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Background: In the US, hepatitis C virus (HCV) infection is the leading bloodborne infection and injection drug use is the most common mode of transmission. North Carolina (NC) is one of the states with the highest rates of acute HCV infection. Syringe exchange programs are effective in the prevention of HCV infection in injection drug users. With only approximately 30 syringe exchange programs in North Carolina, access is limited. Implementation of syringe exchange programs in community pharmacies can increase access. **Objective:** This study examined NC community pharmacists' support of implementation of syringe exchange programs in community pharmacies and the associated intrapersonal, interpersonal, and organizational factors. Factors represented constructs of the Social Ecological Model (SEM). **Methods:** This quantitative correlational, cross-sectional study was guided by the SEM. NC community pharmacists (N = 304) were surveyed using an online survey. Descriptive statistics, Somers' d correlation coefficient, PLUM ordinal logistic regression modeling, and Chi-squared tests were used to answer 6 research questions. **Results:** Findings revealed that 68.6% of NC community pharmacists surveyed supported implementation of a syringe exchange program in their pharmacy to some extent, which included from a small extent to a great extent. Pharmacists' support for syringe exchange programs was indicated at all three concept levels. Specifically, the major intrapersonal factors that validated support included the beliefs about the effectiveness of syringe exchange programs, practicing in

an independent community pharmacy, male gender, and receiving education on syringe exchange programs. Receiving injection drug user cultural competency training was the interpersonal factor that indicated support. The major organizational factors that substantiated support were having a company/store policy that allows implementation of a syringe exchange program and receiving training on how to implement a syringe exchange programs. The belief about the effectiveness of syringe exchange programs at preventing HCV infection in injection drug users was the intrapersonal factor most strongly related to support. Concern about having increased numbers of injection drug users in the pharmacy was the interpersonal factor most strongly related to support. Receiving training on how to implement a syringe exchange program was the organizational factor most strongly related to support. Factors predicting support were type of community pharmacy, gender, and years of practice. Support and factors differed between chain and independent community pharmacists. Chain community pharmacists were 56.1% less likely to express support for implementation to a great extent compared to independent community pharmacists. Chain community pharmacists had fewer beliefs about the effectiveness of syringe exchange programs and more concerns associated with implementation. **Conclusion:** NC community pharmacists supported syringe exchange programs in community pharmacies to some extent. All three concept levels indicated support for syringe exchange programs among the pharmacists. A lack of knowledge of the overall potential public health impact of syringe exchange programs existed to some extent based on some responses to beliefs about syringe exchange programs. Stigmatization of injection drug users was suggested based on responses around the

concern about having increased numbers of injection drug users in the pharmacy. Multilevel strategies to mitigate concerns and increase knowledge about syringe exchange programs including the public health impact and how to implement a syringe exchange program are warranted. Public health nurses are in a pivotal role to develop and implement these strategies. Implications for practice include the development and implementation of multilevel strategies through nurse-led interdisciplinary teams and consideration of chain and independent community pharmacists separately during strategy development. Implications for education include incorporation of injection drug user health information and the role of interventions such as syringe exchange programs into nursing, pharmacy, and other healthcare provider education curriculum, and provision of continuing education for current practitioners on these topics. Implications for research include conducting action or community-based participatory research with community pharmacists and other stakeholders such as pharmacy policy makers to determine best practices for implementing syringe exchange programs in community pharmacies. Implications for policy and community engagement include providing community awareness campaigns of syringe exchange program positive outcomes and contributions to decrease HCV infection and improve health of the community.
Keywords: HCV infection, syringe exchange program, community pharmacist, injection drug user, chain community pharmacy, independent community pharmacy, United States, US

EXAMINATION OF PHARMACISTS' SUPPORT FOR IMPLEMENTATION OF SYRINGE EXCHANGE PROGRAMS IN COMMUNITY PHARMACIES IN NORTH CAROLINA: A SOCIAL ECOLOGICAL APPROACH

by

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_____
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To my best friend and husband Jeffrey Roberts for his ever present and steadfast love, encouragement, and support throughout this crazy journey. Thank you for being so understanding and patient and for continually pushing me forward. Without you, there is no way that I could have endured this process. I love you immensely.

APPROVAL PAGE

This dissertation, written by Heather Hinkle Roberts, has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

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TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER I

INTRODUCTION

Over the last decade, the rates of hepatitis C virus (HCV) infection have significantly increased worldwide, in the United States, and in the state of North Carolina, leading to national and international initiatives focused on its prevention and elimination (Centers for Disease Control and Prevention [CDC], 2019c; Edlin, Eckhardt, Shu, Holmberg, & Swan, 2015; World Health Organization [WHO], 2016). As the leading cause of liver cancer and liver transplantation in the United States, HCV infection creates a substantial burden of disease on patients, families, healthcare providers, and healthcare systems at large (CDC, 2015a). With injection drug use being the most common mode of HCV infection transmission, injection drug users have become a priority population on which prevention and elimination efforts are focused (CDC, 2015b, 2017, 2019c; U.S. Department of Health and Human Services [USDHHS], 2017). Prevention efforts within this population are focused on increased awareness of HCV infection risks and the need for safer injection practices along with provision of safer injection supplies (USDHHS, 2017). Syringe exchange programs serve as the primary source of these prevention efforts, supporting access to care, disease prevention, and health promotion in a high risk, vulnerable, and marginalized population (Clarke et al., 2016; DeCuir, Lovasi, El-Sayed, & Lewis, 2018; O'Keefe et al., 2018; Platt et al., 2017; Sawangjit, Khan, & Chaiyakunapruk, 2017).

While legal in many U.S. states, the number of syringe exchange programs is limited. As of 2018, there were only 320 reported syringe exchange program locations in the nation (Kaiser Family Foundation [KFF], 2019). Research has shown that limited numbers of syringe exchange programs create an issue of limited access for injection drug users (Canary et al., 2017; Davis et al., 2018; Deryabina & El-Sadr, 2017; McCutcheon & Morrison, 2014; Welch-Lazoritz et al., 2017) and limited access affects syringe-sharing behaviors (Beletsky et al., 2014; Clarke et al., 2016; DeCuir et al., 2018; O'Keefe et al., 2018). Additionally, federal funding policy surrounding syringe exchange programs creates issues of access (Showalter, 2018). Although the ban on the use of state funding for supplies was lifted on July 22, 2019, the availability of both state and federal funding remains very limited (Opioid Epidemic Response Act of 2019). To mitigate these issues for injection drug users in the United States, it has been suggested that the incorporation of syringe exchange programs in community pharmacies is needed (Kim, Jin, McFarland, & Raymond, 2015; NC Board of Pharmacy [NCBOP], 2016; NC Harm Reduction Coalition [NCHRC], 2019a; Quinn, Chu, Wenger, Bluthenthal, & Kral, 2014; Siddiqui et al., 2015; WHO, 2007, 2017; Yang, Latkin, Luan, & Yang, 2016).

Community pharmacies are in a position to serve as additional points of access, augmenting existing syringe exchange programs and further affecting HCV infection risk reduction in injection drug users (McCutcheon & Morrison, 2014; NCBOP, 2016; NCHRC, 2019a; Rivera, DeCuir, Crawford, Amesty, & Lewis, 2014; Sawangjit et al., 2017). Therefore, the need for identifying factors affecting the implementation of pharmacy-based syringe exchange programs was considered critical. Identification of

these factors is needed for the development of future interventions to mitigate barriers and improve access. Additionally, identification of factors will assist in the recognition of areas where policy change is needed.

Background and Significance

Originally referred to as non-A non-B hepatitis, HCV is a bloodborne virus identified in 1989 as part of the flavivirus family. There are seven different genotypes of HCV, of which genotypes one through six are the most prominent, with genotype one being the most common in the United States (Wang, D'Souza, & Jacobson, 2016; Westbrook & Dusheiko, 2014). Hepatitis C virus is responsible for HCV infection, which is classified as either acute or chronic. Acute HCV infection is characterized primarily by the serologic presence of HCV antibodies and a positive HCV detection test for less than 12 months, while chronic HCV infection is characterized by a positive HCV detection test for 12 months or longer (CDC, 2015b). Hepatitis C virus infection is often referred to as a silent epidemic because the majority of those infected are unaware of their disease status, whether acute or chronic, due to its asymptomatic nature (CDC, 2015a).

Unlike other bloodborne viruses such as human immunodeficiency virus (HIV) and hepatitis B virus (HBV), HCV resides in the blood only and is transmitted with direct blood-to-blood contact. Hepatitis C virus is not transmitted through other bodily fluids unless those bodily fluids contain blood (CDC, 2015b). Transmission of HCV occurs most commonly through injection drug use; receipt of blood, blood products, or organs before 1992; needlestick injuries in healthcare settings; and birth to HCV-infected mothers (CDC, 2015b, 2019b). Other less common routes of transmission include

intranasal cocaine use with sharing of inhalation equipment, sharing of personal items contaminated with HCV-infected blood, unregulated tattooing and body piercing, and sex with an HCV-infected person. Overall, injection drug use is the most common mode of HCV infection transmission in the United States (CDC, 2015b).

While 15-25% of those infected with HCV eradicate the virus on their own without any treatment, 75-85% of all HCV-infected persons progress to the development of chronic HCV infection, requiring treatment and follow-up healthcare. The high prevalence of conversion to chronic HCV infection is thought to be due to the pattern of viral replication and the inability of the immune system to sustain a response (CDC, 2015b). Persons with chronic HCV infection are at risk for advanced liver disease, including liver cirrhosis, liver cancer, liver failure, the need for liver transplantation, and death (Ly, Hughes, Jiles, & Holmberg, 2016; Younossi et al., 2014).

In the United States, liver cirrhosis related to HCV infection has steadily increased over the last several years and is expected to continue to increase through the next decade (Udompap, Mannalithara, Heo, Kim, & Kim, 2016; Younossi et al., 2014). As well, persons infected with HCV have an almost 25-fold increase in relative risk of liver cancer than non-infected persons (Younossi et al., 2014). In the United States, chronic HCV infection is the leading cause of liver cancer and liver transplantation (CDC, 2015b), making HCV infection prevention a priority. Treatment and follow-up healthcare for HCV-infection is costly, especially in the presence of advanced liver disease, adding to the importance of HCV infection prevention (Younossi et al., 2014). From a cost perspective, antivirals overall ranked as the top drug group for Medicaid

spending in the United States from 2014 to 2017, with antivirals for HCV infection treatment being a significant driver of this spending (Young, 2019). Annual Medicaid spending for these drugs during this time consistently failed to align with utilization, further validating the burden of cost (Young, 2019). According to drug trend reports from Express Scripts, these drugs ranked as one of the top 15 drugs for commercial insurance, Medicare, Medicaid, and health insurance exchanges spending in 2016, and for all except commercial insurance spending in 2017 (Express Scripts, 2016, 2017). In 2018, these drugs continued to rank at this level for Medicaid and health insurance exchanges spending (Express Scripts, 2018). Additionally, antivirals for HCV infection treatment ranked as one of the 20 most expensive prescription drugs in the United States in 2018 (FiercePharma, 2018; GoodRx, 2019).

The most recent data on HCV infection in the United States indicate that a total of 3,186 cases of acute HCV infection were reported in 2017, with an incidence rate of 1.0 per 100,000 persons. This represents a 30.8% increase from 2015, where 2,436 cases were reported with an incidence rate of 0.8. This represents an almost four-fold increase since 2010, where the total reported cases of acute HCV infection were 850, and the incidence rate was 0.3 per 100,000 persons (CDC, 2019c). Because the majority of cases in the United States are not reported, adjustments in calculations are made to factor in underreporting. These adjustments are based on the estimate of actual cases being 13.9 times that of reported cases. Based on these adjusted estimates, there were 44,285 cases of acute HCV infection in the United States in 2017 with an incidence rate of 13.9 per 100,000 persons (American Foundation for AIDS Research [amfAR], 2019; CDC,

2019c). In North Carolina, there were a total of 114 cases of acute HCV infection reported in 2017 with an incidence rate of 1.1 per 100,000, representing an increase from 2016 from 82 and 0.8 per 100,000 persons, respectively. From an estimation perspective, total cases of acute HCV infection in North Carolina in 2017 were 1,585, with an incidence rate of 15.29 per 100,000 (amfAR, 2019; CDC, 2019c). These rates exceed the 2017 U.S. average and are more than four times those of the national goal (CDC, 2019c; Healthy People 2020 [HP2020], 2019).

Among age groups in the United States, the largest increase in the incidence of acute HCV infection has occurred within persons 20 to 29 years of age. Between 2005 and 2017, the incidence rate in this age group increased from 0.4 to 2.7 per 100,000. In 2017, the incidence rate of acute HCV infection remained highest among this population (CDC, 2019c). Among racial/ethnic groups in the United States, the largest increase in incidence occurred within the American Indian/Alaska Native (AI/AN) population. Between 2009 and 2016, reported cases of acute HCV infection rose from 12 to 70 and the incidence rate increased from 0.6 to 3.1 per 100,000 persons within this group (CDC, 2019c). In 2017, a slight decrease was seen in total cases to 67, and the incidence rate to 3.0 per 100,000 persons. Despite the slight decrease in 2017, the incidence rate for acute HCV infection per 100,000 persons in the United States was highest within the AI/AN group (3.0) compared to non-Hispanic Whites (1.2), non-Hispanic Blacks (0.5), Hispanics (0.4), and Asian/Pacific Islanders (0.1). Non-Hispanic Whites, however, accounted for nearly three-fourths of all acute HCV infection cases in the United States in 2017 (CDC, 2019c). Among gender groups, the incidence of acute HCV infection

increased four-fold for males and three-fold for females between 2010 and 2017. In 2010 the incidence rate for both males and females was 0.3 per 100,000 persons and increased in 2017 to 1.2 and 0.9, respectively (CDC, 2019c). Males accounted for slightly more of the total number of acute HCV infection cases than did females in the United States in 2017 (1,758 vs. 1,418) (CDC, 2019c).

The sharp increases in acute HCV infection cases, especially in younger age groups, have been attributed to increased heroin use with the U.S. opioid epidemic (CDC, 2019c). According to the 2018 National Survey on Drug Use and Health, 808,000 people in the United States used heroin (Substance Abuse and Mental Health Services Administration [SAMHSA], 2019). Due to the epidemic, the CDC recently identified 220 counties in the United States at risk for HCV infection outbreaks, five of which were in the state of North Carolina (amfAR, 2019). Between 2010 and 2014, there was a 350 percent increase in HCV infection in U.S. injection drug users (USDHHS, 2017). In the United States, it is estimated that injection drug users account for 75% of all acute HCV infection cases, making them the priority population for a prevention focus (CDC, 2017; USDHHS, 2017).

The importance of HCV infection prevention has been stressed through national and international initiatives. Within the immunization and infectious diseases topic goal to increase immunization rates and reduce preventable infectious diseases, Healthy People 2020 addresses HCV infection prevention through objective IIDC-26. This objective specifically aims to reduce new HCV infection cases in the United States to 0.25 per 100,000 (HP2020, 2019). Likewise, the CDC addresses the need for HCV

infection prevention in the Division of Viral Hepatitis Strategic Plan, 2016-2020 (CDC, 2016). Similarly, the USDHHS focuses on HCV infection prevention through the National Viral Hepatitis Action Plan 2017-2020 (USDHHS, 2017). Finally, the WHO addresses HCV infection prevention in their Combating Hepatitis B and C to Reach Elimination by 2030 advocacy brief (WHO, 2016). The CDC, USDHHS, and WHO each outline injection drug users as a priority population for prevention focus and indicate implementation of syringe exchange programs as one key prevention measure (CDC, 2016; USDHHS, 2017; WHO, 2016). The WHO extends this indication by setting specific goals to increase the annual number of syringes provided to each injection drug user from a baseline of 20 syringes as of 2015 to 200 by 2020 and 300 by 2030 (WHO, 2016).

Purpose Statement

The purpose of this study was to examine NC community pharmacists' support of the implementation of syringe exchange programs in community pharmacies in North Carolina. In this study, the PI examined factors influencing NC community pharmacists' support of implementation of syringe exchange programs in community pharmacies in North Carolina; factors associated with community pharmacist's support, including beliefs about syringe exchange programs; differences between pharmacists practicing in chain and independent community pharmacies in their level of support; and differences between pharmacists practicing in chain and independent community pharmacies in the primary factors influencing their level of support. Community pharmacies as an additional point of access can improve disease prevention and health promotion services

for injection drug users, especially in areas of limited syringe exchange services access. Additionally, studies exploring pharmacy-based syringe exchange programs are severely limited and have not compared chain and independent community pharmacies, which will be one focus of this study.

Syringe Exchange

Syringe exchange programs provide injection drug users access to sterile syringes, proper syringe disposal, HCV infection risk education, HCV infection testing or testing referrals, HCV infection treatment referrals, substance use disorder treatment or treatment referrals, and other health-related services and referrals. As a result of increasing rates of acute HCV infection in U.S. injection drug users, federal funding for syringe exchange programs was approved in 2015 (USDHHS, 2017). Models of syringe exchange programs generally include on-site/fixed, mobile/outreach, delivery, and integrated (Clarke et al., 2016; DeCuir et al., 2018; NCHRC, 2019b; O'Keefe et al., 2018; Platt et al., 2017). Outside of exchange programs, syringes can be acquired in many states through nonprescription syringe sales at pharmacies (Chiarello, 2016; NCBOP, 2016; NCHRC, 2019a).

Specific to HCV infection prevention in injection drug users, the provision of HCV infection risk and prevention education, sterile syringes, and proper syringe disposal serve as critical measures. Education stressing the risk of HCV infection transmission through the sharing of used syringes with others increases risk knowledge and awareness among injection drug users, leading to safer injection behaviors (Grau, Zhan, & Heimer, 2016; McCutcheon & Morrison, 2014). This education is generally

provided through printed materials offered at syringe exchange programs or through one-on-one conversations with syringe exchange program providers. Along with HCV infection risk and prevention education, the provision of sterile syringes and proper syringe disposal lead to reduced syringe-sharing behaviors, reducing the risk of HCV infection transmission in injection drug users, those they inject with, and the community at large. O'Keefe et al. (2018) demonstrated that without sufficient access to sterile syringes, injection drug users would reuse syringes putting those individuals and those in their injecting network at risk for HCV infection.

Similarly, Clarke et al. (2016) showed a reduction in syringe-sharing behaviors in injection drug users utilizing syringe exchange programs. Injection drug users in this study were willing to use new syringes if access was provided. In their systematic review, Platt et al. (2017) showed a 76% reduction of HCV infection in injection drug users with high syringe exchange program coverage (provision of one or more sterile syringe per injection per injection drug user). Likewise, DeCuir et al. (2018) demonstrated that syringe exchange programs serve as a protective measure against syringe-sharing behaviors when access is sufficient and close in proximity, even in disadvantaged areas. Furthermore, Beletsky et al. (2014) showed a significant negative association with the frequency of syringe exchange program use by injection drug users and syringe-sharing behaviors.

Provision of HCV infection risk and prevention education, sterile syringes, and proper syringe disposal can occur through any one of the syringe exchange program models. On-site/fixed, mobile/outreach, delivery, and integrated are common models of

syringe exchange programs. The decision on which type of model to utilize is generally based on resources available to the program provider/founder.

On-site/fixed models are located in a space dedicated to the associated syringe exchange program that injection drug users visit to receive related services. This model offers the benefit of privacy for program users; however, it does require injection drug users to travel to the program site, can have limited hours of operation, and can be costly with overhead (NCHRC, 2019b; WHO, 2017). Mobile/outreach models utilize a vehicle to conduct syringe exchange services. Program providers generally drive to specific locations on specific days and at specific times to reduce the travel burden on program users. Peer outreach through secondary exchanges is common with mobile services. This model offers increased access, flexibility, and privacy for injection drug users; however, it does present issues of cost in acquiring and maintaining a vehicle for the program provider (NCHRC, 2019b; WHO, 2017). Delivery models utilize direct delivery of syringe exchange services to homes of injection drug users or other mutually acceptable locations. This model significantly decreases the burden of access for injection drug users, but significantly increases the burden of time and other resources for program providers (NCHRC, 2019b). Integrated models are utilized by existing organizations, such as local health departments, who opt to incorporate syringe exchange services into other existing community services. This model offers the benefit of having existing resources such as space and staff; however, training of existing staff is required, and existing staff may be opposed to the addition of and participation in these services. Additionally, the lack of privacy can be an issue for program users (NCHRC, 2019b).

While legal in many U.S. states, the number of syringe exchange programs is limited. As of 2018, there were only 320 reported syringe exchange program locations in the nation (KFF, 2019). Research has shown that limited numbers of syringe exchange programs create an issue of limited access for injection drug users (Canary et al., 2017; Davis et al., 2018; Deryabina & El-Sadr, 2017; McCutcheon & Morrison, 2014; Welch-Lazoritz et al., 2017) and limited access affects syringe-sharing behaviors (Beletsky et al., 2014; Clarke et al., 2016; DeCuir et al., 2018; O'Keefe et al., 2018). To mitigate these issues for injection drug users in the United States, it has been suggested incorporation of syringe exchange programs in community pharmacies is needed (Kim et al., 2015; NCBOP, 2016; NCHRC, 2019a; Quinn et al., 2014; Siddiqui et al., 2015; WHO, 2007, 2017; Yang et al., 2016). Community pharmacies are in a position to serve as an additional source of sterile syringe acquisition for injection drug users, leading to a reduction in high-risk injecting behaviors and risk for HCV infection (Kim et al., 2015; McCutcheon & Morrison, 2014; NCBOP, 2016; NCHRC, 2019a; Siddiqui et al., 2015; WHO, 2007, 2017). Community pharmacies are in a position to provide access to proper syringe disposal, HCV infection risk and prevention education, and other syringe exchange services as well, enhancing protection for injection drug users and the community as a whole (Kim et al., 2015; Quinn et al., 2014; Rose, Lutnick, & Kral, 2014; WHO, 2007, 2017; Yang et al., 2016).

