any further changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. The investigator must submit a Final Report application to the UMCIRB prior to the Expected End Date provided in the IRB application. If the study is not completed by this date, an Amendment will need to be submitted to extend the Expected End Date. The investigator must adhere to all reporting requirements for this study.

Approved consent documents with the IRB approval date stamped on the document should be used to consent participants (consent documents with the IRB approval date stamp are found under the Documents tab in the study workspace).

The approval includes the following items:

Document	Description
Consent Letter for Expedited Survey	Consent Forms

Document	Description
Research(0.02)	
Interview No More than Minimal Risk Consent (0.02)	Consent Forms
	Add Drs. C. McNeill and A. Schreier to the study team

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

IRB00003781 East Carolina U IRB #2 (Behavioral/SS) IORG0000418

APPENDIX C: SCREENING QUESTIONNAIRE CONSENT AND QUESTIONNAIRE

Consent Letter for Expedited Survey Research

Dear Participant,

I am a PhD student at East Carolina University in the College of Nursing. I am asking you to take part in my research study titled, "Barriers and Facilitators to Buprenorphine Prescribing Among Nurse Practitioners Working in Primary Care Settings in Eastern North Carolina."

The purpose of this research is to understand barriers and facilitators nurse practitioners face related to prescribing buprenorphine for opioid use disorder. By doing this research, I hope to learn how nurse practitioners who want to prescribe this medication can be better supported. Your participation is completely voluntary.

You are being invited to take part in this research because you found or were provided the study link and are a nurse practitioner who would like to be considered as a potential participant in a study that requires a semi-structured interview. The amount of time it will take to complete this survey is approximately 5 minutes.

If you agree to take part in this survey, you will be asked questions related to your area(s) of NP certification, your practice setting, and your practice location. You will also be asked about your familiarity with buprenorphine and your buprenorphine prescribing practices, if applicable. At the end of the screening survey, you will be asked to provide contact information if you wish to be considered to take part in the interview portion of the study. The interview will be conducted by the Principal Investigator via telephone and will take approximately 20-40 minutes but not longer than 60 minutes. A separate informed consent document will be provided should you be selected and choose to participate in the telephone interview.

As part of participating in this survey, you will be asked to share the research flyer and link with other potential participants. However, you are under no obligation to do so: sharing the information is not required to participate in screening or to be selected for the interview portion of the study.

This research is overseen by the University and Medical Center Institutional Review Board (UMCIRB) at ECU. Therefore, some of the members of the UMCIRB staff may need to review your research data. However, the information you provide will not be linked to you unless you provide your email address or phone number. Should you provide your email address or telephone number to be contacted by the Principal Investigator for participation in the interview portion of the study, your identity will be evident to those individuals who see this information. However, I will take precautions to ensure that anyone not authorized to see your identity will not be given that information.

Identifiers might be removed from the identifiable private information and, after such removal, the information could be used for future research studies or distributed to another investigator for future research studies without additional informed consent from you or your Legally Authorized Representative (LAR). However, there still may be a chance that someone could figure out the information is about you.

If you have questions about your rights when taking part in this research, call the University and Medical Center Institutional Review Board (UMCIRB) at 252-744-2914 (weekdays, 8:00 am-5:00 pm). If you would like to report a complaint or concern about this research study, call the Director of Human Research Protections, at 252-744-2914.

You do not have to take part in this research, and you can stop at any time. If you decide you are willing to take part in this study, please continue with the survey below.

Questionnaire

1. What is/are your NP area(s) of certification? For example, family nurse practitioner, psychiatric-mental health nurse practitioner, acute care nurse practitioner. If you hold more than one NP certification, please list all your current, active certifications.

_____

2. In what city or cities do you currently work as a nurse practitioner?

_____

3. Which of these best describe your current practice setting? If you work in more than one setting, please select multiple options.

Primary care
Acute care/hospital
Specialty care clinic, please describe_____
Federally qualified health care center
Health department
Student health
Veterans Administration
Behavioral health
Women's health
In-home care
Long-term care
Acute care, hospital
Other, please describe_____

4. How would you describe your familiarity with the medication buprenorphine (commonly known as Suboxone)?

Very familiar
Familiar
Not very familiar
Not at all familiar

5. Thinking about how you learned about buprenorphine, which of these would you describe as primary information sources. Please check as many as apply.