Community pharmacies are considered important in improving access to syringe exchange services for several reasons. One, most communities have one or more pharmacies already in existence within proximity to residents or public transportation.

This alleviates issues related to start-up activities, including the acquisition of space and staff, and eases the burden of access based on locale (McCutcheon & Morrison, 2014; WHO, 2007). Additionally, community pharmacies offer extended, flexible, and consistent hours of operation compared to traditional syringe exchange programs, where hours are often very limited (McCutcheon & Morrison, 2014; WHO, 2007). As well, community pharmacies may offer an environment where injection drug users do not feel readily identifiable as such (Rivera et al., 2014).

Furthermore, as healthcare providers, pharmacists are qualified to provide judgment-free education and counseling to injection drug users on HCV infection risks and the need for sterile syringe use and proper syringe disposal (McVeigh, Hearne, Bates, & Van Hout, 2017; Rose et al., 2014). Moreover, as healthcare providers, pharmacists are situated to develop trusting, caring relationships with injection drug users and positively impact their health (Rose et al., 2014). Finally, the incorporation of community pharmacies in syringe exchange services presents the potential to increase coverage of services considerably and increase the number of injection drug users served (WHO, 2017).

In 2015 there were a total of 67,753 community pharmacies in the United States. Of those, 40% were chain, 35% were independent, 12% were mass retailer, 10% were food store, 3% were clinic-based, and less than 1% were government pharmacies (Qato et al., 2017). As of April 1, 2019, the total number of U.S. community pharmacies was only slightly lower at 66,234 (Data.Gov, 2019). Given the large number of U.S. community pharmacies, the incorporation of syringe exchange programs in even a fraction has the

potential to increase needed access for injection drug users significantly. Although nonprescription syringe sales are legal in community pharmacies in many states, there are no reported pharmacy-based syringe exchange programs in the United States (KFF, 2019; North American Syringe Exchange Network [NASEN, 2019). With only approximately 30 syringe exchange programs to serve the entire state of North Carolina but over 2,000 community pharmacies, incorporation of these entities is needed, and examination of community pharmacists' support of implementation and factors associated with and influencing their support is required.

While some studies have revealed negative attitudes of pharmacists toward the implementation of syringe exchange services in community pharmacies, others have demonstrated positive attitudes. The study by Chiarello (2016), for example, suggested that many of the pharmacists had moral or ethical issues related to nonprescription syringe sales to injection drug users, despite the practice being legal. Similarly, Goodin, Fallin-Bennett, Green, and Freeman (2018) suggested pharmacists had ethical, legal, and safety concerns associated with nonprescription syringe sales to injection drug users. However, Rose et al. (2014) indicated that pharmacists are willing and open to offering nonprescription syringe sales and other preventive measures to injection drug users when feasible to do so. Likewise, McVeigh et al. (2017) demonstrated that community pharmacists had overall positive experiences with nonprescription syringe sales to injection drug users.

Conceptual Framework

The conceptual framework for this study is based on the Social Ecological Model (SEM), a model that focuses on the interrelatedness of individuals, relationships, environment, policies, and behavior (Simons-Morton, McLeroy, & Wendel, 2012). The SEM evolved from early ideas around the primary role of the individual in the manifestation of behavior to the role of the individual in combination with those things external to the individual. The model proposed by McLeroy, Bibeau, Steckler, and Glanz (1988) encompassing the levels of intrapersonal, interpersonal, organizational, community, and public health was used.

This model has been used extensively to guide research and practice in health promotion and has been used by a variety of disciplines, including nursing, public health, psychology, sociology, and medicine (Simons-Morton et al., 2012). Specifically, the SEM has been used by the CDC to guide their work and recommendations on violence prevention (CDC, 2019b). The model was used in the Healthy People 2020 Framework as a guide to health promotion and disease prevention (HP2020, n.d.). In their systematic review of the literature, Ma, Chan, and Loke (2017) assessed barriers and facilitators to healthcare access for sex workers through the lens of the SEM. Aboueid, Pouliot, Nur, Bourgeault, and Giroux (2019) utilized the SEM as a guide in their identification of patient barriers and facilitators to weight management from the perspective of dieticians. The SEM was used as the framework to overcome barriers in randomized clinical trials for minorities and underserved communities (Salihu, Wilson, King, Marty, & Whiteman,

2015). Sogari, Velez-Argumedo, Gomez, and Mora (2018) utilized the SEM in their study assessing barriers and facilitators to healthy eating habits among college students.

Additionally, Moe at al. (2018) used the model in their review to guide the identification of barriers to care and the impact of external factors for individuals experiencing a first episode of psychosis. In their study of rehabilitation providers caring for hip fracture patients in skilled nursing facilities, Wong and Leland (2018) utilized the SEM to understand more fully the barriers and facilitators to patient engagement. Soderlund (2017) used the SEM in their review to determine multilevel factors associated with successful physical activity interventions for Hispanic women with type two diabetes. Tanhan and Francisco (2019) used the SEM to guide their understanding of mental health issues among Muslims in the United States. The SEM was utilized by Davidson et al. (2018) to develop a framework on which to base ethical practice in nursing.

The SEM by McLeroy et al. (1988) demonstrates the understanding that the focus of health promotion and disease prevention cannot reside solely with the individual. The model supposes the social context of the individual—and its associated influence on their choices of whether or not and how to behave—must be considered as well. This realization aids in a more holistic assessment of factors affecting behavior choices and provides insight into multilevel interventions. Interventions targeting more than just the individual are potentially more effective in health promotion behavior change. The model emphasizes the role of the intrapersonal, interpersonal, organizational, community, and public policy levels concerning individual behavior and the potential effect of each level

on the others. The primary assumption of the model is that behavior is influenced and established by intrapersonal, interpersonal, organizational, community, and public policy factors, and interventions are based on the ideas and perceptions of these factors (McLeroy et al., 1988; Simons-Morton et al., 2012).

The intrapersonal level of the model assesses behavior as it is determined by the individual and individual characteristics such as knowledge, attitudes, skills, values, beliefs, self-concept, perceptions, and locus of control. This level provides an understanding of the relationship between these characteristics and behavior and provides insight into areas for behavior change intervention. Interventions at this level could involve things such as education, advertisement through multiple channels, and support groups (McLeroy et al., 1988; Simons-Morton et al., 2012).

The interpersonal level of the model evaluates behavior as it is influenced by the relationship of an individual with others, and the opinion of those others about the behavior. Moreover, this level allows evaluation of the structure of those relationships and considers indirect connections. These relationships can be within both formal and informal networks, including family, workgroups, school groups, neighborhoods, community groups, healthcare groups, and friendships. The interpersonal level provides understanding into the effect of others on individual behaviors and, similar to the intrapersonal level, provides insight into areas for behavior change intervention. Interpersonal interventions would focus on addressing the social network and transforming social norms and influence (McLeroy et al., 1988; Simons-Morton et al., 2012).

The organizational level of the model assesses behavior as it is established by the influence of organizations to which an individual belongs. These organizations include work, school, religious, healthcare, recreational, etc., and provide some level of rules and regulations by which an individual generally abides. Organizations can provide access to health promotion activities in which an individual can participate. Interventions at this level are focused on organizational attributes that encourage health promotion behavior and/or change within an organization to enable it to better support and influence health promotion behavior. Organizational culture is an important consideration at this level (McLeroy et al., 1988; Simons-Morton et al., 2012).

The community level of the model examines the interplay and influence of the core community groups to which an individual belongs, relationships among community organizations, and inherent community decision-making bodies on health promotion behavior. This level recognizes the importance of groups working together to support and effect health promotion behavior change. Additionally, the community level recognizes the importance of including marginalized groups in planning to improve the capacity and sustainability of health promotion interventions. Interventions at the community level focus on increased access, target population input, enhanced community organization relationships to streamline resources, and the development of community coalitions. Support for health promotion behavior at the community level can ultimately affect individual behavior change (McLeroy et al., 1988; Simons-Morton et al., 2012).

The public policy level of the model evaluates the influence of policies, laws, and regulations on health promotion behavior. This level stresses the important consideration

of how ideas around needed change in public health and health promotion affect policy and how, in turn, policy affects those ideas. The public policy level offers the opportunity to create health promotion behavior change on a broad social spectrum, which has the potential to create individual change. Interventions at this level focus on policy development, implementation, evaluation, and change to meet target population needs and promote health (McLeroy et al., 1988; Simons-Morton et al., 2012).

This study utilized the first three levels of the SEM proposed by McLeroy et al. (1988), as shown in Figure 1. The model was used to identify intrapersonal level factors affecting community pharmacists' support of implementation of syringe exchange programs in community pharmacies in North Carolina, including age; gender; type of community pharmacy where they practice the majority of the time; current role at the community pharmacy where they practice the majority of the time; approximate number of years worked as a practicing pharmacist; approximate number of full-time pharmacists employed at the community pharmacy where they practice the majority of the time; the county location of the community pharmacy where they practice the majority of the time; beliefs about syringe exchange programs; concern about whether it is lawful to operate a syringe exchange program in a pharmacy and personal liability; and receiving education on syringe exchange programs. The model was used to identify interpersonal level factors as possible factors affecting community pharmacists' support of implementation of syringe exchange programs in community pharmacies in North Carolina, including concern about the disapproval of colleagues and customers who are not injection drug users, having increased numbers of injection drug users in the pharmacy, and how to

interact with injection drug users and receiving injection drug user cultural competency training. The model was used to identify organizational level factors as possible factors affecting community pharmacists' support of implementation of syringe exchange programs in community pharmacies in North Carolina, including concern about company/store policy, cost of supplies, and the time required to operate a syringe exchange program; having a company/store policy that allows implementation of a syringe exchange program; and receiving training on how to implement a syringe exchange program. The model was used to identify possible factors at each level through assessment of free text qualitative responses regarding any other thoughts about the implementation of syringe exchange programs in community pharmacies in North Carolina.

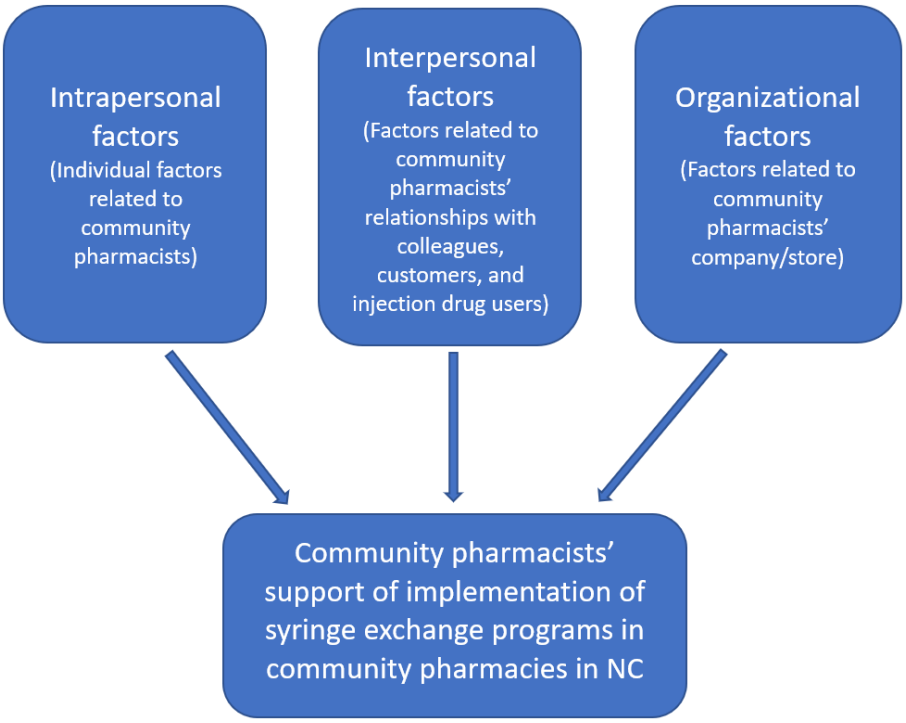

Figure 1. Social Ecological Model (McLeroy et al., 1988).

Definition of Theoretical Terms

HCV infection (theoretical)—as defined by the Mayo Clinic, "Hepatitis C is a viral infection that causes liver inflammation, sometimes leading to serious liver damage" (Mayo Clinic, 2019, "Overview," para. 1).

Injection drug users (theoretical)—also referred to as IDUs or PWID as defined by the CDC, are "persons who inject drugs" (CDC, 2018).

Syringe exchange program (theoretical): as defined by the CDC, is

> community-based prevention programs that can provide a range of services, including linkage to substance use disorder treatment; access to and disposal of sterile syringes and injection equipment; and vaccination, testing, and linkage to care and treatment for infectious diseases. (CDC, 2019a, "Syringe Services Programs (SSPs)," para. 1).

Prevention (theoretical)—also referred to as primary prevention as defined by the CDC, is "intervening before health effects occur, through measures such as vaccinations, altering risky behaviors (poor eating habits, tobacco use), and banning substances known to be associated with a disease or health condition" (CDC, n.d., p. 1).

Pharmacist (theoretical)—as defined by Pham (2015), is one who "dispense[s] medications, advise[s] on side effect management, discuss[es] drug-drug interactions, counsel[s] on nutrition, and provide[s] health education and other preventive services" (para. 4).

Chain community pharmacy (theoretical)—as generally defined by the American Pharmacists Association (APhA) and Qato et al. (2017) is a community pharmacy that

"consists of four or more stores" (APhA, n.d.a, p. 1), "including large retail pharmacies such as Walgreens or Rite Aid" (Qato et al., 2017, p. 4).

Independent community pharmacy (theoretical)—as defined by the American Pharmacists Association, "may be a single store with a sole proprietor or may consist of several stores owned by an individual or small group" (APhA, n.d.b, p. 1).
Intrapersonal level (theoretical): as defined by McLeroy et al. (1988), is "characteristics of the individual such as knowledge, attitudes, behavior, self-concept, skills, etc." (p. 355).

Interpersonal level (theoretical)—as defined by McLeroy et al. (1988), is "formal and informal social network and social support groups, including the family, work groups, and friendship networks" (p. 355).

Organizational level (theoretical)—as defined by McLeroy et al. (1988), is "social institutions with organizational characteristics, and formal (and informal) rules and regulations for operation" (p. 355).

Definition of Operational Terms

HCV infection (operational)—for this study, defined as a positive HCV infection screening test.

Injection drug user (operational)—for this study, defined as a person who uses a syringe to inject drugs intravenously.

Syringe exchange program (operational)—for the purpose of this study will be defined as a program that offers needles, hypodermic syringes, and other injection supplies at no cost; disposal of used needles and hypodermic syringes; educational

materials on overdose prevention, communicable disease prevention, and referrals to mental illness and substance use disorder treatment; and naloxone or referrals to programs that provide naloxone.

Prevention (operational)—for this study, defined as activities aimed at protecting injection drug users from acquiring HCV infection.

Pharmacist (operational)—for this study, defined as a healthcare professional licensed to practice pharmacy in the state of North Carolina.

Chain community pharmacy (operational)—for this study, defined as a pharmacy registered as a chain community pharmacy with the NCBOP.

Independent community pharmacy (operational)—for this study, defined as a pharmacy registered as an independent community pharmacy with the NCBOP.

Intrapersonal level (operational)—as defined by McLeroy et al. (1988), is "characteristics of the individual such as knowledge, attitudes, behavior, self-concept, skills, etc." (p. 355).

Interpersonal level (operational)—as defined by McLeroy et al. (1988), is "formal and informal social network and social support groups, including the family, work groups, and friendship networks" (p. 355).

Organizational level (operational)—as defined by McLeroy et al. (1988), is "social institutions with organizational characteristics, and formal (and informal) rules and regulations for operation" (p. 355).

Research Questions

Research Question 1

What are the primary intrapersonal, interpersonal, and organizational factors influencing community pharmacists' support of the implementation of syringe exchange programs in community pharmacies in North Carolina?

Research Question 2

What is the relationship between intrapersonal factors and community pharmacists' level of support of the implementation of syringe exchange programs in community pharmacies in North Carolina?

Research Question 3

What is the relationship between interpersonal factors and community pharmacists' level of support of the implementation of syringe exchange programs in community pharmacies in North Carolina?

Research Question 4

What is the relationship between organizational factors and community pharmacists' level of support of the implementation of syringe exchange programs in community pharmacies in North Carolina?

Research Question 5

Are there differences between pharmacists practicing in chain and independent community pharmacies in their level of support of the implementation of syringe exchange programs in community pharmacies in North Carolina?

Research Question 6

Are there differences between pharmacists practicing in chain and independent community pharmacies in the primary intrapersonal, interpersonal, and organizational factors influencing their support of the implementation of syringe exchange programs in community pharmacies in North Carolina?

Contribution to Nursing Science

This study advances the science of nursing through interdisciplinary work to increase access to disease prevention and health promotion community services to a high-risk, vulnerable population. This stance is supported through statements by the American Nurses Association (ANA), International Council of Nurses (ICN), and Association of Nurses in AIDS Care (ANAC). The ANA position statement on health promotion and disease prevention states,

> Nursing must expand its efforts to design and implement interventions which support promotion of health and prevention of disease/illness and disability. Preventing illness and staying well involve complex, multidimensional activities focused not only on the individual, but also on families, groups, and populations. (ANA, 1995, para. 1)

Additionally, the ANA position statement on needle exchange and HIV states,

> The ANA supports the availability of needle exchange programs which include: . . . Access to needle exchange programs at the local community level . . . The utilization of qualified health care providers, including nurses, as resources for quality, cost-effective program outcomes . . . (ANA, 1993, para. 1)

Furthermore, the ANA Code of Ethics for Nurses Provision 1 states, “The nurse practices with compassion and respect for the inherent dignity, worth, and unique

attributes of every person" under which Section 1.2 specifically states, ". . . When patient choices are risky or self-destructive, nurses have an obligation to address the behavior and to offer opportunities and resources to modify the behavior or to eradicate the risk" (ANA, 2015, p. 1). Likewise, Provision 3 states, "The nurse promotes, advocates for, and protects the rights, health, and safety of the patient" (ANA, 2015, p. 9), and Provision 8 states, "The nurse collaborates with other health professionals and the public to protect human rights, promote health diplomacy, and reduce health disparities" (ANA, 2015, p. 31). Similarly, Element 1 of the ICN Code of Ethics for Nurses states, "The nurse shares with society the responsibility for initiating and supporting action to meet the health and social needs of the public, in particular those of vulnerable populations" (ICN, 2012, p. 2). Finally, the ANAC position statement on syringe access programs states, "Syringe Access programs are an effective method of preventing the spread of HIV infection, Hepatitis B and C and other bloodborne pathogens among injection drug users without encouraging the use of illegal drugs" and "Federal funds should be released to support the development, implementation, and continued capabilities of Syringe Access programs around the country" (ANAC, 2009, p. 1).

Summary

Hepatitis C virus infection cases in the United States and North Carolina have risen dramatically over the last decade. Treatment and follow-up care required for HCV infection are costly to patients, families, and the healthcare system as a whole. Hepatitis C virus infection poses significant health risks to those infected through the progression of liver disease to liver cirrhosis, liver cancer, liver failure, liver transplantation, and

death, creating a burden of disease and adding to the issue of cost. To mitigate the burden of disease and associated costs, and work toward the WHO viral hepatitis elimination goal, prevention of HCV infection is imperative. Injection drug users account for an estimated 75% of acute HCV infection cases in the United States, making them a priority population for HCV infection prevention focus.

Syringe exchange programs provide HCV infection prevention in injection drug users through access to sterile syringes, proper syringe disposal, and HCV infection risk and prevention education. Additionally, syringe exchange programs provide access to other health-related services and referrals, including those for substance use disorder treatment. Community pharmacies are in an ideal position to serve in this role, especially in areas of the state where syringe exchange services access is limited. In order to capitalize on this position, it is vital to understand factors associated with and influencing community pharmacists' support of the implementation of pharmacy-based syringe exchange programs. Understanding these factors can provide insight into the development of future interventions with which to mitigate identified barriers. Thus, the focus of this study was to examine NC community pharmacists' support of the implementation of syringe exchange programs in community pharmacies in North Carolina and associated factors, including differences in pharmacy ownership or type.

The SEM proposed by McLeroy et al. (1988) was used to guide this study. Interpersonal, intrapersonal, and organizational levels of the model were included for a comprehensive determination of factors associated with and influencing community pharmacists' support of the implementation of syringe exchange programs in community

pharmacies in North Carolina. In this study, the PI examined factors influencing NC community pharmacists' support of the implementation of syringe exchange programs in community pharmacies in North Carolina; factors associated with community pharmacists' support, including beliefs about syringe exchange programs; differences between pharmacists practicing in chain and independent community pharmacies in their level of support; and differences between pharmacists practicing in chain and independent community pharmacies in the primary intrapersonal, interpersonal, and organizational factors influencing their level of support.

CHAPTER II

LITERATURE REVIEW

Background

While legal in many U.S. states, the number of syringe exchange programs is limited. As of 2018, there were only 320 reported syringe exchange program locations throughout the nation (KFF, 2019). Research has shown that limited numbers of syringe exchange programs create an issue of limited access for injection drug users (Canary et al., 2017; Davis et al., 2018; Deryabina & El-Sadr, 2017; McCutcheon & Morrison, 2014; Welch-Lazoritz et al., 2017) and limited access affects syringe-sharing behaviors (Beletsky et al., 2014; Clarke et al., 2016; DeCuir et al., 2018; O'Keefe et al., 2018). To mitigate these issues for injection drug users in the United States, it has been suggested incorporation of syringe exchange services in community pharmacies is needed (Kim et al., 2015; NCBOP, 2016; NCHRC, 2019a; Quinn et al., 2014; Siddiqui et al., 2015; WHO, 2007, 2017; Yang et al., 2016). Community pharmacies are in a position to serve as an additional source of sterile syringe acquisition for injection drug users, leading to a reduction in high-risk injecting behaviors and risk for HCV infection (Kim et al., 2015; McCutcheon & Morrison, 2014; NCBOP, 2016; NCHRC, 2019a; Siddiqui et al., 2015; WHO, 2007, 2017). Community pharmacies are in a position to provide access to proper syringe disposal, HCV infection risk and prevention education, as well as other syringe exchange services, enhancing protection for injection drug users and the community as a

whole (Kim et al., 2015; Quinn et al., 2014; Rose et al., 2014; WHO, 2007, 2017; Yang et al., 2016).

Conceptual Framework

The social ecological model was used to guide this review to examine the state of the science on factors affecting the implementation of pharmacy-based syringe exchange programs. Developed by McLeroy et al. (1988), the Social Ecological Model focuses on the interrelatedness of individuals, relationships, environment, policies, and behavior (Simons-Morton et al., 2012). The model proposes that behavior is influenced and established by intrapersonal, interpersonal, organizational, community, and public policy factors (McLeroy et al., 1988; Simons-Morton et al., 2012). The intrapersonal, interpersonal, and organizational constructs were applied to this review.

The intrapersonal level of the model assesses behavior as it is determined by the individual and characteristics related to the individual. Individual characteristics include things such as beliefs, attitudes, knowledge, skills, values, self-concept, perceptions, and locus of control. This level provides understanding into the relationship between these characteristics and behavior and insight into areas for behavior change intervention (McLeroy et al., 1988; Simons-Morton et al., 2012).

The interpersonal level of the model evaluates behavior as it is influenced by the relationship of an individual with others, and the opinion of those others about the behavior. Also, this level allows evaluation of the structure of those relationships and considers indirect connections. These relationships can be within both formal and informal networks, including family, work groups, school groups, neighborhoods,

community groups, healthcare groups, and friendships. The interpersonal level provides understanding into the effect of others on individual behaviors and, similar to the intrapersonal level, provides insight into areas for behavior change intervention (McLeroy et al., 1988; Simons-Morton et al., 2012).

The organizational level of the model assesses behavior as it is established by the influence of organizations to which an individual belongs. These organizations include work, school, religious, healthcare, recreational, etc. and provide some level of rules and regulations by which an individual generally abides. Organizations can provide access to health promotion activities in which an individual can participate. Interventions at this level are focused on organizational attributes that encourage health promotion behavior and/or change within an organization to enable it to better support and influence health promotion behavior. Organizational culture is an important consideration at this level (McLeroy et al., 1988; Simons-Morton et al., 2012).

The integrative review method proposed by Whittemore and Knafl (2005) was undertaken to determine current knowledge and associated gaps around intrapersonal, interpersonal, and organizational factors affecting the implementation of pharmacy-based syringe exchange programs. The integrative review methodology was chosen to provide a comprehensive review of relevant literature. The literature search was conducted using the Academic Search Complete, Medline, ProQuest Central, WorldCat.org, Cumulative Index of Nursing and Allied Health Literature (CINAHL) Complete, ProQuest Central Dissertations and Theses, PsychINFO, PubMed, Scopus, and Social Work Abstracts databases.

Literature search terms were developed according to recommendations of Creswell and Creswell (2018) and Roberts and Hyatt (2019) and reviewed with the health sciences reference librarian for accuracy, breadth, and pertinence. Due to the limited number of eligible articles and to better determine the current state of the science, the search was expanded to peer-reviewed research conducted in the United States and published between 1998 and 2019. The research must have included pharmacists in the sample population. Non-research literature was excluded, including reviews. Titles and abstracts were reviewed for pertinence, and removal of duplicates followed by full-text article reviews were performed for those deemed relevant. A total of 14 articles were included in this literature review. Reference lists of the 14 articles chosen for the review were examined to determine the presence of additional literature meeting inclusion criteria. No additional literature was identified with this process. Through personal communication with the NC Board of Pharmacy and the primary researcher, one poster was included in the review based on its pertinence to the topic and setting.

Intrapersonal Factors

Chiarello (2016) conducted a qualitative comparative study with 17 community pharmacists practicing in California, Kansas, Mississippi, and New Jersey using semi-structured, in-depth interviews to examine barriers to nonprescription syringe sales to injection drug users. The sample of this study was chosen from the sample of a larger study that examined pharmacists' ethical decision-making in daily practice based on their responses about ethics around syringe distribution. While the author did not identify barriers to pharmacy-based syringe exchange programs exclusively, they did identify

barriers to nonprescription syringe sales, the equivalent of syringe distribution as a component of syringe exchange.

Findings revealed that while the majority of participants (N = 13) were aware that the provision of clean syringes to injection drug users prevents the spread of infectious diseases, concern about the promotion of drug use led to hesitation in conducting nonprescription syringe sales. Despite organizational policy allowing nonprescription syringe sales, some pharmacists used personal discretion on whether to conduct sales and identified suspected drug users based on appearance and behavior. A considerable number of pharmacists (N = 13) developed their own practices to deter injection drug users from frequenting their pharmacy. These pharmacists developed practices such as quizzing suspected drug users on their healthcare provider and health condition, limiting the number of syringes allowed for purchase, and establishing informal policies. Informal policies included requiring the purchase of insulin at the time of the syringe purchase, requiring a prescription, contacting providers to verify syringes were for medical purposes, and requiring in-store rather than drive-through purchases (Chiarello, 2016).

Goodin et al. (2018) conducted a quantitative correlational study with 827 community pharmacists in Kentucky. The study assessed pharmacists' willingness to participate in syringe/needle exchange, pharmacists' attitudes and perceptions of their role in harm reduction as related to overdose, and pharmacists' attitudes and perceptions of their role in public health. The sample was evenly split between urban and rural areas, had slightly more females (50.4%), and represented chain/supermarket pharmacies to a higher degree (58.6%). The authors used an online survey for data collection.

Results indicated that willingness was a potential barrier to syringe/needle distribution and disposal, with 39.1% and 62.6% of pharmacists not willing to participate, respectively. Nearly one-fourth of pharmacists strongly disagreed, and over one-third could neither agree nor disagree that "pharmacists could have a significant public health impact by providing access to syringes and needles for injection drug users." Nearly one-fourth of pharmacists could neither agree nor disagree, and 10.2% strongly disagreed that "access to clean syringes and needles is important to prevent blood-borne infection such as HIV and hepatitis in injection drug users." In multivariable analyses, however, only agreement with the former was a significant predictor to pharmacists' willingness to participate in syringe/needle distribution (AOR = 3.56, 95% CI = [3.06, 4.15]) and disposal (AOR = 2.04, 95% CI = [1.77, 2.35]). Results indicated pharmacists practicing in chain or supermarket pharmacies were 39 percent less likely than pharmacists in independent pharmacies (AOR = 0.61, 95% CI = [0.43. 0.87]) to express willingness to participate in syringe/needle disposal. Female pharmacists were 28 percent less likely than male pharmacists (AOR = 0.72, 95% CI = [0.52, 0.99]) to express willingness to participate in syringe/needle disposal. Both findings were statistically significant (Goodin et al., 2018).

Furthermore, results indicated that while nearly two-thirds of community pharmacists sold syringes without a prescription, significantly fewer independent pharmacists sold syringes without a prescription compared to chain/supermarket pharmacists (51.9% and 71.5%, respectively; $p < 0.01$). Chain/supermarket pharmacists reported selling more syringes/needles than did independent pharmacists ($p = 0.01$);

however, they reported denying requests for syringes/needles more often ($p < 0.01$). Chain/supermarket pharmacists reported concerns about clientele in the pharmacy (75%, $p < 0.01$) and finding or handling used needles (100%, $p = 0.01$) more frequently. Independent pharmacists were generally more willing to participate in syringe/needle distribution ($p = 0.04$) and disposal ($p < 0.01$) compared to chain/supermarket pharmacists, though they reported problems with record-keeping significantly more frequently (72.7% vs. 27.3%, $p = 0.02$). The majority of community pharmacists (62.6%) were unwilling to participate in syringe/needle disposal. When asked to respond to an open-ended question about what barriers existed to selling syringes without a prescription, a total of 172 pharmacists reported at least one barrier, while 655 pharmacists did not indicate a barrier. The most commonly reported barrier was ethical concerns about supplying materials for abuse or illegitimate use (Goodin et al., 2018).

Meyerson et al. (2018) conducted a quantitative comparative study where 298 managing pharmacists in Indiana were surveyed to identify factors predicting nonprescription syringe sales to injection drug users. The sample was evenly split between male and female pharmacists, and the majority of pharmacists worked in chain pharmacies (57.4%). Results indicated that the majority of pharmacists did not feel comfortable distributing syringes to injection drug users (85.9%) and did not agree that injection drug users should be allowed to buy syringes without a prescription (58.7%). Nearly half reported personal disagreement with supplying injection drug users with syringes (46.3%) and did not agree that dispensing syringes to injection drug users would reduce harm to addicts in their community (49.0%). Nearly half did not agree that over-

the-counter syringe sales was an effective way to protect the health of injection drug users (46.6%).

In the independent bivariate analysis, pharmacists who felt comfortable distributing syringes to injection drug users and had been asked by anyone about the sale of syringes for nonprescription use had significantly higher odds of working in a pharmacy that sells syringes without a prescription to injection drug users. This was also the case for pharmacists who agreed that dispensing syringes to injection drug users reduced harm to addicts in their community, agreed that injection drug users should be allowed to buy syringes without a prescription, and did not have a personal disagreement with supplying injection drug users with syringes. With multivariable analysis, significantly higher odds remained for all factors except pharmacists who did not have a personal disagreement with supplying injection drug users with syringes (Meyerson et al., 2018).

Additional independent bivariate analysis demonstrated that male pharmacists had significantly higher odds of being comfortable with selling syringes without a prescription to injection drug users, as did pharmacists who had been asked about the sale of syringes for nonprescription use by medical providers and other pharmacists. Significantly higher odds of being comfortable with this practice were seen in pharmacists who worked in a pharmacy that currently sold syringes to injection drug users and stocked naloxone, did not work in a chain pharmacy, and agreed that dispensing syringes to injection drug users reduced harm to addicts in their community. Pharmacists who agreed that injection drug users should be allowed to buy syringes

without a prescription and did not have personal disagreement with supplying injection drug users with syringes had significantly higher odds of being comfortable with nonprescription syringe sales to injection drug users (Meyerson et al., 2018).

Multivariable analysis demonstrated that male pharmacists continued to have significantly higher odds of being comfortable with nonprescription syringe sales to injection drug users. Significantly higher odds remained for pharmacists who had been asked about the sale of syringes for nonprescription use by medical providers and pharmacists who worked in a pharmacy that currently sold syringes to injection drug users and stocked naloxone. Pharmacists who agreed that injection drug users should be allowed to purchase syringes without a prescription continued to have significantly higher odds of being comfortable with these sales (Meyerson et al., 2018).

Pollini (2017) conducted a quantitative cross-sectional study with 404 pharmacists and pharmacy staff in 215 pharmacies in two California counties of predominately rural areas with high drug use and limited access to syringe exchange programs. The author investigated self-reported syringe sales policies in retail pharmacies in these counties and factors associated with nonprescription syringe sales to known or suspected injection drug users. Of the 404 participants, 386 provided information on their pharmacy syringe sales practices. The majority of these respondents were female (57.3%) and worked at chain pharmacies (89.4%), and nearly half were pharmacists (49.7%). Despite the majority of participants believing that pharmacies could be an important resource of healthcare for injection drug users (82.1%) and being willing to provide information/resources to injection drug users who purchase syringes at their pharmacy

(83.9%), over half were concerned that providing syringes to injection drug users encouraged drug use (60.4%). Over half of the participants believed that only people who have a medical condition should be allowed to buy syringes. Only 61.1 percent of the participants knew that syringe sales to injection drug users 18 years of age and older were legal.

Univariate analysis demonstrated that being a pharmacist ($p = 0.049$), working at chain pharmacies ($p < 0.001$), knowing that syringe sales to injection drug users were legal ($p < 0.001$), and agreement that pharmacies could be an important resource for injection drug users ($p = 0.036$) were significantly associated with syringe sales to injection drug users. Agreement that only those with medical conditions should be allowed to purchase syringes ($p < 0.001$) and concern that selling syringes to injection drug users encouraged drug use ($p < 0.001$) were significantly negatively associated with syringe sales to injection drug users (Pollini, 2017). Multivariable analysis demonstrated that participants working at independent/other pharmacies and agreeing that only people with medical conditions should be able to buy syringes had lower odds of selling syringes to injection drug users. Participants had higher odds of selling syringes to injection drug users when basing syringe sales on personal discretion only (AOR = 1.37, 95% CI = [0.59, 3.20]) compared to store policy only and when knowing that selling syringes to injection drug users without a prescription was legal (AOR = 3.38, 95% CI = [1.75, 5.40]). *P*-values were not provided for the adjusted odds ratios (Pollini, 2017).

Rose et al. (2014) conducted a qualitative case study using semi-structured interviews to assess the feasibility of using pharmacies as public health venues to provide

health-related services to injection drug users. The authors used quota sampling to recruit a total of 23 pharmacy policymakers, owners/managers, dispensing pharmacists, and staff from 110 community chain and independent pharmacies in San Francisco, California. Dispensing pharmacists accounted for 14 of the 23 study participants. The majority of participants were male (74%) and worked in chain pharmacies (60%). The authors investigated eight potential health services including the provision of educational materials, enhanced syringe access, syringe disposal, methadone administration, provision of naloxone for overdose prevention, safer injection and overdose prevention training programs, clinical testing and vaccination, and directly observed therapy. Results demonstrated that participants ranked coupon syringe exchange programs (N = 13), provision of educational materials (N = 10), provision of free syringes (N = 6), and safe syringe disposal (N = 6) as the most feasible interventions. Specific to syringe exchange services, results demonstrated that while participants were overall supportive of enhanced syringe access, the perception of injection drug users as undesirable patients was reported as a barrier. Concern about enabling drug use affected the willingness of pharmacists to provide safer injection training.

Stopka, Donahue, Hutcheson, and Green (2017) conducted a quantitative cross-sectional study with 809 pharmacy staff in Massachusetts. The authors investigated the prevalence of nonprescription naloxone and syringe sales, factors associated with nonprescription syringe sales, geospatial access to nonprescription naloxone and syringe selling pharmacies, and targets for potential interventions. The sample represented both chain and independent pharmacies and included a total of 567 pharmacists (68.8%). The

majority of pharmacies were chain (85.8%). A phone survey was used for data collection. Results indicated that the majority of pharmacies surveyed sold nonprescription syringes (97.5%). Of the pharmacies selling nonprescription syringes, chain pharmacies were more likely to do so than independent pharmacies (99.9% vs. 83.5%, $p < 0.001$) and, on average, sold more syringes per week (165.5 vs. 61.4. $p < 0.01$). Although chain pharmacies sold on average more syringes per week, they refused nonprescription syringe sales more often than did independent pharmacies (673 vs. 93, $p < 0.0001$). Compared to independent pharmacies, chain pharmacies were more likely to sell syringes in 10-packs (95.2% vs. 78.1%, $p < 0.001$) and less likely to sell single syringes (15.6% vs. 30.2%, $p < 0.001$). Chain pharmacies were more likely to require customers to provide identification when purchasing nonprescription syringes (89.2% vs. 53.1%, $p < 0.0001$).

Zaller, Yokell, Apeakorang, Gaggin, and Case (2012) conducted a qualitative descriptive study of 21 pharmacy staff (pharmacists and pharmacy technicians) and 21 injection drug users in Providence, Rhode Island. The study intended to better understand issues around syringe purchases from both perspectives. Pharmacy staff were employed at community chain and independent pharmacies and were recruited by phone or in-person using purposive sampling. The authors used digitally recorded, in-person, in-depth, semi-structured interviews for data collection. Specific to pharmacy staff, the majority were pharmacists (71%). Themes that emerged from the study were the number of syringes sold; individual attitudes, beliefs, and perceptions; interpersonal experiences buying or selling syringes; and injection drug user/pharmacist relationship.

Results from pharmacy staff interviews indicated that the number of syringes sold depended on the discretion of the pharmacy staff. A dispensing pharmacist in a chain pharmacy commented that some pharmacy staff altered their practice to discourage injection drug users from making nonprescription syringe purchases. Specifically, they moved from selling inexpensive single syringes to selling more expensive larger quantities of syringes only, when nonprescription syringe sales became legal. A pharmacy technician in a chain pharmacy indicated nonprescription syringe sales to injection drug users depended on the pharmacist on duty and their associated views. Another pharmacy technician in a chain pharmacy suggested pharmacy staff differentiated between injection drug users and other pharmacy customers with a comment that drug users were apparent by their behavior, appearance, and speech (Zaller et al., 2012).

Rose and Raymond (2010) conducted a mixed methods descriptive study with 55 pharmacy staff and pharmacists in San Francisco, California community pharmacies participating in the Disease Prevention Demonstration Project. The authors used a mailed, self-administered survey with all 55 participants and a brief interview with 11 of those participants to document the experiences, practices, and challenges associated with nonprescription syringe sales. No sociodemographic characteristics or information on employment status were collected with the survey or the interviews. Survey data demonstrated that the majority of participants represented chain pharmacies (98%) and reported none or very few challenges with nonprescription syringe sales (72%). One challenge cited, however, was time management (24%). Interview data suggested

participants were conflicted between providing a public health service and supporting continued drug use.

Cooper et al. (2010) conducted a quantitative correlational study of 67 community pharmacies in San Francisco (SF) County and 171 community pharmacies in Los Angeles (LA) County, California (N = 238 in total). The author sought to describe nonprescription syringe sales and examine associated factors. The authors used a survey that was mailed, faxed, or conducted as an interview in-person. The sample represented chain (52%), independent (43%), and care (5%) pharmacies and included pharmacists and pharmacy staff. Nonprescription syringe sales in the last 12 months were reported by 42% of the participants. The estimated proportion of injection drug users among customers making nonprescription syringe purchases was 66% in SF County and 16% in LA County, a significant difference between counties ($p < 0.001$). Sixty percent of study participants reported no problems associated with nonprescription syringe sales in their pharmacy. Results for refusals to sell nonprescription syringe sales indicated that one-fourth of pharmacies refused sales sometimes or often. All reasons for refusals cited by participants were significantly different between counties and more likely to be exercised by participants in LA County pharmacies. The most frequently cited reasons for refusals were intoxication (78%), known injection drug users (72%), and unfamiliar customers (65%) in LA County and intoxication (32%) and excessive purchases (26%) in SF County.

Bivariate analysis demonstrated that one or more nonprescription syringe sales compared to no sales in the last year was significantly more likely ($p < 0.05$) in

pharmacists who agreed it is important to provide clean syringes to people who cannot stop injecting drugs (86% vs. 68%). Likewise, this was significantly more likely in pharmacists who agreed that pharmacy access to syringes is an important public health measure (93% vs. 83%), and HIV/AIDS is an important health concern in the area of their pharmacy (83% vs. 72%). Conversely, sales compared to no sales in the last year was significantly less likely ($p < 0.05$) in pharmacists who agreed that injection drug users would continue to share syringes at the same rate, even if they had increased access to clean syringes (30% vs. 43%). This was the case in pharmacists who agreed that an increase in syringe access would increase the number of syringes found on the street and playgrounds (37% vs. 55%). Participants in chain pharmacies (68%, $p < 0.001$) compared to independent (13%) and care (10%) pharmacies, and pharmacies located in grocery stores (60%) were more likely to have had one or more nonprescription syringe sales in the last year ($p < 0.05$). In multivariable analysis, pharmacists who agreed that access to clean syringes was important for HIV prevention (AOR = 2.95, 95% CI = [1.10, 7.92]), were in chain pharmacies (AOR = 12.5, 95% CI = [4.55, 33.33]), and were in SF county pharmacies (AOR = 4.88, 95% CI = [1.94, 12.28]) were significantly more likely to have sold nonprescription syringes (Cooper et al., 2010).

Tesoriero, Battles, Klein, Kaufman, and Birkhead (2009) conducted a quantitative longitudinal study in New York State with 506 and 682 managing pharmacists in 346 pharmacies in 2002 and 2006, respectively. The authors investigated changes in practices, attitudes, and experiences with the Expanded Syringe Access Program permitting nonprescription syringe sales in pharmacies. The authors used a mailed survey for data

collection. Results indicated that while the majority of participants reported “no problems” or “very few problems” associated with nonprescription syringe sales in both years, there was a significant change from “no problems” (78.1% in 2002, 69.0% in 2006) toward “very few problems” (15.5% in 2002, 24.3% in 2006) between 2002 and 2006 ($p = 0.029$). Although reports of “some” or “many” problems were low both survey years, results indicated that participants in New York City (NYC) pharmacies had higher odds of reporting these compared to those in the remainder of the state. While higher odds were indicated for 2002 (OR = 3.3, 95% CI = [1.3, 10.0], $p = 0.02$) and 2006 (OR = 2.0, 95% CI = [0.9, 10.0]), results were only significant in 2002. Chain pharmacies had consistently higher odds of reporting “some” or “many” problems associated with nonprescription syringe sales in 2002 (OR = 2.5, 95% CI = [0.8, 7.8]) and 2006 (OR = 2.1, 95% CI = [0.7, 6.5]), although not significant in either year. New York City pharmacists were more likely to sell single syringes than those in the remainder of the state in 2002 (58.1% vs. 44.1%) and 2006 (60.5% vs. 43.0%); however, significance was not specified. New York City pharmacists sold more syringes on average than did those in the remainder of the state in 2002 (71.0 vs. 39.3, $p = 0.001$) and 2006 (89.1 vs. 63.8, $p = 0.03$). Chain pharmacists sold more syringes on average than did independent pharmacists in 2006 (75.1 vs. 45.3, $p = 0.001$).