Required continuing education courses
Drug company representatives
Professional journals and organizations
Media (TV, commercials, newspapers)
Colleagues
Education and training while earning the NP degree

Other, please describe_____
None, I am familiar with buprenorphine.

6. Do you have a waiver, known as a DEA-X, to prescribe buprenorphine?

Yes
No
I don't know

6a. If yes, do you prescribe buprenorphine or combination buprenorphine products for opioid use disorder?

Yes
No

6b. If no (to #6), which of the following best describes your willingness to obtain a buprenorphine waiver and prescribe buprenorphine?

Very willing
Somewhat willing
Somewhat unwilling
Very unwilling

7. This is a screening survey for a study that asks nurse practitioners to participate in a telephone interview to discuss barriers and facilitators to buprenorphine prescribing. If you would like to be considered for inclusion in the interview portion of the study, please provide your contact information. You will be contacted if you are selected and will receive a $50 Amazon gift card for your participation in the interview.

> I wish to provide my contact information and be considered for participation.
>
> I DO NOT wish to provide my contact information and be considered for participation.

7a. If answered: I wish to provide my contact information and be considered for participation.

> Please enter your first and last name, preferred contact information (telephone or email), and any notes about contacting you (for example, please call me after 8 am and before 7 pm).

7a1. The research team may conduct additional research on buprenorphine prescribing. Whether or not you are selected for participation in this study, would you like to be considered for participation in future studies? If yes, your contact information will be

saved on a secure platform for 7 years after this study is complete. If no, your contact information will be destroyed after this study is complete.

Yes please contact me about future studies.
No, please do not contact me about future studies.

7b. I DO NOT wish to provide my contact information and be considered for participation.

If you provided your contact information and are selected for participation in the interview portion of this study, you will be contacted using the information you provided no later than May 15, 2020. At that time, you will receive additional information about the interview and have the opportunity to choose whether you would like to participate in the interview portion of the study

Thank you for taking the time to participate in my research. Please consider sharing the link to the REDCap screening survey and/or the Facebook page with colleagues you feel may be interested. Sharing this information is not required for participation in the study.

REDCap Screening Survey Link

https://redcap.ecu.edu/surveys/?s=H4RM4AA4LT

Facebook Page

https://www.facebook.com/groups/697935390633869/

Sincerely, Chandra Speight, MSN, RN, NP-C, Principal Investigator

APPENDIX D: PROFESSIONAL NETWORK COMMUNICATION

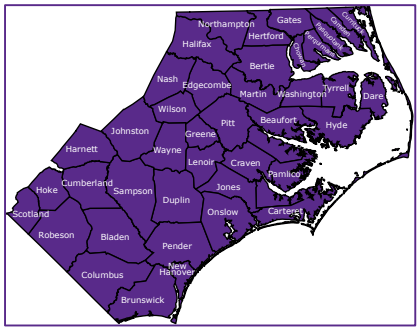
Email Subject Line: Buprenorphine Study – Please Share

Dear [Insert Professional Contact's Name],

I am a nurse practitioner (NP) and a PhD candidate at East Carolina University (ECU) in the College of Nursing. I am currently recruiting participants for my doctoral research study titled Barriers and Facilitators to Buprenorphine Prescribing Among Nurse Practitioners Working in Primary Care Settings in Eastern North Carolina.

The opioid crisis has deeply impacted North Carolina. Two of the top 25 cities for opioid use, Wilmington and Jacksonville, are in eastern North Carolina. One evidence-based intervention for opioid use disorder is buprenorphine. Nurse practitioners and physicians in North Carolina may prescribe buprenorphine if they receive a specialized Drug Enforcement Administration waiver. However, studies show that few NPs and physicians are prescribing this medication despite high demand.

This study seeks to understand barriers and facilitators to buprenorphine prescribing by interviewing NPs working in primary care settings in eastern North Carolina, defined as the 41 counties on the map featured here. Nurse practitioners who do and who do not prescribe buprenorphine are sought for participation. By conducting this research, I hope to provide evidence about how to better support NPs who wish to begin or continue prescribing this medication.