In multivariable analysis, independent pharmacists were more likely to report accepting used syringes for disposal than chain pharmacists in 2002 (22.0% vs. 2.6%, OR = 8.9, $p = 0.04$) and 2006 (21.6% vs. 5.1%, OR = 6.1, $p = 0.001$). Independent pharmacists (18.6% vs. 6.8%, OR = 2.9, $p = 0.01$) and NYC pharmacists (23.1% vs. 8.6,

OR = 2.9, $p = 0.03$) were more likely to report providing free sharps containers than chain pharmacists and pharmacists in the remainder of the state respectively in 2006. Pharmacists outside of NYC were more likely to provide counseling on safe syringe disposal than NYC pharmacists in 2002 (63.7% vs. 38.5%, OR = 3.10, $p = 0.002$) and 2006 (65.1% vs. 38.5%, $p = 0.001$). The OR was not provided for 2006. In 2002, NYC pharmacists and chain pharmacists were more likely to agree/strongly agree that participation in the Expanded Syringe Access Program had made customers in their pharmacy uncomfortable/fearful (OR = 5.6, $p = 0.002$; OR = 6.2, $p = 0.020$, respectively). New York City pharmacists were more likely to agree/strongly agree in 2002 that an increased number of used syringes had been found on their premises during participation (7.3% vs. 2.7%, OR = 4.6, $p = 0.052$). In 2002 and 2006, NYC pharmacists were more likely to agree/strongly agree that participation in the program had increased shoplifting in their pharmacy (11.6% vs. 1.7%, OR = 11.1, $p = 0.002$ and 11.6% vs. 3.8%, OR = 5.9, $p = 0.007$, respectively). Confidence intervals were not provided (Tesoriero et al., 2009).

Deibert et al. (2006) conducted a quantitative comparative, cross-sectional study to assess structural and individual-level changes in pharmacy syringe sales to injection drug users between 1996 and 2003 in Seattle and suburban King County, Washington. These comparisons represented a time before the legalization of pharmacy syringe sales (1996) and a time afterward (2003). The authors replicated a 1996 study of 104 Seattle pharmacists to examine changes in syringe test-buys conducted at pharmacies and pharmacists' attitudes and practices around pharmacy syringe sales to injection drug

users. The authors utilized telephone surveys with pharmacists and syringe-test purchases in selected retail pharmacies. The study sample included a total of 227 pharmacists with 107 Seattle and 120 suburban King County, Washington pharmacists and a total number of syringe-test purchases of 100.

Although noted in 1996 only, results indicated 85% of pharmacists practicing pharmacy for 10 years or less were willing to counsel injection drug users on the hazards associated with illicit drug use compared to only 53 percent of pharmacists practicing pharmacy for over 10 years ($p < 0.01$). Results for the 2003 cohort of pharmacists indicated that those working in independent pharmacies were more likely than their corporate chain counterparts to agree that syringes should be available to injection drug users through pharmacy sales ($p < 0.01$) and that it is appropriate to sell syringes to injection drugs users ($p = 0.04$). In 1996, pharmacists working in independent pharmacies were more likely to counsel injection drug users on the hazards of injection drug use ($p = 0.05$). In the 2003 cohort, pharmacists working in suburban pharmacies were more likely to report syringe sales in the last month than those working in Seattle pharmacies ($p < 0.02$) (Deibert et al., 2006).

Lewis, Koester, and Bush (2002) conducted a qualitative descriptive study that included 32 pharmacists at 24 pharmacies in Denver, Colorado to assess pharmacists' attitudes and concerns regarding syringe sales to injection drug users. Data were collected using one-hour audiotaped interviews. Of the 32 pharmacists, 11 refused to sell syringes to injection drug users, and five were undecided. The most common theme that emerged was concerns about disease transmission and increased drug use. Of those refusing

syringe sales, participants cited not wanting to support behavior that was detrimental to health as a reason for sales refusals. Participants in this group cited several beliefs as reasons for sales refusals. These included beliefs that pharmacists played a role in preventing drug abuse and that sales refusals could discourage drug use, thereby reducing the risk of infectious diseases, and encourage injection drug users to seek addiction treatment. Ambivalence related to not wanting to support destructive behavior led undecided pharmacists rarely to conduct syringe sales to injection drug users. Uncertainty of the legality of syringe sales was another theme that emerged. The majority of pharmacists were unaware of any existing law or regulation around syringe sales (17 out of 32). Eleven pharmacists were aware of a state statute but were unclear on the actual implications. A final theme was business concerns where pharmacists' perceptions of injection drug users as "bad clientele" and being untrustworthy, vandals, and possible threats to others prevented syringe sales.

Reich et al. (2002) conducted a qualitative descriptive study with 58 pharmacists in urban and rural pharmacies in Colorado, Connecticut, Kentucky, and Missouri to assess pharmacist ambivalence around syringe sales to injection drug users. Of the participating pharmacists, 34 were urban and 24 were rural. The authors conducted a total of eight one-hour audiotaped focus groups. The major themes of the study were grouped into categories of "Will Sell," "Conditional Sales," and "Won't Sell." Pharmacists from all but one site fell within the "Won't Sell" category. Moral issues, promotion of drug use, beliefs that access to sterile syringes would not affect risk behavior, and beliefs that syringe exchange programs do not work were cited as reasons for not conducting syringe

sales. Some pharmacists reported little to no actual knowledge on the efficacy of syringe exchange programs or sterile syringe access through pharmacies. Some pharmacists in this study were eager for education on syringe exchange programs. Despite nearly all of the participants being aware of laws in all four states allowing nonprescription syringe sales, pharmacists in every group agreed that the decision to sell syringes was at their discretion. Rural pharmacists were mostly less supportive of pharmacy syringe sales and participating in syringe exchange than their urban counterparts.

Singer, Baer, Scott, Horowitz, and Weinstein (1998) conducted a quantitative descriptive study of 27 pharmacists to examine pharmacy access to syringes among injection drug users in Hartford, Connecticut and surrounding towns within five blocks of the city line. The study was a follow-up to the removal of the ban on nonprescription syringe sales in Connecticut 4 years prior. It utilized face-to-face interviews (23), mailed surveys (2), and phone interviews (2) to collect data. Findings revealed that pharmacists practicing in pharmacies outside of the city of Hartford were less likely to have a store policy allowing nonprescription syringes sales (55.6%) than those within the city (72%) and to have fewer sales, including single syringe sales. Despite store policy allowing nonprescription syringe sales, pharmacists' discretion was allowed in whether to participate.

Ong, Harris, Bible, and Marciniak (2016) investigated barriers to dispensing nonprescription syringes among community pharmacists in North Carolina using a quantitative descriptive, cross-sectional design. The authors used an online 15-item survey for data collection. The sample included a total of 1,067 partially and 904 fully

completed surveys. Of the sample (*N* = 1,067), the majority of pharmacists reported selling nonprescription syringes sometimes (60%), while 30% reported selling always and 8% reported never selling. Of those who reported always selling, 83% cited public health and HIV/HCV prevention and 35% cited personal beliefs as the top reason for that decision. Of those who reported never selling, 70% cited personal beliefs as the top reason for that decision. The top five "extremely important" factors participants considered in the decision to sell nonprescription syringes included customer's sobriety (*N* = 282), federal and state regulations (*N* = 256), concern that syringes may be used for illicit drug use (*N* = 193), if the customer had an insulin prescription (*N* = 192), and pharmacy company policy (*N* = 162). Of the sample (*N* = 904), the majority reported that they would support the legalization of syringe exchange programs (89%) and would refer customers to a syringe exchange program near their pharmacy (87%). One-fourth of the participants, however, reported that they would not support the efforts to update NC law to state the legalization of retail pharmacies selling nonprescription syringes clearly.

Interpersonal Factors

In the qualitative comparative study with 17 community pharmacists in California, Kansas, Mississippi, and New Jersey, Chiarello (2016) identified pharmacists' concerns with nonprescription syringe sales to injection drug users. Pharmacists expressed concerns about their personal reputation in being affiliated with injection drug users and the potential effects on other pharmacy customers, including dangers associated with inappropriate syringe disposal. Pharmacists expressed concern about attracting increased numbers of injection drug users to their pharmacy. Responses (*N* = 172) to an

open-ended question in the quantitative correlational study by Goodin et al. (2018) with Kentucky community pharmacists revealed similar concerns with nonprescription syringe sales. Concern about clientele in the pharmacy (N = 44), finding or handling used needles (N = 6), and reputation with colleagues or the community (N = 5) were reported by community pharmacists.

Results from the quantitative comparative study by Meyerson et al. (2018) of 298 managing pharmacists in Indiana revealed that over half of the participants believed that nonprescription syringe distribution would attract the wrong customers to the pharmacy (55.4%). Nearly one-third of the participants believed that other pharmacists might disapprove of their selling syringes to injection drug users, and 13.4% of pharmacists were concerned about the disapproval of other customers.

In the quantitative cross-sectional study by Pollini (2017) with 404 pharmacists and pharmacy staff in 215 pharmacies in two California counties of predominately rural areas with high drug use and limited access to syringe exchange programs, 386 participants provided information on their pharmacy syringe sales practices. Of those participants, over half agreed that selling syringes to injection drug users was not good business for their pharmacy and 40.2% agreed injections drug users were a disruption to their pharmacy. Over two-thirds of participants were concerned that some customers making nonprescription syringe purchases would feel uncomfortable if given HIV information (68.4%) and information on how to access drug treatment (69.4%). Univariate analysis indicated that all of these factors were significantly negatively associated with nonprescription syringe sales to injection drug users. Multivariable

analysis suggested that participants who agreed that selling syringes to injection drug users was not good business for their pharmacy had 64% lower odds of selling syringes to injection drug users without a prescription compared to those who did not agree (AOR = 0.36, 95% CI = [0.21, 0.63], $p < 0.05$).

Business concerns were a theme that emerged in the qualitative descriptive study by Lewis et al. (2002) with 32 pharmacists at 24 pharmacies in Denver, Colorado. Specifically, pharmacists were concerned about the effect of syringe sales to injection drug users on other pharmacy customers, including the safety and loss of those customers. Pharmacists were concerned about the effects on business and their professional reputations. In the qualitative descriptive study of 58 pharmacists by Reich et al. (2002), the majority of urban and rural pharmacists reported being concerned about the reputation of their pharmacy and attracting the wrong "clientele" and about safety for others with improperly discarded syringes. These concerns were cited as reasons for not using their pharmacies as syringe exchange sites.

Although specific frequencies were not provided, the quantitative descriptive study of 27 pharmacists by Singer et al. (1998) indicated like findings. Pharmacists from four pharmacies in the city of Hartford and one outside of Hartford cited safety issues around inappropriate syringe disposal, an increase of injection drug users in their pharmacy, increased shoplifting, and accounts of these incidents at other stores as the main reasons for not conducting nonprescription syringe sales. The quantitative comparative, cross-sectional study by Deibert et al. (2006) of Seattle and suburban King County, Washington pharmacists in 1996 and 2003 revealed business and safety concerns

as the most frequently cited primary reasons for not selling syringes to injection drug users. Business concerns were reported by 28% of Seattle pharmacists during both years, and safety concerns were reported by 27% and 32% in 1996 and 2003, respectively.

The qualitative case study by Rose et al. (2014) included 23 pharmacy policymakers, pharmacy owners/managers, dispensing pharmacists, and pharmacy staff in San Francisco, California community chain and independent pharmacies. Participants cited concern about injection drug users frequenting the pharmacy too often for syringes as one of the primary reasons that they were hesitant to provide enhanced syringe access. Participants cited concerns about how other customers would feel and the image of the pharmacy with injection drug users frequenting the business. Results from the Providence, Rhode Island community pharmacy staff interviews in the qualitative descriptive study by Zaller et al. (2012) revealed that a bad experience with an injection drug user resulted in a chain pharmacy technician feeling degraded. Pharmacy staff indicated that they were unsure of how to interact with injection drug user customers, and some were unsure of whether injection drug user customers wanted a relationship with them at all. One participant indicated that having education on how to interact with injection drug users would be helpful. Some pharmacy staff indicated that they did not wish to have a formal relationship with their injection drug user customers, but a professional one only.

Rose and Raymond (2010) conducted a mixed methods descriptive study with 55 pharmacy staff and pharmacists in San Francisco, California community pharmacies participating in the Disease Prevention Demonstration Project. The authors used a

mailed, self-administered survey with all 55 participants and a brief interview with 11 of those participants. While survey data indicated that the majority of participants encountered none or very few challenges with nonprescription syringe sales, 28% cited educating patients about syringe disposal was a challenge. Interview data indicated that while participants expressed pride in how they treated nonprescription syringe sales customers, often preparing their syringe packages before their arrival at the pharmacy, there were challenges with communication around the use of terms. All respondents commented it was challenging to understand customer preference for syringe type (length and gauge) based on their common terminology versus manufacturer terms.

In the quantitative correlational study by Cooper et al. (2010) with community pharmacies in SF and LA Counties in California, the most frequently cited reasons for nonprescription syringe sales refusals included safety concerns (67%), concerns about unsafe disposal (46%), and risk of theft (46%) in LA County and safety concerns (43%) and risk of theft (26%) in SF County. The longitudinal study by Tesoriero et al. (2009) with managing pharmacists in New York State in 2002 and 2006 revealed similar results. While the frequency was reasonably low, some pharmacists agreed/strongly agreed that participation in the Expanded Syringe Access Program had made customers in their pharmacy uncomfortable/fearful (7.1% in 2002, 4.4% in 2006), increased the number of used syringes found on their premises (3.2% in 2002 6.1% in 2006), and increased shoplifting in their pharmacy (2.9% in 2002, 4.5% in 2006).

Organizational Factors

Responses to an open-ended question in the quantitative correlational study by Goodin et al. (2018) with 827 Kentucky community pharmacists (N = 172) revealed that conflict with city ordinance or company policy (N = 25), problems with record-keeping (N = 22), time (N = 6), and supply problems (N = 3) were barriers to nonprescription syringe sales. Singer et al. (1998) cited time as an issue for conducting nonprescription syringe sales in their quantitative descriptive study of 27 pharmacists in Connecticut. Findings demonstrated that of pharmacists conducting nonprescription syringe sales, the majority reported an imbalance between time and profit associated with those sales. Despite the acknowledgment of the importance by pharmacists, time was cited as an issue in providing HIV prevention education. The qualitative case study by Rose et al. (2014) with 23 pharmacy policymakers, pharmacy owners/managers, dispensing pharmacists, and pharmacy staff in San Francisco, California community pharmacies revealed similar results. Corporate policy, obtaining corporate approval, cost reimbursement, the need for staff training, and lack of time were cited as issues for providing syringe access and disposal to injection drug users. Having a company policy that allowed syringe disposal was positively associated with participation. Lack of time, space, and sufficient staff expertise were cited as issues with the provision of safer injection and overdose prevention training programs. Respondents indicated that space and language translation were issues for the provision of educational materials, despite feeling this was a useful strategy to educate injection drug users.

In the quantitative cross-sectional study by Pollini (2017) with 404 pharmacists and pharmacy staff in 215 pharmacies in two California counties, nearly half of the participants indicated that nonprescription syringe sales to injection drug users was based on store policy (45.6%). Slightly fewer indicated that this practice was based on both store policy and personal discretion (42.2%). In univariate analysis, using store policy only as a basis was significantly associated with nonprescription syringe sales to injection drug users. In multivariable analysis, participants using both store policy and personal discretion had higher odds of selling syringes to injection drug users without a prescription (AOR = 3.08, 95% CI = [1.75, 5.40]) compared to using store policy only.

In the quantitative comparative, cross-sectional study of 227 Seattle and King County, Washington pharmacists by Deibert et al. (2006), pharmacists' personal polices on syringe sales to injection drug users were strongly associated with their pharmacy policy ($p < 0.01$). Pharmacists' participation in nonprescription syringe sales was associated with company policy. Results indicated that having a company policy that allows nonprescription syringe sales was positively associated with pharmacists' participation. Similar results between syringe sales and company policy were found in the qualitative comparative study with 17 community pharmacists in California, Kansas, Mississippi, and New Jersey by Chiarello (2016). In the quantitative descriptive, cross-sectional study by Ong et al. (2016) with 1,067 community pharmacists in North Carolina, company policy was cited by nearly one-third of those that reported always selling nonprescription syringes and by 44% of those that reported never selling. Results from the quantitative comparative study by Meyerson et al. (2018) with 298 managing

pharmacists in Indiana revealed that over one-fourth of participants reported store policy as a barrier to syringe distribution. Board of Pharmacy policy was believed to be a barrier to syringe distribution by 18.1% of pharmacists in this study.

Results from the quantitative cross-sectional study with 809 pharmacy staff in Massachusetts by Stopka et al. (2017) indicated that on average, pharmacies operated 84.9 hours per week and the majority were open seven days per week (88.6%). The majority of pharmacies stocked or sold nonprescription naloxone (45.1%) and reported providing information on syringe disposal options to customers (81.7%). Few, however, accepted sharps containers (4.2%) or offered syringe discard programs on-site (2.5%). Bivariate analysis demonstrated that pharmacies open seven days per week compared to pharmacies open five days per week had nearly 12 times the odds of selling nonprescription syringes (OR = 11.936, 95% CI = [6.030, 23.625], $p < 0.05$). The number of operating hours per week was positively associated with nonprescription syringe sales (OR = 1.065, 95% CI = [1.038, 1.09], $p < 0.05$). In multivariable analysis factors significantly associated with nonprescription syringe sales ($p < 0.05$) were pharmacies open 7 days per week (AOR = 3.614, 95% CI = [1.102, 11.851]) and pharmacies that accepted sharps containers (AOR = 0.154, 95% CI = [0.047, 0.504]) and provided information on syringe disposal (AOR = 3.624, 95% CI = [1.488, 8.827]). Pharmacies that stocked or sold naloxone (AOR = 5.255, 95% CI = [1.629, 16.947]) and resided in an overdose hotspot (AOR = 0.253, 95% CI = [0.075, 0.850]) were significantly associated with nonprescription syringe sales.

Results from the Providence, Rhode Island community pharmacy staff interviews in the qualitative descriptive study by Zaller et al. (2012) revealed that selling single syringes was difficult because the pharmacy did not stock individually wrapped single syringes. A chain pharmacy technician commented that they had no way of ordering single syringes at the time of the interview and that it was not possible to sell individual syringes from packs of 10 due to how they were packaged. Pharmacy staff interviews revealed pharmacy practice as an issue. Two pharmacists expressed a desire to expand their professional roles and frustration with limitations of practice. Another pharmacist commented on the challenge of expanding roles due to the professional trend where greater focus is on dispensing pills.

In the mixed methods descriptive study by Rose and Raymond (2010) with 55 pharmacy staff and pharmacists in San Francisco, California community pharmacies, survey data indicated that the majority of participants reported asking for identification from customers making nonprescription syringe purchases. Interview data, however, revealed that identification was requested when the customer appeared to be younger than 18 years of age. Survey data indicated that although 53 of the 55 pharmacies had conducted nonprescription syringe sales and the majority reported none or very few problems (72%), only 4% advertised the availability of these sales through signage.

The quantitative correlational study by Cooper et al. (2010) with community pharmacies in SF and LA Counties in California demonstrated that of pharmacies participating in nonprescription syringe sales in the last year, only 54% of LA County pharmacies provided information on syringe disposal compared to 91% in SF County

pharmacies ($p < 0.001$). Of LA County pharmacies, 11% provided free sharps containers and 13% accepted sharps containers compared to 76% and 73% of SF County pharmacies, respectively ($p < 0.001$). Results demonstrated that there were requirements for nonprescription syringe sales in pharmacies of both counties. The most commonly reported requirements were providing proof of a medical condition (80% in LA, 30% in SF) and entering name on a purchase log (70% in LA, 22% in SF). Requirements were significantly more prevalent in LA county pharmacies than in SF county pharmacies ($p < 0.001$). While 91% of pharmacies in SF county provided information on syringe disposal and 76% provided information on syringe exchange programs, only 54% and 28% of pharmacies in LA county, respectively, provided this information ($p < 0.001$).

Results from a longitudinal study conducted by Tesoriero et al. (2009) in New York State with 506 and 682 managing pharmacists in 346 pharmacies in 2002 and 2006 respectively revealed issues with pharmacy requirements for nonprescription syringe sales. Outside of the requirement of the Expanded Syringe Access Program in which pharmacies were participating to verify age, additional requirements had been implemented. Despite a significant decrease in these practices from 2002 to 2006 ($p = 0.016$), 45.1% of pharmacies continued to employ additional requirements. The most commonly reported requirements in 2006 were requiring customers to explain why they needed to purchase syringes (12.3%), requiring them to provide their name and/or address (10.5%), and requiring them to show proof of a medical condition (6.3%). There was not a significant change in the frequency of these requirements since 2002, and frequencies did not differ between region, pharmacy type, or community need index.

Results indicated that although the majority of pharmacies sold sharps containers both survey years (85.2% in 2002, 92.8% in 2006), very few provided free sharps containers (8.4% vs. 10.2%) or accepted used syringes for disposal (9.9% vs. 10.8%). The qualitative descriptive study of 32 pharmacists at 24 pharmacies in Denver, Colorado conducted by Lewis et al. (2002) indicated that a lack of options for safe syringe disposal prevented several pharmacists from selling syringes to injection drug users.

Literature Summary

The studies entailed in this literature review included a combination of quantitative, qualitative, and mixed methods designs. Specifically, nine of the studies were quantitative, five were qualitative, and one was mixed methods. The quantitative studies included correlational, comparative, cross-sectional, longitudinal, and descriptive designs utilizing surveys administered electronically, by mail, by fax, over the phone, in person, or through a combination of these. The qualitative studies included comparative, descriptive, and case study designs using semi-structured, in-depth interviews, and focus groups. The mixed methods study included quantitative descriptive design using a self-administered survey and qualitative descriptive design using brief interviews. Twelve of the studies focused on nonprescription syringe sales only and three focused on other components of syringe exchange programs in pharmacies as well. One study included a brief mention of pharmacy-based syringe exchange programs exclusively. None of the 15 studies (14 articles and one poster) used a conceptual framework to guide the research.

Samples for all 15 studies included pharmacists, pharmacy staff, pharmacy policymakers, and pharmacy managers/owners working almost exclusively in community

pharmacies. One study included injection drug users in the sample to gain their perspectives for comparison with pharmacists (50% injection drug users and 50% pharmacists). Sample size varied greatly from a total of 17 to 1,067 participants. Sample size ranged specifically from 17 to 58 and 27 to 1,067 for qualitative and quantitative studies respectively. Fifty-five participants were included in the mixed methods study.

The studies in this review represented a total of 14 U.S. states and all four U.S. regions (Northeast, South, Midwest, and West). One-third of the studies represented the state of California, two of which had a specific focus on the city of San Francisco. One study represented the state of North Carolina. The studies were published in a variety of national and international journals, including addiction, drug policy, harm reduction, urban, poor and underserved, public health, and pharmacists' association journals. The study representing the state of North Carolina was not published.

Current Knowledge

The focus of studies over the last two decades was primarily on nonprescription syringe sales. Few studies focused on syringe exchange programs exclusively or components outside of nonprescription syringe sales. Multiple intrapersonal, interpersonal, and organizational factors were identified as being associated with nonprescription syringe sales and other components of syringe exchange programs.

Intrapersonal factors affecting components of syringe exchange programs included factors such as beliefs, perceptions, or attitudes; years of practice; type and/or location of pharmacy at which one was employed; pharmacy role; personal practice and discretion; knowledge; and gender. One of the most commonly identified factors was

beliefs, perceptions, or attitudes. The majority of authors reported the belief that the provision of syringes to injection drug users promoted and/or increased injection drug use (Chiarello, 2016; Goodin et al., 2018; Lewis et al., 2002; Ong et al., 2016; Pollini, 2017; Reich et al., 2002; Rose et al., 2014; Rose & Raymond, 2010). Other authors reported that participants felt that the provision of syringes to injection drug users did not have a significant public health impact, did not reduce harm or protect the health of injection drug users, and did not change syringe-sharing behavior (Cooper et al., 2010; Goodin et al., 2018; Meyerson et al., 2018; Reich et al., 2002). Lewis et al. (2002) indicated participants believed that refusal of access to syringes could actually decrease drug use and thereby decrease the risk of infectious disease. Participant perceptions of a customer being an injection drug user based on appearance, behavior, and intoxication affected nonprescription syringe sales as did participant attitudes toward injection drug users (Chiarello, 2016; Cooper et al., 2010; Ong et al., 2016; Pollini, 2017; Zaller et al., 2012).

Several studies indicated that the type and/or location of the pharmacy at which one was employed was a factor. Of the pharmacies selling nonprescription syringes, participants at chain pharmacies sold more syringes without a prescription (Cooper et al., 2010; Goodin et al., 2018; Stopka et al., 2017; Tesoriero et al., 2009), yet were more likely to refuse sales more often (Goodin et al., 2018; Stopka et al., 2017). Participants at chain pharmacies were more likely to report problems with nonprescription syringe sales (Tesoriero et al., 2009) and to require identification (Stopka et al., 2017). Chain pharmacists, however, were less likely to express willingness to participate in syringe disposal (Goodin et al., 2018). As well, participants at chain pharmacies more often

reported concerns of attracting injection drug users to their pharmacy and finding used syringes more frequently (Goodin et al., 2018). Likewise, participants at chain pharmacies reported concerns of making other customers uncomfortable with syringe sales to injection drug users than did participants at independent pharmacies (Tesoriero et al., 2009).

Participants at independent pharmacies were more willing to participate in syringe distribution and disposal (Goodin et al., 2018; Tesoriero et al., 2009) and more likely to provide free sharps containers (Tesoriero et al., 2009), agree syringes should be available to injection drug users, and to provide associated counsel (Deibert et al., 2006). However, fewer participants at independent pharmacies sold syringes without a prescription (Goodin et al., 2018; Pollini, 2017). Participants at independent pharmacies reported problems with record-keeping more frequently than those at chain pharmacies (Goodin et al., 2018).

Studies indicated pharmacies located outside of a city sold fewer syringes (Singer et al., 1998) and those in rural areas were less supportive of nonprescription syringe sales and participation in syringe exchange programs (Reich et al., 2002). Pharmacies within a city sold more syringes on average and were more likely to provide free sharps containers (Tesoriero et al., 2009) than those in other areas. Also, participants at pharmacies located within a city reported finding more used syringes on their premises, increased shoplifting at their pharmacy, and concerns about making other customers feel uncomfortable with participation in a syringe access program for injection drug users (Tesoriero et al., 2009).

Other commonly identified factors were personal practice and discretion. Chiarello (2016) reported that participants developed new practices to deter injection drug users from frequenting their pharmacies. Zaller et al. (2012) reported that participants altered their usual practice to discourage injection drug users from making nonprescription syringe purchases. Employment of personal discretion in the decision to conduct nonprescription syringe sales, regardless of policy, was frequently reported (Chiarello, 2016; Lewis et al., 2002; Singer et al., 1998; Zaller et al., 2012).

Remaining identified factors included participants having minimal to no knowledge about the efficacy of nonprescription syringe sales or syringe exchange programs (Reich et al., 2002) and being unaware of whether nonprescription syringe sales were legal (Lewis et al., 2002; Pollini, 2017). Receiving education on syringe exchange programs was a potential factor affecting nonprescription syringe sales (Reich et al., 2002). One author reported that female participants were less likely to express willingness to participate in syringe disposal (Goodin et al., 2018), and one reported that male participants had significantly higher odds of being comfortable with selling syringes to injection drug users (Meyerson et al., 2018). Years of practice was reported to affect the willingness of participants to counsel customers on the hazards of injection drug use, with those having practiced for 10 years or less being more willing to provide counsel (Deibert et al., 2006). Finally, Pollini (2017) reported role as a factor where pharmacists had higher odds of participating in nonprescription syringe sales than other pharmacy staff.

Multiple interpersonal factors affecting components of syringe exchange programs, primarily nonprescription syringe sales, were identified. The most frequently reported factor was concern about attracting injection drug users to the pharmacy (Chiarello, 2016; Goodin et al., 2018; Lewis et al., 2002; Meyerson et al., 2018; Reich et al., 2002; Rose et al., 2014; Singer et al., 1998). Several authors reported concern about the effects on others, including danger associated with improper syringe disposal (Chiarello, 2016; Cooper et al., 2010; Goodin et al., 2018; Reich et al., 2002; Singer et al., 1998) and making other pharmacy customers feel uncomfortable or fearful (Chiarello, 2016; Tesoriero et al., 2009). Several authors cited general safety concerns for staff and/or pharmacy customers (Cooper et al., 2010; Deibert et al., 2006; Lewis et al., 2002; Reich et al., 2002). Some authors reported business concerns associated with nonprescription syringe sales to injection drug users and considered the practice to be poor business (Deibert et al., 2006; Lewis et al., 2002; Pollini, 2017). Concerns about increased shoplifting/theft in their pharmacy (Cooper et al., 2010; Deibert et al., 2006; Lewis et al., 2002; Singer et al., 1998; Tesoriero et al., 2009), personal and business reputation (Chiarello, 2016; Lewis et al., 2002; Reich et al., 2002), and disapproval of colleagues and other customers were cited as reasons for not conducting nonprescription syringe sales to injection drug users (Meyerson et al., 2018). Zaller et al. (2012) indicated that being unsure of how to interact or engage with injection drug users affected nonprescription syringe sales and that receiving education on this would be helpful.

Organizational factors affecting components of syringe exchange programs were identified. Company/store policy was the most frequently reported factor associated with

nonprescription syringe sales (Chiarello, 2016; Meyerson et al., 2018; Ong et al., 2016; Pollini, 2017; Rose et al., 2014; Zaller et al., 2012). Additionally, Rose et al. (2014) reported company/store policy as a factor affecting syringe disposal. The lack of syringe disposal options at pharmacies was reported by several authors to affect nonprescription syringe sales (Cooper et al., 2010; Lewis et al., 2002; Stopka et al., 2017; Tesoriero et al., 2009), as was a lack of time (Goodin et al., 2018; Rose et al., 2014; Singer et al., 1998). Rose et al. (2014) reported a lack of time as a factor affecting syringe disposal and safe injection education as well. Additionally, enforcement of stipulations such as requiring customers to provide identification, enter a name on a purchase log, provide name/address, and/or provide proof of a medical condition decreased nonprescription syringe sales (Cooper et al., 2010; Rose & Raymond, 2010; Tesoriero et al., 2009).

Other reported factors associated with nonprescription syringe sales and syringe disposal included cost, and the need for staff training (Rose et al., 2014). Similarly, problems with record-keeping and supplies were cited as factors affecting nonprescription syringe sales (Goodin et al., 2018). The number of hours/days per week of pharmacy operation and residing in an overdose hotspot (Stopka et al., 2017), selling syringes in packs/boxes versus selling single syringes (Zaller et al., 2012), and Board of Pharmacy policy (Meyerson et al., 2018) were cited as factors impacting nonprescription syringe sales as well. Finally, space, staff expertise, and language translation issues were reported as factors associated with the provision of safer injection training and educational materials (Rose et al., 2014).

Gaps in the Literature

Only one study was identified that narrowly addressed perspectives on having a pharmacy-based syringe exchange program and that study was conducted in 2002. While there have been studies conducted on components of pharmacy-based syringe exchange programs in the United States, there have been very few conducted in the last 20 years and even fewer during the past five to 10 years when rates of HCV infection have sharply increased, and federal and state laws have provided program funding and legalization. The majority of studies focused primarily on non-prescription syringe sales only. Few studies focused on syringe disposal and/or other essential components of syringe exchange programs in pharmacies. One-third of the studies were conducted in the state of California, making it challenging to understand how representative results were for the remainder of the United States. Only four of the 15 studies included states in the Southern Region. Only one study examined factors affecting components of pharmacy-based syringe exchange programs in the state of North Carolina. That study did not compare differences between chain or independent community pharmacies in North Carolina, was conducted before the legalization of syringe exchange programs in the state and was not published. Of the 15 studies included in this review, none used a conceptual framework to guide the research.

Contribution of the Current Study

The current study is the first of its kind in North Carolina. It contributes identification and understanding of factors associated with and influencing community pharmacists' support of the implementation of syringe exchange programs in community

pharmacies in the state. The current study utilizes a conceptual framework to guide the research and contributes identification and understanding of factors at three important levels: intrapersonal, interpersonal, and organizational. Consideration of factors at these levels contributes valuable information on which to potentially develop multi-level interventions to improve support for and implementation of pharmacy-based syringe exchange programs in North Carolina.

Another contribution is that the current study examines differences between pharmacists practicing in chain and independent community pharmacies in their level of support and the primary factors influencing their level of support of the implementation of syringe exchange programs in community pharmacies in North Carolina. Additionally, it provides valuable information on community pharmacists' beliefs about the public health impact of syringe exchange programs and the relationship of those beliefs to their support of the implementation of a syringe exchange program in their pharmacy. Furthermore, the current study provides information since the legalization of syringe exchange programs in the state. With syringe exchange programs having been legal in North Carolina for over 3 years, it is important to gauge current perspectives on the implementation of pharmacy-based syringe exchange programs.

Finally, the current study recognizes the overall importance of pharmacy-based syringe exchange programs exclusively, rather than individual components only. Focus on pharmacy-based syringe exchange programs exclusively is important in further reducing harm to injection drug users and the community as a whole in the state. Examination of the topic of pharmacy-based syringe exchange programs is important for

the state of North Carolina due to its ranking as one of the states with the highest rates of acute HCV infection (CDC, 2019c). Information obtained from the current study provides needed knowledge for the state of North Carolina regarding pharmacy-based syringe exchange programs. It adds to the knowledge for the southern region of the United States and the United States as a whole.

Summary

Increased rates of acute HCV infection in the United States and North Carolina require a further focus on prevention to mitigate the burden of disease and associated morbidity and mortality on patients, families, healthcare providers, and healthcare systems. Because injection drug use is the leading route of HCV infection transmission and injection drug users account for an estimated 75 percent of all acute HCV infections, they are the priority population for prevention efforts. Prevention in this population is centered around increased awareness of HCV infection risk and the need for safer injection practices, in addition to the provision of safer injection supplies and proper syringe disposal. Syringe exchange programs serve as the primary source of these efforts. With only 320 reported syringe exchange programs in the United States and only approximately 30 in the state of North Carolina, additional points of access to syringe exchange services for injection drug users are needed. It has been suggested that community pharmacies can and should serve as these additional points of access, considering every community has one or more pharmacy within proximity to residents and/or local transportation, and community pharmacies offer extended, flexible, and consistent hours of operation compared to traditional syringe exchange programs.

Using the intrapersonal, interpersonal, and organizational levels of the social ecological model as a guide, an extensive review of the literature was conducted to determine the current state of the science on factors affecting the implementation of pharmacy-based syringe exchange programs. While the primary focus of the research included in the review was on nonprescription syringe sales only, a few articles provided some insight on other vital components of pharmacy-based syringe exchange programs. Multiple factors associated with the incorporation of syringe exchange programs within community pharmacies in the United States were identified, increasing the knowledge on potential ways to intervene and improve the process of future implementation. While increased knowledge was obtained from these studies, one-third of the studies focused on the state of California, only four focused on the Southern Region of the United States, and only one focused on the state of North Carolina. With North Carolina ranked as one of the states with the highest increases in acute HCV infection rates, a better understanding of factors affecting the incorporation of pharmacy-based syringe exchange programs specific to the state is needed. This new knowledge will provide a foundation for mitigating barriers and improving the implementation of programs to reduce rates of HCV infection and reduce harm to injection drug users and the community.

CHAPTER III

METHODS

Research Design

The design for this study was a quantitative correlational, cross-sectional design using an online instrument to survey licensed and practicing community pharmacists in North Carolina. The primary outcome in this study was community pharmacists' support of the implementation of syringe exchange programs in community pharmacies in North Carolina. Variable selection for this study was guided by the social ecological model (McLeroy et al., 1988; Simons-Morton et al., 2012). The design was appropriate to answer the research questions and to establish relationships between variables and assess the strength of those relationships. Additionally, the design was appropriate given that the use of an intervention and randomization were not employed. Furthermore, the design was straightforward, cost-effective, flexible, an efficient and effective way to collect data, eliminated the issue of loss to follow-up, and provided a foundation for future research (Cooper et al., 2010; Curtis, Comiskey, & Dempsey, 2016; Gliner, Morgan, & Leech, 2017; Goodin et al., 2018; Hulley, Cummings, Browner, Grady, & Newman, 2013; Meyerson et al., 2018; Polit & Beck, 2017; Pollini, 2017; Stopka et al., 2017; Tabachnick & Fidell, 2013).

Setting and Sample

The setting for this study was the state of North Carolina. Convenience sampling was used to recruit NC licensed and practicing pharmacists working in community pharmacies in North Carolina (Hulley et al., 2013; Polit & Beck, 2017). At the time of the NC Board of Pharmacy Annual Report 2018-2019 on October 21, 2019, there were 12,328 NC licensed and practicing pharmacists in North Carolina, with a total of 4,604 practicing in the community setting (NCBOP, 2019). This report reflected data from October 2018 through June 30, 2019. At the time of the survey distribution on December 9, 2019, the number of NC licensed and practicing pharmacists practicing in the community setting was 4,390 (K. Moore, personal communication, December 9, 2019). Inclusion and exclusion criteria were developed for the study. The inclusion criteria for study participation included: 18 years of age or older, NC licensed and practicing pharmacist employed in an NC community pharmacy (chain or independent pharmacy), willing to complete the online survey (Appendix A), and able to read and write English. Exclusion criteria for the study included: less than 18 years of age, unlicensed pharmacist or a practicing NC pharmacist in a setting other than a community pharmacy, not willing to complete the online survey, and/or unable to read and write English.

Missing data were assessed for this study to determine the percentage missing and the potential effect on study results (Polit, 2010). Of the initial 336 cases, ineligible cases (cases that were not NC licensed pharmacists practicing in a NC chain or independent community pharmacy (N = 5) and cases that opened the survey and did not answer any questions (N = 4) were deleted. A total of 26 survey questions were factored into the data

analysis. Questions 1, 2, 5, 6, and 31 were not applicable to the data analysis. Question 2 was the eligibility question, Questions 1, 5, and 6 provided important information to the participants and was automatically assigned a question number by Qualtrics, and Question 31 was for the gift card drawing.

With a total of 26 survey questions, cases were required to answer at least 85% of the questions (22 or more) to be considered a valid case. As well, all cases that answered less than five questions did not have any pattern among the beliefs, concerns, or other factors that influenced support; only a few of the initial survey questions were answered. Therefore, cases that answered four or fewer of the 26 questions (N = 23) were considered invalid and were deleted. One of the cases deemed invalid and deleted answered a total of five questions (case 336). The decision to delete this case was made based on the date on which the responses to the five questions was recorded in Qualtrics. This case did not return to complete the survey and based on the survey settings, Qualtrics automatically closed the survey for that case at the one-week mark and recorded all responses. The automatic record date was two days after the IRB-approved end date of the survey, which made the case invalid and required deletion.

Frequencies and proportions were assessed on the 23 invalid cases before deletion to provide a basic description of those cases. The majority of the invalid cases represented pharmacists working in chain community pharmacies (72.2%) and pharmacists who were primarily staff/dispensing pharmacists (72.7%). Only six pharmacists provided responses to Question 7, with the majority believing that syringe exchange programs promote injection drug use to a small extent. Only four pharmacists

provided responses to Questions 8 and 9, which addressed beliefs about the effectiveness of syringe exchange programs. Pharmacists were evenly split between believing that syringe exchange programs are slightly effective, very effective, and extremely effective at preventing HCV infection in injection drug users and do not know. The majority of these pharmacists believed that syringe exchange programs are moderately effective at ensuring the proper disposal of used syringes (50%). Responses were not provided for any additional questions.

Cases that answered five or more of the 26 questions were retained, including cases that did not provide a response to the dependent variable. A total of 304 eligible cases were retained. The eligible cases represented 90.5% of the initial 336 cases. Of the 304 eligible cases, the percent with missing data was 18.8% for both continuous variables and ranged from 0.3% to 7.6% for the ordinal level variables and 3.9% to 16.4% for the nominal level variables. Age in years was not used in any statistical analysis tests. Missingness was addressed for the ordinal level variables through the use of the nonparametric measure of association of Somers' *d*. With this measure of association, each ordinal independent variable was assessed independently with the ordinal dependent variable, taking into account the frequency of each variable (Vogt et al., 2014). Missing data were addressed for the nominal level variables through the use of PLUM ordinal regression. With this method of analysis, the frequency of each variable is taken into account (Tabachnick & Fidell, 2013).

Recruitment

Participants from the study were recruited using an online email sent by the NC Board of Pharmacy using their internal listserv. The email was sent to licensed and practicing community pharmacists in North Carolina and contained information about the survey. Additionally, the language required by the NC Board of Pharmacy was included. Once participants clicked on the survey link, they were provided all IRB-required information, including how they would be protected. After this information, participants were informed that moving forward with the survey questions indicated an understanding of the information provided and their agreement to study participation.

Measurement

The online survey was used to collect data on the sample characteristics and the three concept levels. The survey is presented in Appendix A. Each level of measurement is discussed, and the reliability and validity of the survey content are described. A measurement table is presented in Appendix B.

Intrapersonal Level

Intrapersonal level factors were identified using 16 items in the survey instrument. Seven items measured demographic factors related to the pharmacist (age, gender, type of community pharmacy where they practice the majority of the time, current role at the community pharmacy where they practice the majority of the time, approximate number of years worked as a practicing pharmacist, approximate number of full-time pharmacists employed at the community pharmacy where they practice the majority of the time, and the county location of the community pharmacy where they practice the majority of the

time). Four items measured beliefs about syringe exchange programs. For example, belief about the effectiveness of syringe exchange programs at preventing HCV infection in injection drug users was a belief about syringe exchange programs item. One of the beliefs about syringe exchange programs items had a response set of 1 = *Not at all* to 5 = *To a great extent*, and *Don't know*, and three beliefs about syringe exchange programs items had a response set of 1 = *Not at all effective* to 5 = *Extremely effective,* and *Don't know*.

One item measured support for the implementation of a syringe exchange program in the community pharmacy where practicing the majority of the time with a response set of 1 = *Not at all* to 5 = *To a great extent*. One item measured concern about whether it is lawful to operate a syringe exchange program in a pharmacy, one item measured concern about personal liability, and one item measured receiving education on syringe exchange programs, all with response sets of 1 = *Not at all* to 5 = *To a great extent*. One item examined any other thoughts participants had about implementing a syringe exchange program in the community pharmacy where they practice the majority of the time using a free-text response.

Interpersonal Level

Interpersonal level factors were identified using six items in the survey instrument. One item measured concern about the disapproval of colleagues and one item measured concern about the disapproval of customers who are not injection drug users, both with response sets of 1 = *Not at all* to 5 = *To a great extent*. One item measured concern about having increased numbers of injection drug users in the pharmacy and one

item measured concern about how to interact with injection drug users, both with response sets of 1 = *Not at all* to 5 = *To a great extent*. One item measured receiving injection drug user cultural competency training with a response set of 1 = *Not at all* to 5 = *To a great extent*. One item examined any other thoughts participants had about implementing a syringe exchange program in the community pharmacy where they practice the majority of the time using a free-text response.