I am reaching out to you to ask you to share the research flyer (attached) and/or study link and Facebook page link with potential participants:

REDCap Screening Survey Link:

https://redcap.ecu.edu/surveys/?s=H4RM4AA4LT

Facebook Page

https://www.facebook.com/groups/697935390633869/

Thank you for considering this request. Should you have questions, please contact me.

Chandra Speight, MSN, RN, NP-C
East Carolina University
speightc92@students.ecu.edu
252-341-9496

APPENDIX E: RESEARCH FLYER

Research Participants Needed

Barriers and Facilitators to Buprenorphine* Prescribing

You may be eligible if you . . . .

- Are a nurse practitioner
- Practice in eastern NC
- Work in a primary care setting

You do not have to prescribe buprenorphine to be eligible for participation.

If interested, please complete a screening survey:

https://redcap.ecu.edu/surveys/?s=H4RM4AA4LT

The survey will be used to determine eligibility. If selected, you will be contacted to participate in a phone interview and will receive a $50 Amazon gift card after completing the interview.

*Buprenorphine is marketed alone and in combinations under brands including Suboxone and Subutex.

ECU

Chandra Speight, MSN, RN, NP-C, PhD(c)
Principal Investigator
College of Nursing
252-341-9496, speightc92@students.ecu.edu

APPENDIX F: FACEBOOK STUDY PAGE

APPENDIX G: SOCIAL MEDIA SCRIPT

The opioid crisis has deeply impacted our nation and our region, eastern North Carolina. Implementing effective opioid use disorder treatments is essential to curbing the crisis. This study seeks to understand barriers and facilitators to buprenorphine (Suboxone, Subutex) prescribing among nurse practitioners working in primary care settings in eastern North Carolina

Please share this research study Facebook page with friends and colleagues who may be interested in participating in this research. I appreciate your help!

Please contact Chandra Speight, MSN, RN, NP-C, Principal Investigator, at speightc92@students.ecu.edu if you have questions

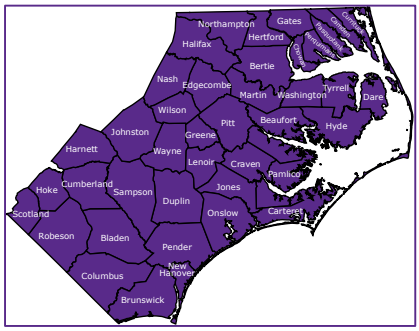
APPENDIX H: RECRUITMENT EMAIL, NCBON DATABASE

Email Subject: Important Research Opportunity Related to Opioid Use Disorder

Dear Nurse Colleague,

My name is Chandra Speight. I am a nurse practitioner (NP) and a PhD candidate at East Carolina University in the College of Nursing. You are receiving this email because you may be eligible for participation in my doctoral research on buprenorphine (e.g., Suboxone, Subutex) prescribing.

This study seeks to understand barriers and facilitators to buprenorphine prescribing for opioid use disorder by interviewing NPs working in primary care settings in eastern North Carolina, defined as the 41 counties on this map. Nurse practitioners who do and who do not prescribe buprenorphine are sought for participation. By conducting this research, I hope to provide evidence about how to better support NPs who wish to begin or continue prescribing this medication.



If you are interested in participating, please click on the link below, which will take you to an online screening survey that will take approximately 5 minutes to complete. You will be asked questions about your certification, practice setting and location, and buprenorphine prescribing practices. You will be given the opportunity to provide contact information should you wish to be considered for participation in the interview portion of the study. If selected to participate in the interview portion, you will be asked to complete a phone interview and you will receive a $50 Amazon gift card for your time.

REDCap Screening Survey Link: https://redcap.ecu.edu/surveys/?s=H4RM4AA4LT

Facebook Page: https://www.facebook.com/groups/697935390633869/

The link will remain open until 5:00 pm on December 31, 2019. If you have questions, please contact me at speightc92@students.ecu.edu

Sincerely,

Chandra Speight, MSN, RN, NP-C
Doctoral Student
East Carolina University

APPENDIX I: NO MORE THAN MINIMAL RISK INTERVIEW CONSENT

Informed Consent to Participate in Research

Information to consider before taking part in research that has no more than minimal risk.