Organizational Level

Organizational level factors were identified using six items in the survey instrument. One item measured concern about company/store policy, one item measured concern about the cost of supplies, and one item measured concern about the time required to operate a syringe exchange program, all with response sets of 1 = *Not at all* to 5 = *To a great extent*. One item measured having a company/store policy that allows the implementation of a syringe exchange program and one item measured receiving training on how to implement a syringe exchange program, both with response sets of 1 = *Not at all* to 5 = *To a great extent*. One item examined any other thoughts participants had about implementing a syringe exchange program in the community pharmacy where they practice the majority of the time using a free-text response.

Reliability and Validity

The selection of factors was guided by the following: the conceptual framework; existing literature; feedback from two practicing community pharmacists, one of which serves in a harm reduction specialist role with the NC Department of Health and Human Services; and feedback from a content and legal expert with the NC Department of

Health and Human Services. Factors in each model level were consistent with factors proposed by McLeroy et al. (1988). Additionally, factors in each model level were similar to those used in surveys by Goodin et al. (2018) and Ong et al. (2016). Also, factors in the intrapersonal, interpersonal, and/or organizational levels were comparable to those examined by other authors in similar studies (Chiarello, 2016; Cooper et al., 2010; Deibert et al., 2006; Lewis et al., 2002; Meyerson et al., 2018; Pollini, 2017; Reich et al., 2002; Rose et al., 2014; Rose & Raymond, 2010; Singer et al., 1998; Stopka et al., 2017; Tesoriero et al., 2009; Zaller et al., 2012). Furthermore, factors at each model level in the survey instrument were reviewed by two practicing community pharmacists and one content and legal expert for face and content validity. Finally, the survey instrument was reviewed by two practicing community pharmacists, one content and legal expert, and six non-content experts for clarity, design format, and flow.

Data Collection

Self-reported information was obtained from NC licensed pharmacists practicing in community pharmacies in North Carolina using an online survey administered using Qualtrics. The survey was estimated to require less than 10 minutes of the participant's time. The principal investigator (PI) obtained approval from the NC Board of Pharmacy for the online survey, which included IRB-required participant information explaining the study and the recruitment email. The online survey was developed using Qualtrics, and a link to the survey was emailed to all NC licensed pharmacists practicing in community pharmacies in North Carolina (N = 4,390) by the NC Board of Pharmacy. On day 14, a reminder email was sent to all NC licensed pharmacists practicing in community

pharmacies in North Carolina (N = 4,390) to encourage survey completion. The response rate at day 30 was not sufficient and required a 14-day extension of the survey. Based on NC Board of Pharmacy policy, additional reminders could not be sent to the community pharmacists. On day 44, the survey link was disabled, and data collection ceased.

A total of 336 responses were recorded, which represented an overall response rate of 7.7%. The response rate was lower than anticipated and could have been due to the timing of survey distribution around the holidays. A lower response rate could have been related to the sensitive nature of the survey questions as well. While prior literature had investigated factors around nonprescription syringe sales, the current study addressed factors around syringe exchange programs, which can be controversial in general and among healthcare providers. Additionally, the NC Board of Pharmacy sent two emails to NC pharmacists the week prior to the survey distribution that were related to upcoming elections. It is possible that the community pharmacists felt bombarded with emails over those 2 weeks.

Within 48 hours of the initial email, 174 participants (51.8%) completed the survey. Within 48 hours of the reminder email, 71 participants (21.1%) completed the survey. A total of 47 participants (14%) opened the survey during the 44 days and answered at least one question but did not return to complete the survey. Per the survey settings, the survey closed automatically for these participants one week after the survey was started, and all responses were recorded at that time. Ninety-six percent of valid participants completed the survey in an average of 6.8 minutes (N = 292). Qualtrics data

were downloaded into SPSS v26 (IBM Corp., Armonk, NY) to assess for completeness and analysis.

Data Analysis Plan

All analyses were performed using SPSS v26 (IBM Corp., Armonk, NY). Descriptive statistics were calculated and used to describe the sample of community pharmacists. Measures of central tendency including mean, standard deviation, median, and mode were calculated for the continuous variables of age (years) and the approximate number of years worked as a practicing pharmacist. Continuous variables were assessed for outliers and normality in univariate analysis using boxplots, histograms, Normal Q-Q and P-P plots, and Kolmogorov-Smirnov (K-S) tests. No outliers were present for either variable. Neither variable had a normal distribution. The lack of a normal distribution was noted by skewed and somewhat bimodal histograms, multiple runs on both Normal Q-Q and P-P plots, and statistically significant K-S tests ($p < 0.001$) for both variables. The approximate years of practice variable was transformed to an ordinal level variable to address the lack of normal distribution. Because the relationship of age in years was not assessed against the dependent variable, transformation was not required. Proportions and frequencies were calculated for the nominal and ordinal level variables, which included all remaining variables.

Somers' *d* analysis was used to assess the relationship between ordinal level independent variables and the outcome variable, which was also an ordinal level variable. Somers' *d* analysis was used because unlike other correlation coefficients such as Spearman's Rho, this method of analysis took into account the frequency of each

independent variable response as it occurred with each level of the outcome variable. Additionally, Somers' *d* analysis took into account which variable was independent and which variable was dependent. This provided a better understanding of existing relationships between the two, rather than just knowledge of an overall correlation. PLUM ordinal regression modeling was used to examine the relationship between nominal level variables and the outcome variable and one ordinal level variable and the outcome variable. Chi-square tests were used to examine differences. Content analysis was used to determine categories related to any other participant thoughts about implementing a syringe exchange program in the community pharmacy where they practice the majority of the time provided in the free-text responses for this item.

A study identification (ID) number was assigned to each of the initial 336 cases (1-336). The accuracy of the value and value label assigned to each variable was verified. Several variables were recoded as part of the data cleaning process. Frequencies were assessed for each variable throughout the data cleaning process to examine for accuracy and errors. For clarity on eligibility status and as part of the data cleaning process, the response values for this variable were changed to 1 = *Yes* and 0 = *No*. For Questions 7-10, 14 = *Don't Know* was recoded as missing for all analyses. For Question 30, 3 = *Prefer not to answer* was recoded as missing for all analyses.

Question 26 was recoded to classify counties as either 1 = *Urban* or 0 = *Rural*. There are several definitions of urban and rural by the Census Bureau, Department of Agriculture, and the Health Resources and Services Administration. This study used the following to classify counties as urban or rural. Urban was defined as

> The Office of Management and Budget (OMB) designates counties as Metropolitan, Micropolitan, or Neither. A Metro area contains a core urban area of 50,000 or more population, and a Micro area contains an urban core of at least 10,000 (but less than 50,000) population. All counties that are not part of a Metropolitan Statistical Area (MSA) are considered rural. Micropolitan counties are considered non-Metropolitan or rural along with all counties that are not classified as either Metro or Micro. (HRSA, 2018, "Defining Rural Population," para 5)

Rural was defined as

> The FORHP accepts all non-Metro counties as rural and uses an additional method of determining rurality called the Rural-Urban Commuting Area (RUCA) codes. Like the MSAs, these are based on Census data that is used to assign a code to each Census Tract. Tracts inside Metropolitan counties with the codes 4-10 are considered rural. While use of the RUCA codes has allowed identification of rural census tracts in Metropolitan counties, among the more than 70,000 tracts in the U.S. there are some that are extremely large. In these larger tracts, use of RUCA codes alone fails to account for distance to services and sparse population. In response to these concerns, FORHP has designated 132 large area census tracts with RUCA codes 2 or 3 as rural. These tracts are at least 400 square miles in area with a population density of no more than 35 people. (HRSA, 2018, "Defining Rural Population," para. 7)

These definitions were used to provide a more accurate assessment of urban versus rural counties in the state of NC. It has been suggested that the Census Bureau overestimates rural areas and the Office of Management and Budget underestimates rural areas. Therefore, the FORHP definitions were used based on the consideration and use of RUCA codes, which added further validity to defining and differentiating urban versus rural areas (HRSA, 2018).

Question 27 was initially recoded to accurately and consistently reflect the approximate number of years each case had worked as a practicing pharmacist. Five cases had a response of less than one year; these cases were recoded to a response of 0.9.

Question 27 was recoded a second time due to non-normal distribution. In order to perform more complex analyses, the approximate years of practice variable was collapsed into the categories of 0 = *0-5 years*, 1 = *6-10 years*, 2 = *11-20 years*, and 3 = *More than 20 years*. For Questions 27 and 29, if the responses were "more than" or "number of years+" type responses, they were truncated to the actual number provided.

For all analyses, a two-sided p-value ≤ 0.05 was considered to be statistically significant. The following sections outline the analyses performed for each research question.

Research Question 1

What are the primary intrapersonal, interpersonal, and organizational factors influencing community pharmacists' support of the implementation of syringe exchange programs in community pharmacies in North Carolina?

Primary factors were identified using proportions. A primary factor was defined as a factor influencing support to a moderate extent or higher (*To a moderate extent, To a fairly great extent, and To a great* extent) with a cumulative response of at least half.

Research Question 2

What is the relationship between intrapersonal factors and community pharmacists' level of support of the implementation of syringe exchange programs in community pharmacies in North Carolina?

Associations between ordinal level intrapersonal factors (except approximate number of years worked as a practicing pharmacist) and community pharmacists' level of support were analyzed using Somers's *d* test statistic. Assumptions were checked before

performing analyses. Use of Somers's *d* statistic aided in the determination of the relationship between variables and the direction and strength of those relationships while taking into account which variable was independent and which variable was dependent. Uses of Somers's *d* aided in the ability to better predict the dependent variable in consideration of the independent variable.

First-level analyses between nominal level intrapersonal factors and community pharmacists' level of support were performed using the Chi-square statistic. The Chi-square statistic was used to analyze first-level associations between one ordinal level intrapersonal factor (approximate number of years worked as a practicing pharmacist) and community pharmacists' level of support. Assumptions were checked before performing analyses. First-level analyses were performed to determine the presence of significant relationships.

Second-level analyses between nominal level intrapersonal factors and community pharmacists' level of support were performed using PLUM ordinal regression. PLUM ordinal regression was used to analyze second-level associations between one ordinal level intrapersonal factor (approximate number of years worked as a practicing pharmacist) and community pharmacists' level of support. Assumptions were checked before performing analyses. Use of the PLUM ordinal regression aided in determining relationships between nominal level factors and community pharmacists' support and one ordinal level factor and community pharmacists' support.

Research Question 3

What is the relationship between interpersonal factors and community pharmacists' level of support of the implementation of syringe exchange programs in community pharmacies in North Carolina?

Associations between ordinal level intrapersonal factors and community pharmacists' level of support were analyzed using Somers' *d* test statistic. Assumptions were checked before performing analyses. Use of Somers' *d* statistic aided in the determination of the relationship between variables and the direction and strength of those relationships while taking into account which variable was independent and which variable was dependent. Uses of Somers' *d* aided in the ability to better predict the dependent variable in consideration of the independent variable.

Research Question 4

What is the relationship between organizational factors and community pharmacists' level of support of the implementation of syringe exchange programs in community pharmacies in North Carolina?

Associations between ordinal level intrapersonal factors and community pharmacists' level of support were analyzed using Somers' *d* test statistic. Assumptions were checked before performing analyses. Use of Somers' *d* statistic aided in the determination of the relationship between variables and the direction and strength of those relationships while taking into account which variable was independent and which variable was dependent. Use of Somers' *d* aided in the ability to better predict the dependent variable in consideration of the independent variable.

Research Question 5

Are there differences between pharmacists practicing in chain and independent community pharmacies in their level of support of the implementation of syringe exchange programs in community pharmacies in North Carolina?

Differences between pharmacists practicing in chain and independent community pharmacies in their level of support of the implementation of syringe exchange programs in community pharmacies in North Carolina were analyzed using the Chi-squared statistic. All assumptions were checked before performing analyses. The use of the Chi-square statistic provided the ability to determine group differences based on variables reported in proportions rather than means. The sample size was large enough that the use of the Chi-square statistic was not affected.

Research Question 6

Are there differences between pharmacists practicing in chain and independent community pharmacies in the primary intrapersonal, interpersonal, and organizational factors influencing their support of the implementation of syringe exchange programs in community pharmacies in North Carolina?

Differences between pharmacists practicing in chain and independent community pharmacies in the primary intrapersonal, interpersonal, and organizational factors influencing their support of the implementation of syringe exchange programs in community pharmacies in North Carolina were analyzed using the Chi-squared statistic. All assumptions were checked before performing analyses. The use of the Chi-square statistic provided the ability to determine group differences based on variables reported in

proportions rather than means. The sample size was large enough that the use of the Chi-square statistic was not affected.

Power Analysis

The sample size was sufficient to answer the research questions as determined by the review of the literature, recommendations by Polit (2010), and the use of the statistical power analysis software G*Power 3.1.9.2. According to Polit (2010), the ratio of participants to predictor variables (independent variables) and power analysis are two ways to determine sample size when using logistic regression. Concerning the ratio of participants to predictor variables, it is recommended that there be 10 to 20 participants per predictor variable (Polit, 2010). The sample size would be a minimum of 220 (N = 10 participants x 22 predictor variables) using these recommendations. Concerning power analysis, using the statistical test of logistic regression, *a priori* type of power analysis, an odds ratio of 1.5, an α error probability of 0.05, and a power of 0.80 in G*Power 3.1.9.2, the recommended total sample size would be 308. Although G*Power 3.1.9.2 uses the statistical test of binary logistic regression rather than ordinal logistic regression, it aided in estimating the required sample size in combination with the ratio of participants to predictor variables.

Concerning assessing differences between two independent groups (pharmacists practicing at chain community pharmacies and pharmacists practicing at independent community pharmacies), using the statistical test of proportions: difference between two independent proportions, *a priori* type of power analysis, two-sided α, a proportion of 0.6 for p2 and 0.4 for p1, an α error probability of 0.05, a power of 0.80, and an allocation

ration N2/N1 of 1 in G*Power 3.1.9.2, the recommended sample size per group is 97 with a total sample size of 194. Pharmacists practicing at chain community pharmacies were considered as the reference group (p2). The proportions of p2 (0.6) and p1 (0.4) were estimated using the proportion of pharmacists practicing at chain community pharmacies (61%) and the proportion of pharmacists practicing at independent community pharmacies (39%) of the total number of pharmacists practicing in both chain and independent community pharmacies in NC (4,604) (NCBOP, 2019). Therefore, the minimum sample size required to answer all research questions adequately was 194. With a total of 4,604 licensed and practicing community pharmacists in North Carolina, a 10% response rate would yield 460 participants, exceeding the minimum required sample size. Prior similar studies, including the non-published study in North Carolina, had a minimum response rate of 20%, making the stated minimum required sample size a feasible expectation.

Protection of Human Subjects

The PI obtained Institutional Review Board (IRB) approval from the University of North Carolina at Greensboro IRB. All study-related materials were approved by the IRB before use to ensure study participant protection (Fischer, 2006; Gliner et al., 2017; Hulley et al., 2013; U.S. Food and Drug Administration, 2016). The survey included an information sheet on the study for participants to review before advancing to the survey questions. Following the study information sheet, participants were advised that advancing to the survey questions indicated an understanding of the information provided and agreement to participate in the study. All data were collected anonymously using an

online survey through Qualtrics to protect the study participants and reduce risks associated with study participation, such as disclosure of viewpoints around sensitive topics to employers, colleagues, and customers. The information sheet contained the suggestion that participants complete the survey in a private space and to close their Internet browser after survey completion. No participant identifying information was obtained as part of the survey. Confidentiality was maintained throughout the entire study. No IP addresses were recorded or collected during the online survey process. All data were stored securely on the PI's personal password- and firewall-protected computer and on a secure university server. Password-protected files were used. A drawing for one of four $50 Amazon gift cards was offered as a small incentive for study participation to compensate for participant time. Participation in the drawing was optional. The collection of participant information for the drawing was conducted in a separate link from the survey and was not associated with the survey data in any fashion. The four random participants were selected using the random number generator in SPSS. Email addresses obtained for the gift card drawing were permanently deleted from the PI's personal computer.

Limitations

This study employed a quantitative correlational design, and while useful in establishing and predicting relationships between variables and assessing the strength of those relationships, causal relationships cannot be explained. While the use of an online survey reduced the risk of response bias; protects privacy and anonymity; and was convenient, inexpensive, and useful when targeting a large population, self-reported data

may or may not have been subject to issues of accuracy. Some persons may or may not have answered sensitive questions due to personal beliefs or employment concerns. The setting of the completion of an online survey could be controlled and may have been subject to outside influences such as distractions, interruption of Internet access, and limited time to complete the survey. Because this study examined factors associated with and influencing community pharmacists' support of the implementation of syringe exchange programs in community pharmacies in the state of North Carolina only, it may not represent factors associated with and influencing community pharmacists' support in other U.S. states.

Summary

This quantitative correlational, cross-sectional study examined community pharmacists' support of the implementation of syringe exchange programs in community pharmacies in North Carolina and the intrapersonal, interpersonal, and organizational factors associated with and influencing their support. Additionally, the differences between pharmacists practicing at chain and independent community pharmacies in levels of support of and the primary factors influencing their support were examined. The convenience sample size included a total of 304 community pharmacists in North Carolina, using the NC Board of Pharmacy licensing database email list. Data were collected using an online survey through Qualtrics and coded and analyzed using SPSS v26 (IBM Corp., Armonk, NY).

Intrapersonal level factors for community pharmacists were investigated to describe the sample, including age; gender; type of community pharmacy where they

practice the majority of the time; current role at the community pharmacy where they practice the majority of the time; approximate number of years worked as a practicing pharmacist; approximate number of full-time pharmacists employed at the community pharmacy where they practice the majority of the time; and county location of the community pharmacy where they practice the majority of the time (urban/rural). Intrapersonal level factors for community pharmacists were investigated as possible factors associated with and/or influencing support of implementation of syringe exchange programs in community pharmacies in North Carolina, including gender; type of community pharmacy where they practice the majority of the time; current role at the community pharmacy where they practice the majority of the time; approximate number of years worked as a practicing pharmacist; county location of the community pharmacy where they practice the majority of the time (urban/rural); beliefs about syringe exchange programs; concern about whether it is lawful to operate a syringe exchange program in a pharmacy and personal liability; and receiving education on syringe exchange programs. Interpersonal level factors were investigated as possible factors associated with and influencing community pharmacists' support of implementation of syringe exchange programs in community pharmacies in North Carolina, including concern about the disapproval of colleagues and customers who are not injection drug users, having increased numbers of injection drug users in the pharmacy, and how to interact with injection drug users and receiving injection drug user cultural competency training. Organizational level factors were assessed as possible factors associated with and influencing community pharmacists' support of implementation of syringe exchange

programs in community pharmacies in North Carolina, including concern about company/store policy, cost of supplies, and the time required to operate a syringe exchange program; having a company/store policy that allows implementation of a syringe exchange program; and receiving training on how to implement a syringe exchange program. Free-text qualitative responses were obtained to determine any other participant thoughts about the implementation of a syringe exchange program at the community pharmacy where they practice the majority of the time, which represented each level.

Analyses used to answer the research questions include central tendency measures, chi-square statistic, Somers' *d* statistic, and PLUM regression. Content analysis was used to determine categories related to the open free-text responses.

CHAPTER IV

RESULTS

The purpose of this study was to examine NC community pharmacists' support of the implementation of syringe exchange programs in community pharmacies in North Carolina. Data for this study were collected from NC licensed pharmacists practicing in an NC community pharmacy using an online Qualtrics survey. The NC Board of Pharmacy distributed a link to the survey to a total of 4,390 NC licensed community pharmacists through email. Data were exported directly from Qualtrics to SPSS v26. Following accuracy and missing data checks, the statistical analyses required to describe the sample and answer the research questions were executed. In this chapter, the results of this study are discussed and explained.

Sample Characteristics

For the 304 pharmacists that were included in the analyses, the mean age for NC licensed community pharmacists included in this study was 45 (*SD* = 13.79) years with a median of 44 years and a mode of 28 years. The mean number of years worked as a practicing pharmacist was 19 (*SD* = 14.39) years with a median of 16 years and a mode of 5 years. More than half of the community pharmacists included in this study were females and more than half currently practiced in a chain community pharmacy. Nearly two-thirds of the sample were staff/dispensing pharmacists at the community pharmacy where they practiced the majority of the time. A total of 78 of the 100 NC counties were

represented. The number of community pharmacists practicing in urban pharmacies was very similar to the number of community pharmacists practicing in rural pharmacies. Community pharmacists practicing from 0 to 5 years (25.8%) and community pharmacists practicing more than 20 years (43.6%) accounted for the majority of the sample. More than two-thirds of community pharmacists included in this study worked at a community pharmacy where less than three full-time pharmacists were employed (Table 1).

Table 1

Pharmacist Characteristics (N = 304)

Characteristic	n (%) *
Gender	
Male	118 (42.9)
Female	142 (51.6)
Prefer not to answer	15 (5.5)
Type of community pharmacy where currently practice the majority of the time	
Chain	169 (57.9)
Independent	123 (42.1)
Role at the community pharmacy where currently practice the majority of the time	
Staff/dispensing pharmacist	182 (61.1)
Pharmacy manager	116 (38.9)
County location of community pharmacy where practice the majority of the time	
Urban	128 (50.4)
Rural	126 (49.6)

Table 1

Cont.

Characteristic	*n* (%) *
Approximate number of years worked as a practicing pharmacist	
0-5 years	68 (25.8)
6-10 years	29 (11.0)
11-20 years	52 (19.7)
More than 20 years	115 (43.6)
Approximate number of full-time pharmacists employed at the community pharmacy where practice the majority of the time	
Less than 3	193 (70.2)
3 – 5	69 (25.1)
More than 5	13 (4.7)

Note. * Totals may not equal 100% for every characteristic due to missing responses or rounding.