Study ID:UMCIRB 19-002611 Date Approved: 02/18/2020 Does Not Expire.

Title of Research Study: Barriers and Facilitators to Buprenorphine Prescribing Among Nurse Practitioners Working in Primary Care Settings in Eastern North Carolina
Principal Investigator: Chandra Speight (Person in Charge of this Study)
Institution, Department, or Division: East Carolina University, College of Nursing. Address: 2205 W 5th Street, Greenville, NC, 27889. Telephone #: 252-744-6433
Researchers at East Carolina University (ECU) study issues related to society, health problems, environmental problems, behavior problems and the human condition. To do this, we need the help of volunteers who are willing to take part in research.
Why am I being invited to take part in this research? The purpose of this research is to understand barriers and facilitators to buprenorphine prescribing among nurse practitioners working in primary care settings in eastern North Carolina. You are being invited to take part in this research because you are a nurse practitioner who meets the study criteria. The decision to take part in this research is yours to make. By doing this research, we hope to learn what barriers and facilitators nurse practitioners perceive related to buprenorphine prescribing in order to better understand how to support nurse practitioners who wish to provide this therapy. If you volunteer to take part in this research, you will be one of about 15-60 people to do so.
Are there reasons I should not take part in this research? I understand I should not take part in this research if I am under 18 years of age.
What other choices do I have if I do not take part in this research? You can choose not to participate.
Where is the research going to take place and how long will it last? The research will be conducted over the telephone. The total amount of time you will be asked to volunteer for this study is approximately 20-40 minutes and no more than 60 minutes in a telephone interview that will be scheduled at your convenience sometime over the next four months.
What will I be asked to do? You will be asked to do the following: participate in a phone interview with the Principal Investigator. The purpose of the interview will be to understand the barriers and facilitators you perceive related to buprenorphine prescribing. You will first be asked a series of demographic and professional questions, including level of education and years of nursing experience. You will also be asked to verify the certification and practice information you provided in the screening interview. Then, you will be asked a series of questions related to buprenorphine prescribing. This will be what is called a semi-structured interview, which means that the interview will not necessarily conform to a strict script but the conversation around the barriers and facilitators will be allowed to unfold naturally. The interview will be audio-recorded. Only the principal investigator and the research team will have access to the audio recording. After it is transcribed, the audio recording will be destroyed and the transcription will be kept for a period of 7 years. You will be asked to provide a pseudonym/alternative name and this will be used to identify you; this pseudonym will be used with the transcript so that the transcript cannot be linked to you. As part of participating in this research, you may be asked to share the research introductory letter and flyer with other potential participants. However, you are under no obligation to do so and sharing the information is not required to participate in screening or in the study.
What might I experience if I take part in the research? Some questions that you may be asked may lead you to discuss or think about personal and professional experiences with those with substance use disorder. There is a potential that such discussion may lead you to feel uncomfortable and you may thus stop the interview at any time. We don't know if you will benefit from taking part in this study. There may not be any personal benefit to you but the information gained by doing this research may help others in the future.

Will I be paid for taking part in this research? We will be able to pay you for the time you volunteer while being in this study with a $50 Amazon gift card. You will receive the gift card after completing the telephone interview.
Will it cost me to take part in this research? It will not cost you any money to be part of the research.
Who will know that I took part in this research and learn personal information about me? ECU and the people and organizations identified here may know that you took part in this research and may see information about you that is normally kept private. With your permission, these people may use your private information to do this research: ECU University & Medical Center Institutional Review Board (UMCIRB) and its staff have responsibility for overseeing your welfare during this research and may need to see research records that identify you and the Principal Investigator and Research Team
How will you keep the information you collect about me secure? How long will you keep it? Our interviews will be audio recorded and immediately uploaded from the recording device to PirateDrive, a secure drive managed by East Carolina University. The audio file on the recording device will then be destroyed. Audio recordings will be transcribed to text as soon as possible after our interviews and will be identified using the pseudonym you provide. After interviews are transcribed and verified, the audio recording will be destroyed. Information in the transcriptions may be used in future research but only after any potentially identifying information has been removed, thus no one will know it is information you provided.
What if I decide I don't want to continue in this research? You can stop at any time after it has already started. There will be no consequences if you stop and you will not be criticized. You will not lose any benefits that you normally receive.
Who should I contact if I have questions? The people conducting this study will be able to answer any questions concerning this research, now or in the future. You may contact the Principal Investigator at 252-341-9496, Monday – Friday, between 8:00 am and 5:00 pm or at her email address: speightc92@students.ecu.edu.

If you have questions about your rights as someone taking part in research, you may call the Office of Research Integrity & Compliance (ORIC) at phone number 252-744-2914 (week days, 8:00 am-5:00 pm). If you would like to report a complaint or concern about this research study, you may call the Director for Human Research Protections, at 252-744-2914

Is there anything else I should know? No.

I have decided I want to take part in this research. What should I do now? Please read the following and if you agree, you should electronically sign this form:

- I have read all of the above information.
- I have had an opportunity to ask questions about things in this research I did not understand and have received satisfactory answers.
- I know that I can stop taking part in this study at any time.
- By signing this informed consent form, I am not giving up any of my rights.
- I have been given a copy of this consent document, and it is mine to keep.

_____ _____

Participant's E-Signature Date

APPENDIX J: FACEBOOK REMINDER POST, 2 WEEKS

Please consider participating in this research study if you have not already. Please also consider sharing this study Facebook page with friends and colleagues who may be interested in participating in this research. I appreciate your help!

Please contact Chandra Speight, MSN, RN, NP-C, Principal Investigator, at speightc92@students.ecu.edu if you have questions.

APPENDIX K: FACEBOOK REMINDER POST, 4 WEEKS

REMINDER: ONLY 2 WEEKS LEFT!

Please consider participating in this research study if you have not already. Please also consider sharing this study Facebook page with friends and colleagues who may be interested in participating in this research. I appreciate your help!

Please contact Chandra Speight, MSN, RN, NP-C, Principal Investigator, at speightc92@students.ecu.edu if you have questions.

APPENDIX L: FACEBOOK REMINDER POST, 6 WEEKS

REMINDER: ONLY 1 WEEK LEFT!

Please consider participating in this research study if you have not already. Please also consider sharing this study Facebook page with friends and colleagues who may be interested in participating in this research. I appreciate your help!

Please contact Chandra Speight, MSN, RN, NP-C, Principal Investigator, at speightc92@students.ecu.edu if you have questions.

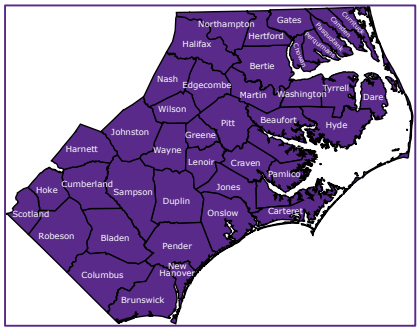
APPENDIX M: NCBON REMINDER EMAIL, 2 WEEKS

Email Subject: Reminder: Research Opportunity Related to Opioid Use Disorder

Dear Nurse Colleague,

My name is Chandra Speight. I am a nurse practitioner (NP) and a PhD candidate at East Carolina University in the College of Nursing. I want to remind you about the opportunity to participate in research related to NPs and buprenorphine prescribing.

This study seeks to understand barriers and facilitators to buprenorphine prescribing for opioid use disorder by interviewing NPs working in primary care settings in eastern North Carolina, defined as the 41 counties on this map. Nurse practitioners who do and who do not prescribe buprenorphine are sought for participation. By conducting this research, I hope to provide evidence about how to better support NPs who wish to begin or continue prescribing this medication.



If you are interested in participating, please click on the link below, which will take you to an online screening survey that will take approximately 5 minutes to complete. You will be asked questions about your certification, practice setting and location, and buprenorphine prescribing practices. You will be given the opportunity to provide contact information should you wish to be considered for participation in the interview portion of the study. If selected to participate in the interview portion, you will be asked to complete a phone interview and you will receive a $50 Amazon gift card for your time.