Regarding chain and independent community pharmacists, the majority of chain community pharmacists included in this study were female (64.3%) and staff dispensing pharmacists (69.0%), while the majority of independent community pharmacists were male (56.9%) and equally staff/dispensing pharmacists (50%) and pharmacy managers (50%). More than one-half of the chain community pharmacists practiced at a pharmacy located in an urban county, whereas nearly two-thirds of the independent community pharmacists practiced at a pharmacy located in a rural county. One-third of the chain community pharmacists had worked as a practicing pharmacist for 0 to 5 years and nearly one third for more than 20 years. More than half of the independent community pharmacists had worked as a practicing pharmacist for more than 20 years. The majority

of chain community pharmacists (68%) and independent community pharmacists (71.1%) practiced at pharmacies where less than three full-time pharmacists were employed. Chain community pharmacists and independent community pharmacists differed significantly on all characteristics except for the approximate number of full-time pharmacists employed at the community pharmacy where they practice the majority of the time (Table 2).

Table 2

Chain and Independent Community Pharmacist Characteristics and Differences Between Groups

Characteristic	*N*	Chain Community Pharmacists *n* (%) [*]	Independent Community Pharmacists *n* (%) [*]	X^2 *p*-value	*V* *p*-value
Gender	249			11.10 [2,3]	-
Male		50 (35.7)	62 (56.9)	0.001[**]	
Female		90 (64.3)	47 (43.1)		
Role at the community pharmacy where practice the majority of the time	286			10.59 [2,3] 0.001[**]	-
Staff/dispensing pharmacist		115 (69.0)	59 (50.0)		
Pharmacy manager		52 (31.0)	59 (50.0)		
County location of community pharmacy where practice the majority of the time	245			15.50 [2,3] < 0.001[**]	-
Urban		84 (60.9)	38 (35.5)		
Rural		54 (39.1)	69 (64.5)		
Approximate number of years worked as a practicing pharmacist	253			25.23 [1] < 0.001[**]	0.316 [1,4] < 0.001[**]
0-5 years		48 (33.8)	17 (15.3)		
6-10 years		20 (14.1)	7 (6.3)		
11-20 years		31 (21.8)	20 (18.0)		
More than 20 years		43 (30.3)	67 (60.4)		

Table 2

Cont.

Characteristic	*N*	Chain Community Pharmacists *n* (%) [*]	Independent Community Pharmacists *n* (%) [*]	X^2 *p*-value	*V* *p*-value
Approximate number of full-time pharmacists employed at the community pharmacy where practice the majority of the time	264			0.317 [1] 0.854	0.035 [1,4] 0.854
Less than 3		102 (68.0)	81 (71.1)		
3–5		40 (26.7)	28 (24.6)		
More than 5		8 (5.3)	5 (4.4)		

Note. [*] Totals may not equal 100% for every characteristic due to missing responses or rounding.
[1] Chi-square and Cramer's *V* results are based on the entire model of responses for the characteristic, not individual responses.
[2] No cells contained less than 5 expected counts; use of Fisher's exact test not required (Polit, 2010).
[3] Cramer's *V* not required for a 2x2 contingency table (Polit, 2010).
[4] Cramer's *V* reported in addition to Chi-square due to the contingency table being larger than 2x2 (Polit, 2010).
[**] $p < 0.05$

Research Question 1

Research Question 1 was concerned with identifying the primary intrapersonal, interpersonal, and organizational factors influencing community pharmacists' level of support of the implementation of syringe exchange programs in community pharmacies in North Carolina. Primary factors were defined as those that influenced support to a moderate extent or higher with a cumulative response rate of at least half. All of the intrapersonal factors influencing pharmacists' level of support met the criteria of a primary factor. These factors included concern about whether it is lawful to operate a syringe exchange program in a pharmacy, concern about personal liability, and receiving education on syringe exchange programs. Concern about personal liability was the

leading primary intrapersonal factor with a cumulative total of 68.0%, followed by receiving education on syringe exchange programs (58.9%). Overall, more community pharmacists indicated that concern about whether it is lawful to operate a syringe exchange program in a pharmacy did not influence their level of support or that it influenced their level of support to a great extent. One-fourth of the sample indicated that concern about personal liability influenced their level of support to a moderate extent, and one-fourth indicated it influenced support to a great extent. Nearly one-third of the sample responded that receiving education on syringe exchange programs would influence their level of support to a moderate extent (Table 3).

Table 3

Primary Intrapersonal Factors Influencing Pharmacists' Level of Support of Implementation of a Syringe Exchange Program in the Community Pharmacy Where Practice the Majority of the Time

Primary Intrapersonal Factor	*N*	*n* (%) *
Extent that concern about whether it is lawful to operate a syringe exchange program in a pharmacy influences level of support	284	
Not at all		74 (26.1)
To a small extent		54 (19.0)
To a moderate extent		41 (14.4)
To a fairly great extent		45 (15.8)
To a great extent		70 (24.6)
Extent that concern about personal liability influences level of support	284	
Not at all		43 (15.1)
To a small extent		48 (16.9)
To a moderate extent		72 (25.4)
To a fairly great extent		48 (16.9)
To a great extent		73 (25.7)

Table 3

Cont.

Primary Intrapersonal Factor	*N*	*n* (%) *
Extent that receiving education on syringe exchange programs would influence level of support	282	
Not at all		55 (19.5)
To a small extent		61 (21.6)
To a moderate extent		84 (29.8)
To a fairly great extent		45 (16.0)
To a great extent		37 (13.1)

Note. * Totals may not equal 100% for every response due to missing responses or rounding.

Primary interpersonal factors influencing support included concern about having increased numbers of injection drug users in the pharmacy and concern about how to interact with injection drug users. Concern about having increased numbers of injection drug users in the pharmacy was the predominant primary interpersonal factor (73.4%) followed by concern about how to interact with injection drug users (50.3%). Overall, nearly one-third of the sample indicated that concern about having increased injection drug users in the pharmacy influenced their level of support to a great extent, and nearly one-fourth indicated it influenced support to a moderate extent. One-fourth of the community pharmacists in this sample responded that concern about how to interact with injection drug users influenced support to a moderate extent. On the other hand, nearly one-half responded that this concern either did not influence their level of support or only influenced support to a small extent (Table 4).

Table 4

Primary Interpersonal Factors Influencing Pharmacists' Level of Support of Implementation of a Syringe Exchange Program in the Community Pharmacy Where Practice the Majority of the Time

Primary Interpersonal Factor	*N*	*n* (%) *
Extent that concern about having increased numbers of injection drug users in the pharmacy influences level of support	286	
Not at all		32 (11.2)
To a small extent		43 (15.0)
To a moderate extent		66 (23.1)
To a fairly great extent		53 (18.5)
To a great extent		91 (31.8)
Extent that concern about how to interact with injection drug users influences level of support	286	
Not at all		72 (25.2)
To a small extent		70 (24.5)
To a moderate extent		73 (25.5)
To a fairly great extent		39 (13.6)
To a great extent		32 (11.2)

Note. * Totals may not equal 100% for every response due to missing responses or rounding.

Concern about the disapproval of colleagues and the disapproval of customers who are not injection drug users and receiving injection drug user cultural competency training did not meet the definition of a primary factor influencing pharmacists' level of support. However, nearly one-fourth of the pharmacists in the sample indicated that receiving injection drug user cultural competency training would influence their level of support to a moderate extent. The majority responded that concern about the disapproval of colleagues (60.9%) and concern about the disapproval of customers who are not injection drug users (31.4%) did not influence their level of support (Table 5).

Table 5

Non-Primary Interpersonal Factors Influencing Pharmacists' Level of Support of Implementation of a Syringe Exchange Program in the Community Pharmacy Where Practice the Majority of the Time

Non-Primary Interpersonal Factor	*N*	*n* (%) *
Extent that concern about the disapproval of colleagues influences level of support	289	
Not at all		176 (60.9)
To a small extent		68 (23.5)
To a moderate extent		27 (9.3)
To a fairly great extent		10 (3.5)
To a great extent		8 (2.8)
Extent that concern about the disapproval of customers who are not injection drug users influences level of support	287	
Not at all		90 (31.4)
To a small extent		62 (21.6)
To a moderate extent		60 (20.9)
To a fairly great extent		36 (12.5)
To a great extent		39 (13.6)
Extent that receiving injection drug user cultural competency training influences level of support	281	
Not at all		77 (27.4)
To a small extent		71 (25.3)
To a moderate extent		68 (24.2)
To a fairly great extent		32 (11.4)
To a great extent		33 (11.7)

Note. * Totals may not equal 100% for every response due to missing responses or rounding.

All of the organizational factors influencing pharmacists' level of support met the criteria of a primary factor. These factors included concern about company/store policy, concern about the cost of supplies, concern about the time required to operate a syringe exchange program, having a company/store policy that allows implementation of a syringe exchange program, and receiving training on how to implement a syringe

exchange program. Concern about the time required to operate a syringe exchange program was the leading primary organizational factor with a cumulative response rate of 74.5%, followed by having a company/store policy that allows the implementation of a syringe exchange program (60.6%). Overall, more than one-fourth of the sample responded that concern about the time required to operate a syringe exchange program influenced their level of support to a moderate extent, and more than one-fourth responded that it influenced support to a great extent. The majority of community pharmacists indicated that receiving training on how to implement a syringe exchange program would influence their support to a moderate extent (27.0%). While concern about company/store policy met the definition of a primary factor influencing support, nearly one-third of the sample indicated that this did not influence their level of support (Table 6).

Table 6

Primary Organizational Factors Influencing Pharmacists' Level of Support of Implementation of a Syringe Exchange Program in the Community Pharmacy Where Practice the Majority of the Time

Primary Organizational Factor	*N*	*n* (%) *
Extent that concern about company/store policy influences level of support	292	
Not at all		94 (32.2)
To a small extent		39 (13.4)
To a moderate extent		52 (17.8)
To a fairly great extent		48 (16.4)
To a great extent		59 (20.2)

Table 6

Cont.

Primary Organizational Factor	*N*	*n* (%) *
Extent that concern about the cost of supplies influences level of support	284	
Not at all		75 (26.4)
To a small extent		60 (21.1)
To a moderate extent		60 (21.1)
To a fairly great extent		47 (16.5)
To a great extent		42 (14.8)
Extent that concern about the time required to operate a syringe exchange program influences level of support	283	
Not at all		23 (8.1)
To a small extent		48 (17.3)
To a moderate extent		75 (26.5)
To a fairly great extent		62 (21.9)
To a great extent		74 (26.1)
Extent that having a company/store policy that allows implementation of a syringe program would influence level of support	285	
Not at all		63 (22.1)
To a small extent		49 (17.2)
To a moderate extent		63 (22.1)
To a fairly great extent		56 (19.6)
To a great extent		54 (18.9)
Extent that receiving training on how to implement a syringe exchange program would influence level of support	281	
Not at all		59 (21.0)
To a small extent		59 (21.0)
To a moderate extent		76 (27.0)
To a fairly great extent		46 (16.4)
To a great extent		41 (14.6)

Note. * Totals may not equal 100% for every response due to missing responses or rounding.

Research Question 2

Research Question 2 examined relationships between intrapersonal factors and community pharmacists' support of implementation of syringe exchange programs in community pharmacies in North Carolina. Concerning beliefs about syringe exchange programs, more than one-third of the community pharmacists included in this study did not believe that syringe exchange programs promote injection drug use. Additionally, more than three-fourths of the sample believed that syringe exchange programs are moderately effective to extremely effective at preventing HCV infection in injection drug users. Nearly two-thirds of the sample believed that syringe exchange programs are moderately effective to extremely effective at ensuring the proper disposal of used syringes. The majority of the sample believed that syringe exchange programs are at least slightly effective to very effective at connecting injection drug users to treatment for substance use disorder (Table 3).

Specific to pharmacists practicing in chain and independent community pharmacies, both groups reported more frequently that they did not believe that syringe exchange programs promote injection drug use. However, a larger number of pharmacists practicing at chain community pharmacies than pharmacists practicing at independent community pharmacies believed that syringe exchange programs promote injection drug use to some extent. The majority of chain community pharmacists (76.3%) and independent community pharmacists (78.7%) believed that syringe exchange programs are moderately to extremely effective at preventing HCV infection in injection drug users. The majority of chain community pharmacists (59.6%) believed that syringe

exchange programs are moderately to extremely effective at ensuring the proper disposal of used syringes, although 40.5% believed that they are not at all effective, only slightly effective, or did not know. In comparison, nearly three-fourths of the independent community pharmacists believed that syringe exchange programs are moderately to extremely effective at ensuring the proper disposal of used syringes. More than half of the chain community pharmacists believed that syringe exchange programs are not at all effective or only slightly effective at connecting injection drug users to treatment for substance use disorder or did not know. Slightly more than half of the independent community pharmacists believed that syringe exchange programs were moderately effective to extremely effective at connecting injection drug users to treatment for substance use disorder while nearly half believed they are not at all effective, slightly effective, or did not know. Pharmacists practicing at chain community pharmacies and pharmacists practicing at independent community pharmacies differed significantly on all beliefs about syringe exchange programs except for the belief about the effectiveness of syringe exchange programs at preventing HCV infection in injection drug users (Table 7 and Figures 2-5).

Table 7

Pharmacist Beliefs About Syringe Exchange Programs and Differences Between Groups (N = 304)

Belief	Overall *n* (%) [*]	Chain Community Pharmacists *n* (%) [*]	Independent Community Pharmacists *n* (%) [*]	X^{2} [1,2] *p*-value	V [1,2,3] *p*-value
Belief that syringe exchange programs promote injection drug use				12.31 0.015[**]	0.207 0.015[**]
Not at all	102 (33.6)	48 (28.4)	51 (41.5)		
To a small extent	72 (23.7)	38 (22.5)	31 (25.2)		
To a moderate extent	49 (16.1)	31 (18.3)	18 (14.6)		
To a fairly great extent	41 (13.5)	24 (14.2)	13 (10.6)		
To a great extent	33 (10.9)	26 (15.4)	6 (4.9)		
Don't know	7 (2.3)	2 (1.2)	4 (3.3)		
Belief about how effective syringe exchange programs are at preventing HCV[***] infection in injection drug users				8.40 0.078	0.176 0.078
Not at all effective	12 (4.0)	10 (5.9)	1 (0.8)		
Slightly effective	35 (11.6)	20 (11.8)	14 (11.5)		
Moderately effective	91 (30.0)	56 (33.1)	30 (24.6)		
Very effective	79 (26.1)	41 (24.3)	36 (29.5)		
Extremely effective	65 (21.5)	32 (18.9)	30 (24.6)		
Don't know	21 (6.9)	10 (5.9)	11 (9.0)		
Belief about how effective syringe exchange programs are at ensuring the proper disposal of used syringes				11.80 0.019[**]	0.206 0.019[**]
Not at all effective	32 (10.6)	25 (14.9)	7 (5.7)		
Slightly effective	58 (19.2)	38 (22.6)	19 (15.6)		
Moderately effective	94 (31.1)	51 (30.4)	35 (28.7)		
Very effective	61 (20.2)	27 (16.1)	31 (25.4)		
Extremely effective	45 (14.9)	22 (13.1)	23 (18.9)		
Don't know	12 (4.0)	5 (3.0)	7 (5.7)		

Table 7

Cont.

Belief	Overall *n* (%) *	Chain Community Pharmacists *n* (%) *	Independent Community Pharmacists *n* (%) *	X^{2} [1,2] *p*-value	V [1,2,3] *p*-value
Belief about how effective syringe exchange programs are at connecting injection drug users to treatment for substance use disorder				14.63 0.006**	0.241 0.006**
Not at all effective	48 (16.1)	35 (21.0)	12 (10.0)		
Slightly effective	86 (28.8)	47 (28.1)	35 (29.2)		
Moderately effective	85 (28.4)	35 (21.0)	46 (38.3)		
Very effective	36 (12.0)	24 (14.4)	11 (9.2)		
Extremely effective	8 (2.7)	3 (1.8)	4 (3.3)		
Don't know	36 (12.0)	23 (13.8)	12 (10.0)		

Note. * Totals may not equal 100% for every response due to missing responses or rounding.
[1] Chi-square and Cramer's *V* results were used to examine differences between chain and independent community pharmacists and are based on the entire model of responses for each belief, not individual responses.
[2] Responses of "Don't know" were removed for Chi-square analysis.
[3] Cramer's *V* reported due to the contingency table being larger than 2x2 (Polit, 2010).
***HCV* = Hepatitis C virus
** $p < 0.05$

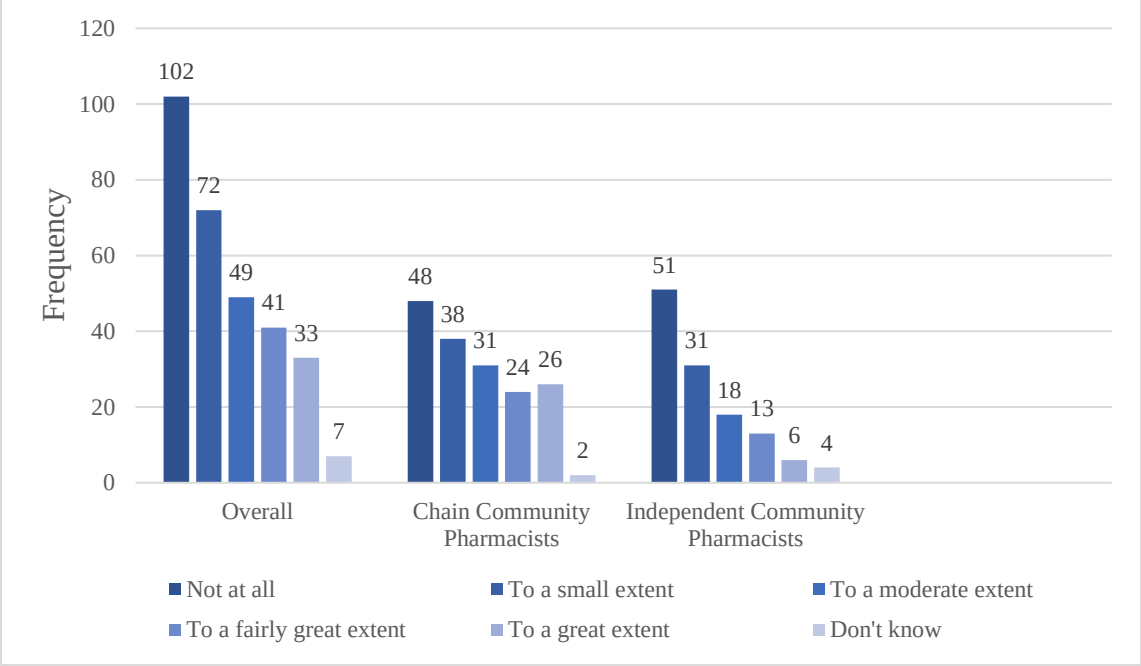

Figure 2. Belief About the Extent to Which Syringe Exchange Programs Promote Injection Drug Use.

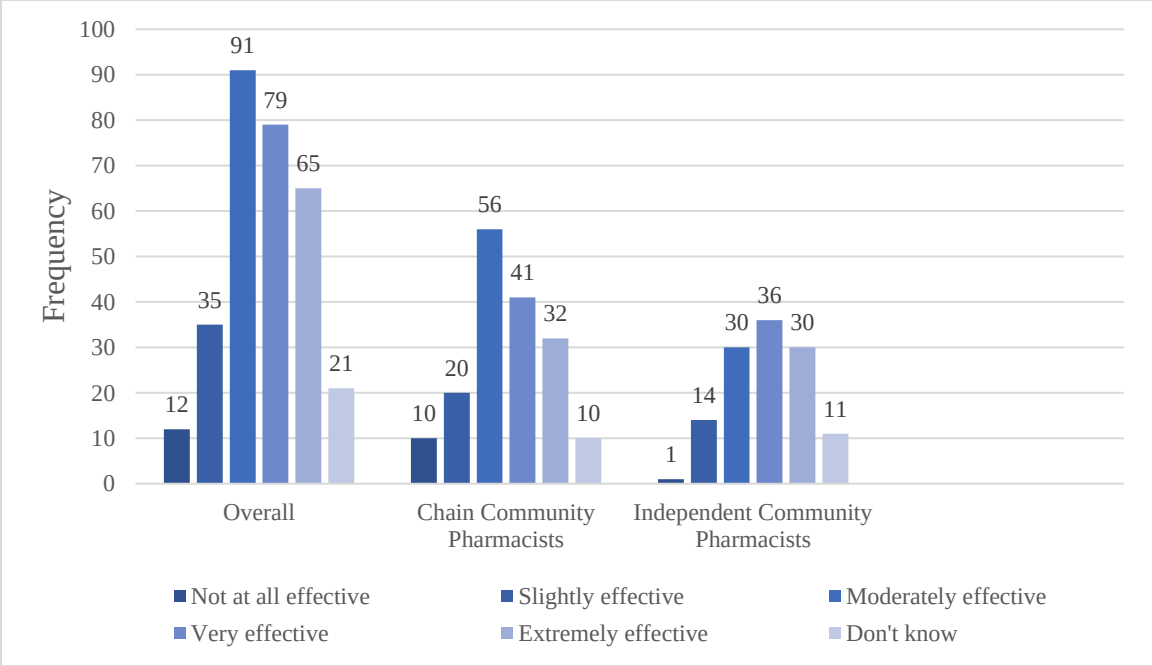

Figure 3. Belief About the Effectiveness of Syringe Exchange Programs at Preventing HCV Infection in Injection Drug Users.