REDCap Screening Survey Link: https://redcap.ecu.edu/surveys/?s=H4RM4AA4LT

Facebook Page: https://www.facebook.com/groups/697935390633869/

The link will remain open until 5:00 pm on December 31, 2019. If you have questions, please contact me at speightc92@students.ecu.edu

Sincerely,

Chandra Speight, MSN, RN, NP-C
Doctoral Student
East Carolina University

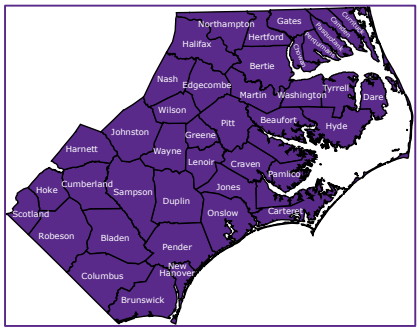
APPENDIX N: NCBON REMINDER EMAIL, 4 WEEKS

Email Subject: Reminder: ONLY TWO WEEKS LEFT: Research Opportunity Related to Opioid Use Disorder

Dear Nurse Colleague,

My name is Chandra Speight. I am a nurse practitioner (NP) and a PhD candidate at East Carolina University in the College of Nursing. I want to remind you about the opportunity to participate in research related to NPs and buprenorphine prescribing.

This study seeks to understand barriers and facilitators to buprenorphine prescribing for opioid use disorder by interviewing NPs working in primary care settings in eastern North Carolina, defined as the 41 counties on this map. Nurse practitioners who do and who do not prescribe buprenorphine are sought for participation. By conducting this research, I hope to provide evidence about how to better support NPs who wish to begin or continue prescribing this medication.



If you are interested in participating, please click on the link below, which will take you to an online screening survey that will take approximately 5 minutes to complete. You will be asked questions about your certification, practice setting and location, and buprenorphine prescribing practices. You will be given the opportunity to provide contact information should you wish to be considered for participation in the interview portion of the study. If selected to participate in the interview portion, you will be asked to complete a phone interview and you will receive a $50 Amazon gift card for your time.

REDCap Screening Survey Link: https://redcap.ecu.edu/surveys/?s=H4RM4AA4LT

Facebook Page: https://www.facebook.com/groups/697935390633869/

The link will remain open until 5:00 pm on December 31, 2019. If you have questions, please contact me at speightc92@students.ecu.edu

Sincerely,

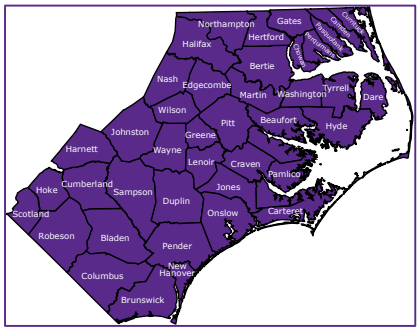
Chandra Speight, MSN, RN, NP-C
Doctoral Student
East Carolina University

APPENDIX O: PROFESSIONAL NETWORK FOLLOW-UP

Email Subject: Only 2 Weeks Left: Please Share Buprenorphine Study

Dear [Insert Professional Contact's Name],

If you have not already, please consider sharing these links or the study flyer (attached) with colleagues or groups you think may be interested in participating in this study. This study explores barriers and facilitators to buprenorphine prescribing among NPs working in primary care settings in eastern North Carolina, defined as the 41 counties on the map featured here. Nurse practitioners who do and who do not prescribe buprenorphine are sought for participation. By conducting this research, I hope to provide evidence about how to better support NPs who wish to begin or continue prescribing this medication.



REDCap Screening Survey Link

https://redcap.ecu.edu/surveys/?s=H4RM4AA4LT

Facebook Page

https://www.facebook.com/groups/697935390633869/

Thank you for considering this request. Should you have questions, please contact me.

Chandra Speight, MSN, RN, NP-C
East Carolina University
speightc92@students.ecu.edu
252-341-9496

APPENDIX P: LETTER TO PARTICIPANTS SELECTED FOR INTERVIEW

Dear NP colleague,

Thank you for volunteering to participate in my research study titled, Barriers and Facilitators to Buprenorphine Prescribing among Nurse Practitioners Working in Primary Care Settings in Eastern North Carolina. The research team has reviewed your screening questionnaire and would like to invite you to participate in a telephone interview about barriers and facilitators to buprenorphine prescribing. The phone interview should last 20-40 minutes and no more than 60 minutes. If you would like to participate in this interview, please complete this online Informed Consent to Participate document:

https://redcap.ecu.edu/surveys/?s=TRKCLFER3K

Feel free to contact me by email or phone if you have any questions before you sign the consent. REDCap will allow you to save a PDF of the consent form and/or send an email copy to yourself. When I have received your completed consent, I will contact you to schedule our interview. You will receive a $50 Amazon gift card via email after completing the interview.

Again, thank you for volunteering to participate in this study.

Sincerely,

Chandra Speight, MSN, RN, NP-C
Doctoral Student
College of Nursing
East Carolina University
Speightc92@students.ecu.edu
252-341-9496

APPENDIX Q: DEMOGRAPHICS AND SEMI-STRUCTURED INTERVIEW GUIDE

Part I: I'd like to start by gathering some professional background information and confirming what you shared on the screening survey.

What is your highest level of NP education?
What is your NP certification?
How long have you practiced as an NP?
What is your current practice setting?
Does your collaborating physician hold a DEA-x?
Do you hold a DEA-x?
Do you prescribe buprenorphine?
For how long have you prescribed buprenorphine?
To approximately how many patients?

Part II: Semi-Structured Interview Question Guide

Background

Can you tell me about your experiences caring for patients with opioid use disorder?

How did you learn about opioid use disorder and treatment?

What do you think is the role of the primary care provider in treating those with substance use disorder?

Treatment - Both

Do you feel comfortable treating patients with opioid use disorder? Why or why not?

What are some of the key challenges of managing opioid use disorder in your practice? Have you been able to overcome any of these challenges and if so how?

What are your colleagues' attitudes toward treating patients with substance use disorder? How did you learn about their attitudes?

Buprenorphine – Non-Prescribers

In the screening survey, you described your level of familiarity with buprenorphine as _____. I would like to talk more about this. Can you tell me how you learned about buprenorphine?

In the screening survey, you described yourself as _____ willing to prescribe buprenorphine. I would like to talk more about this. Can you tell me what factors affect your level of willingness to prescribe the drug?

Do you think your patient population would benefit from access to this medication? Why or why not?

What sort of organizational support would you need to prescribe buprenorphine?

What sort of educational preparation would you need to prescribe buprenorphine?

Please describe some experiences you have had caring for patients with opioid use disorder.

What would you tell NPs who are entering practice about opioid use disorder? What do they need to know?

How do you feel about providers who prescribe buprenorphine?

What else do you think people should know about opioid use disorder treatment in primary care settings? About buprenorphine prescribing?

Buprenorphine – Have Waiver and Don't Prescribe

Can you tell me about how and why you decided to apply for a wavier? What factors influenced your decision?

What factors have influenced your decision not to prescribe buprenorphine?

What barriers have you encountered in buprenorphine prescribing? What do you think could be done to address these? Were you able to offer come any of these barriers? Which ones and how?

Please describe some experiences you have had caring for patients with opioid use disorder.

How do you feel about your ability to provide care for a patient with opioid use disorder?

What would you tell other NPs who may want to prescribe buprenorphine? What do they need to know?

What else do you think people should know about buprenorphine prescribing in primary care settings? About opioid use disorder treatment?

Buprenorphine – Have Waiver and Prescribe

Can you tell me about how and why you decided to apply for a wavier? What factors influenced your decision?

What factors have influenced your decision to prescribe buprenorphine?

What barriers have you encountered in buprenorphine prescribing? What do you think could be done to address these? Have you been able to overcome any of these barriers? Which ones and how?

What strengths do you bring to treating patients with OUD? How were those strengths developed? How have they helped you overcome prescribing barriers?

Before you began prescribing buprenorphine, what were your opinions or assumptions about the practice? Once you began prescribing, how did your views on the practice change?

What would you tell other NPs who may want to prescribe buprenorphine? What do they need to know?

What else do you think people should know about buprenorphine prescribing in primary care settings? About opioid use disorder treatment?