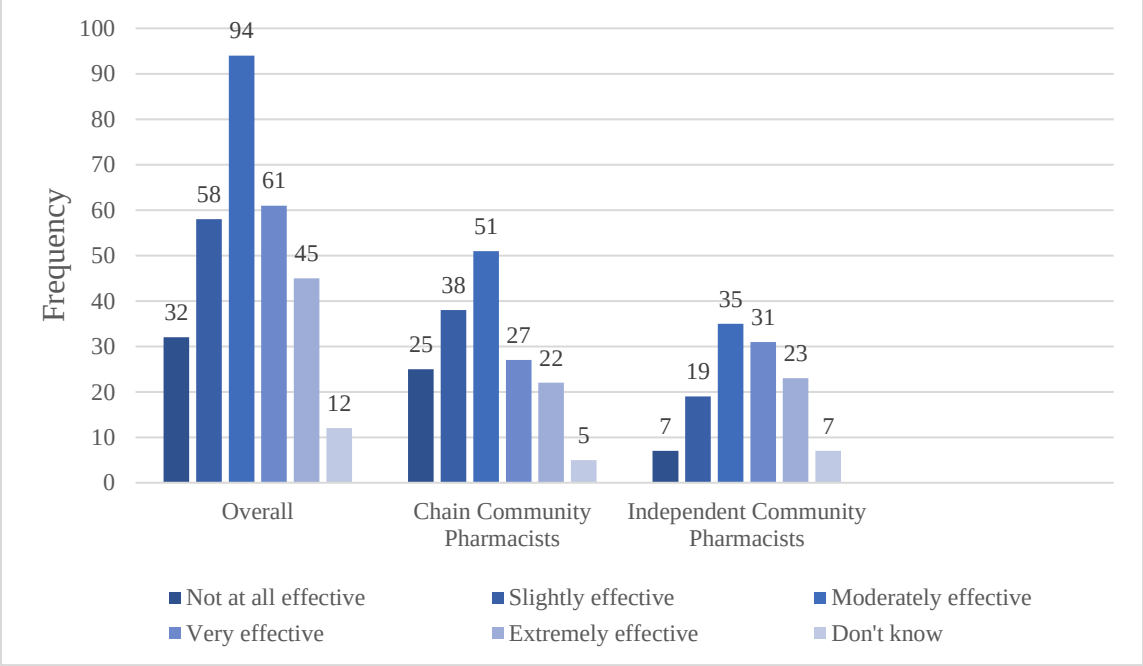

Figure 4. Belief About the Effectiveness of Syringe Exchange Programs at Ensuring the Proper Disposal of Used Syringes.

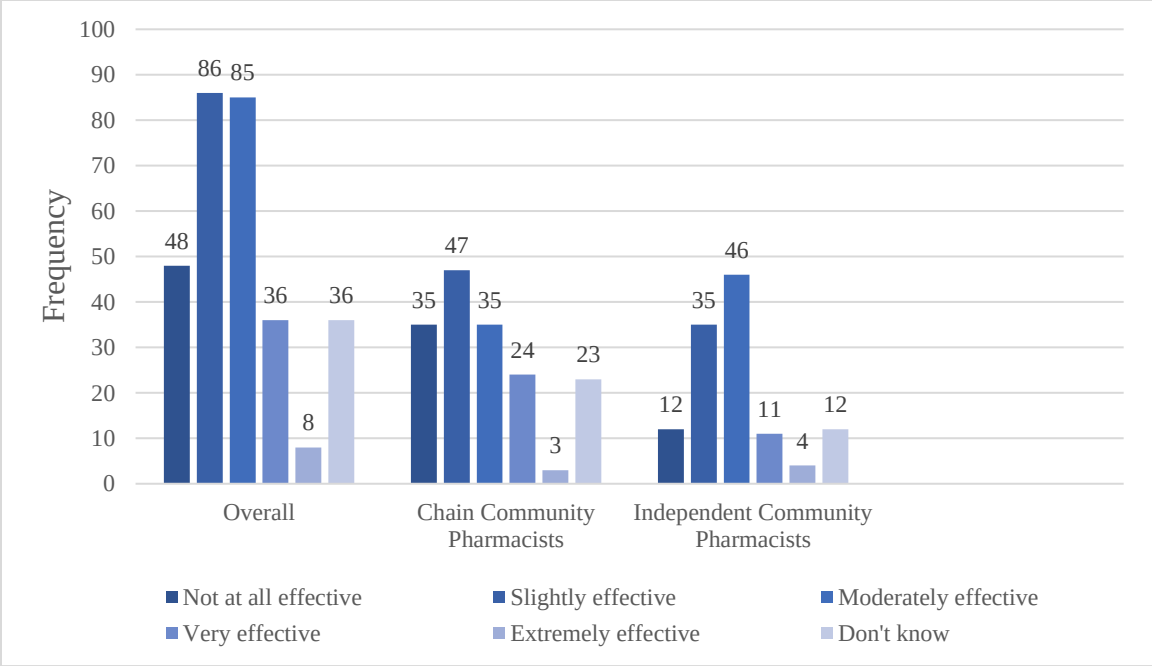

Figure 5. Belief About the Effectiveness of Syringe Exchange Programs at Connecting Injection Drug User to Treatment for Substance Use Disorder.

Concerning associations between beliefs about syringe exchange programs and pharmacists' level of support, there was a statistically significant relationship with all four variables. There was a moderate negative relationship between pharmacists' support and the belief about the extent to which syringe exchange programs promote injection drug use. As the extent of this belief increased, the extent of pharmacists' support decreased. There was a moderate positive relationship between pharmacists' support and beliefs about the effectiveness of syringe exchange programs at preventing HCV infection in injection drug users, ensuring the proper disposal of used syringes, and connecting injection drug users to treatment for substance use disorder. As the level of these beliefs about the effectiveness of syringe exchange programs increased, the extent of pharmacists' support increased. There was a negative relationship between pharmacists' support and the influence of concern about personal liability, which was statistically significant. As the level of influence of this concern increased, there was a decrease in the extent of pharmacists' support. There was a moderate positive association between pharmacists' support and the influence of receiving education on syringe exchange programs, which was statistically significant. This indicates that as the level of influence of receiving education on syringe exchange programs increased, the level of pharmacists' support increased. There was no statistically significant relationship between pharmacists' support and the influence of concern about whether it is lawful to operate a syringe exchange program in a pharmacy using Somers' *d* analysis (Table 8).

Table 8

Bivariate Relationships Between Intrapersonal Factors and Pharmacists' Level of Support of Implementation of a Syringe Exchange Program in the Community Pharmacy Where Practice the Majority of the Time

Intrapersonal Factor	*N*	Somers' *d* *p*-value
Belief that syringe exchange programs promote injection drug use	287	-0.375 < 0.001*
Belief about the level of effectiveness of syringe exchange programs at preventing HCV** infection in injection drug users	274	0.422 < 0.001*
Belief about the level of effectiveness of syringe exchange programs at ensuring the proper disposal of used syringes	280	0.368 < 0.001*
Belief about the level of effectiveness of syringe exchange programs at connecting injection drug users to treatment for substance use disorder	259	0.374 < 0.001*
Extent that concern about whether it is lawful to operate a syringe exchange program in a pharmacy influences level of support	282	-0.062 0.228
Extent that concern about personal liability influences level of support	282	-0.243 < 0.001*
Extent that receiving education on syringe exchange programs would influence level of support	281	0.399 < 0.001*

Note. ***HCV* = Hepatitis C Virus
*$p < 0.05$

Concerning the first level of analysis of the remaining intrapersonal factors in this question, type of community pharmacy where practice the majority of the time had a statistically significant strong association with pharmacists' support, meaning that the level of support depends on the type of community pharmacy where pharmacists practice. There were no statistically significant relationships between pharmacists' support and role at the community pharmacy where currently practice the majority of the time,

gender, county location of the pharmacy where currently practice the majority of the time (urban/rural), or approximate number of years worked as a practicing pharmacist using Chi-square analysis (Table 9).

Table 9

Bivariate Relationships Between Intrapersonal Factors and Pharmacists' Level of Support of Implementation of a Syringe Exchange Program in the Community Pharmacy Where Practice the Majority of the Time

Intrapersonal Factor	*N*	X^2 [1] *p*-value	*V* [1] *p*-value
Type of community pharmacy where currently practice the majority of the time	281	15.25 [2,3] 0.004*	-
Role at the community pharmacy where currently practice the majority of the time	287	4.05 [2,3] 0.399	-
Gender	259	5.42 [2,3] 0.247	-
County location of pharmacy where currently practice the majority of the time (urban/rural)	252	6.15 [2,3] 0.188	-
Approximate number of years worked as a practicing pharmacist	262	10.86 0.541	0.118[4] 0.541

Note. [1] Chi-square and Cramer's *V* results are based on the entire model of responses for the factor, not individual responses.
[2] No cells contained less than 5 expected counts; use of Fisher's exact test not required (Polit, 2010).
[3] Cramer's *V* not required for a 2x2 contingency table (Polit, 2010).
[4] Cramer's *V* reported in addition to Chi-square due to the contingency table being larger than 2x2 (Polit, 2010).
* $p < 0.05$

For the second level of analysis in this question, the type of community pharmacy where pharmacists currently practice the majority of the time, role at the community pharmacy where they practice the majority of the time, county location of the community pharmacy where they practice the majority of the time (urban/rural), gender, and

approximate number of years of practice were included as independent variables in the PLUM ordinal regression model using simultaneous entry. The overall predictive model was statistically significant, indicating that the model has good predictive power (log likelihood). The model and observed data were not significantly different; thus, the model was a good fit in understanding how these intrapersonal factors are related to the level of pharmacists' support of the implementation of a syringe exchange program in the community pharmacy where they practice the majority of the time (Pearson and Deviance X^2). The type of community pharmacy where currently practice the majority of the time, gender, and approximate number of years worked as a practicing pharmacist were significant predictors of supporting the implementation of a syringe exchange program to a great extent compared to the remaining levels of support. Specifically, pharmacists practicing at chain community had 56.1% lower odds of supporting the implementation of a syringe exchange program to a great extent compared to pharmacists practicing at independent community pharmacies. Male pharmacists were nearly two times as likely to support the implementation of a syringe exchange program to a great extent compared to female pharmacists. Pharmacists that had worked as a practicing pharmacist for 11 to 20 years were two times as likely to support the implementation of a syringe exchange program to a great extent compared to pharmacists that have worked as a practicing pharmacist for more than 20 years, adjusting for all other variables in the model (Table 10).

Table 10

PLUM Ordinal Regression Analysis of Intrapersonal Factors and Pharmacists' Level of Support of Implementation of a Syringe Exchange Program in the Community Pharmacy Where Practice the Majority of the Time (N = 228)

Intrapersonal Factor	AOR	95% CI	p-value
Type of community pharmacy where practice the majority of the time			
Chain	0.484	0.286-0.818	0.007*
Independent RC**	-		
Role at the community pharmacy where practice the majority of the time			
Staff/dispensing pharmacist	1.354	0.819-2.238	0.237
Pharmacy manager RC**	-		
County location of pharmacy where practice the majority of the time			
Urban RC**	-		
Rural	0.691	0.424-1.125	0.137
Gender			
Male	1.865	1.128-3.085	0.015*
Female RC**	-		
Approximate number of years worked as a practicing pharmacist			
0-5 years	1.625	0.870-3.032	0.127
6-10 years	1.265	0.558-2.868	0.574
11-20 years	2.037	1.074-3.861	0.029*
More than 20 years RC**	-		

Note. Log Likelihood (X^2 = 17.85), (df = 7), (p = 0.013)
Pearson (X^2 = 176.94), (df = 213), (p = 0.966)
Deviance (X^2 = 192.75), (df = 213), (p = 0.837)
Nagelkerke (R^2 = 0.079)
**RC = Reference category
* $p < 0.05$

Research Question 3

Research Question 3 examined relationships between interpersonal factors and community pharmacists' support of the implementation of syringe exchange programs in community pharmacies in North Carolina. There was a negative relationship between pharmacists' support and the influence of concern about the disapproval of customers who are not injection drug users, which was statistically significant. As the level of influence of this concern increased, there was a decrease in the extent of pharmacists' support. There was a moderate negative relationship between pharmacists' support and the influence of concern about having increased numbers of injection drug users in the pharmacy, which was statistically significant. As the level of influence of this concern increased, the level of pharmacists' support decreased. There was a negative relationship between pharmacists' support and the influence of concern about how to interact with injection drug users, which was statistically significant. As the level of influence of this concern increased, there was a decrease in the extent of pharmacists' support. There was a moderate positive relationship between pharmacists' support and the influence of receiving injection drug user cultural competency training, which was statistically significant. As the level of influence of receiving injection drug user cultural competency training increased, the level of pharmacists' support increased. There was no statistically significant relationship between pharmacists' support and the influence of the concern about the disapproval of colleagues using Somers' *d* analysis (Table 11).

Table 11

Bivariate Relationships Between Interpersonal Factors and Pharmacists' Level of Support of Implementation of a Syringe Exchange Program in the Community Pharmacy Where Practice the Majority of the Time

Interpersonal Factor	*N*	Somers' *d* *p*-value
Extent that concern about the disapproval of colleagues influences level of support	287	-0.033 0.566
Extent that concern about the disapproval of customers who are not injection drug users influences level of support	285	-0.203 < 0.001*
Extent that concern about having increased numbers of injection drug users in the pharmacy influences level of support	284	-0.473 < 0.001*
Extent that concern about how to interact with injection drug users influences level of support	284	-0.231 < 0.001*
Extent that receiving injection drug user cultural competency training would influence level of support	279	0.377 < 0.001*

Note. *$p < 0.05$

Research Question 4

Research Question 4 examined relationships between organizational factors and community pharmacists' support of the implementation of syringe exchange programs in community pharmacies in North Carolina. There was a statistically significant negative association between pharmacists' support and the influence of the concern about the time required to operate a syringe exchange program. As the level of influence of this concern increased, there was a decrease in the level of pharmacists' support. There was a statistically significant positive relationship between pharmacists' support and the influence of having a company/store policy that allows the implementation of a syringe

exchange program. As the level of influence of having a company/store policy that allows the implementation of a syringe exchange program increased, the level of pharmacists' support increased. There was a moderate positive relationship between pharmacists' support and the influence of receiving training on how to implement a syringe exchange program, which was statistically significant. As the level of influence of receiving training on how to implement a syringe exchange program increased, the level of pharmacists' support increased. There was no relationship between pharmacists' support and the influence of the concern about company/store policy or the influence of the concern about the cost of supplies using Somers' *d* analysis (Table 12).

Table 12

Bivariate Associations Between Organizational Factors and Pharmacists' Level of Support of Implementation of a Syringe Exchange Program in the Community Pharmacy Where Practice the Majority of the Time

Organizational Factor	*N*	Somers' *d* *p*-value
Extent that concern about company/store policy influences level of support	290	0.054 0.266
Extent that concern about the cost of supplies influences level of support	282	0.094 0.053
Extent that concern about the time required to operate a syringe exchange program influences level of support	281	-0.181 < 0.001*
Extent that having a company/store policy that allows implementation of a syringe exchange program would influence level of support	283	0.301 < 0.001*
Extent that receiving training on how to implement a syringe exchange program would influence level of support	279	0.450 < 0.001*

Note. $^{*}p < 0.05$

Research Question 5

Research Question 5 examined the differences between pharmacists practicing in chain and independent community pharmacies in the level of support of the implementation of syringe exchange programs in community pharmacies in North Carolina. While nearly one-third of the overall sample of community pharmacists did not support the implementation of a syringe exchange program in their pharmacy, more than two-thirds supported implementation to some extent. Specific to chain and independent community pharmacists, more than half of the chain community pharmacists and more than three-fourths of the independent community pharmacists supported implementation to some extent. More chain community pharmacists (40.7%) did not support the implementation of a syringe exchange program in their pharmacy compared to independent community pharmacists (19.3%). More independent community pharmacists supported the implementation of a syringe exchange program in their pharmacy to some extent compared to chain community pharmacists. The frequency at which independent community pharmacists indicated support to a moderate extent was more than 10% higher than chain community pharmacists. In general, pharmacists practicing in chain community pharmacies and pharmacists practicing in independent community pharmacies differed significantly on the overall level of support, with independent pharmacists showing more support (Table 13 and Figure 6).

Table 13

Level of Support of Implementation of a Syringe Exchange Program in the Community Pharmacy Where Practice the Majority of the Time and Differences Between Groups (N = 304)

Response	Overall *n* (%) *	Chain Community Pharmacists *n* (%) *	Independent Community Pharmacists *n* (%) *	X^{2} [1] *p*-value	V [1,2] *p*-value
To what extent do you support the implementation of a syringe exchange program in the community pharmacy where you practice the majority of the time?				15.25 0.004**	0.233 0.004**
Not at all	92 (31.4)	66 (40.7)	23 (19.3)		
To a small extent	60 (20.5)	31 (19.1)	28 (23.5)		
To a moderate extent	61 (20.8)	26 (16.0)	31 (26.1)		
To a fairly great extent	41 (14.0)	19 (11.7)	19 (16.0)		
To a great extent	39 (13.3)	20 (12.3)	18 (15.1)		

Note. * Totals may not equal 100% for every response due to missing responses or rounding.
[1] Chi-square and Cramer's *V* results were used to examine differences between chain and independent community pharmacists and are based on the entire model of responses about support, not individual responses.
[2] Cramer's *V* reported due to the contingency table being larger than 2x2 (Polit, 2010).
** $p < 0.05$

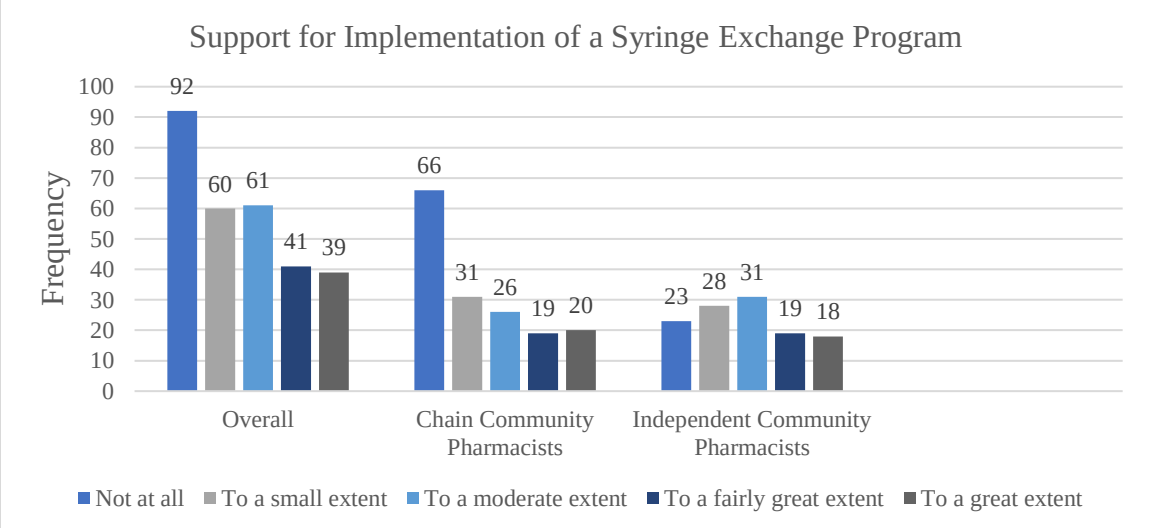

Figure 6. Level of Support of Implementation of a Syringe Exchange Program in the Community Pharmacy Where Practice the Majority of the Time and Differences Between Groups.

Research Question 6

Research Question 6 examined the differences between pharmacists practicing in chain and independent community pharmacies in the primary intrapersonal, interpersonal, and organizational factors influencing the level of support of the implementation of syringe exchange programs in community pharmacies in North Carolina. Primary factors were identified in Research Question 1 (factors that influenced support to a moderate extent or higher with a cumulative response rate of at least half) and compared here for differences.

The primary intrapersonal factors influencing support identified in Research Question 1 were concern about whether it is lawful to operate a syringe exchange program in a pharmacy, concern about personal liability, and receiving education on syringe exchange programs. The only primary intrapersonal factor with statistically significant differences was the concern about personal liability. Pharmacists practicing in chain community pharmacies and pharmacists practicing in independent community pharmacies differed significantly on the overall proportions of responses about the extent of influence of concern about personal liability on their level of support. Overall, more chain community pharmacists (33.5%) indicated that concern about personal liability influenced their level of support to a great extent compared to independent chain pharmacists (15.4%). More independent community pharmacists (40.0%) indicated that concern about personal liability influenced their level of support to a moderate extent compared to chain pharmacists (16.8%). More chain community pharmacists than

independent community pharmacists responded that receiving education on syringe exchange programs would not at all influence their level of support (Table 14).

Table 14

Differences Between Pharmacists Practicing in Chain and Independent Community Pharmacies in the Primary Intrapersonal Factors Influencing Level of Support of Implementation of a Syringe Exchange Program in the Community Pharmacy Where Practice the Majority of the Time

Primary Intrapersonal Factor	*N*	Chain Community Pharmacists *n* (%) *	Independent Community Pharmacists *n* (%) *	X^{2} [1] *p*-value	*V* [1,2] *p*-value
Extent that concern about whether it is lawful to operate a syringe exchange program in a pharmacy influences level of support	272			5.77 0.217	0.146 0.217
Not at all		42 (26.9)	28 (24.1)		
To a small extent		35 (16.0)	27 (23.3)		
To a moderate extent		25 (16.0)	15 (12.9)		
To a fairly great extent		21 (13.5)	23 (19.8)		
To a great extent		43 (27.0)	23 (19.8)		
Extent that concern about personal liability influences level of support	272			17.65 0.001**	0.255 0.001**
Not at all		22 (14.2)	19 (16.2)		
To a small extent		26 (16.8)	22 (18.8)		
To a moderate extent		26 (16.8)	40 (34.2)		
To a fairly great extent		29 (18.7)	18 (15.4)		
To a great extent		52 (33.5)	18 (15.4)		
Extent that receiving education on syringe exchange programs would influence level of support	270			9.13 0.058	0.184 0.058
Not at all		38 (24.5)	16 (13.9)		
To a small extent		33 (21.3)	25 (21.7)		
To a moderate extent		40 (25.8)	40 (34.8)		
To a fairly great extent		19 (12.3)	22 (19.1)		
To a great extent		25 (16.1)	12 (10.4)		

Note. * Totals may not equal 100% for every response due to missing responses or rounding; [1] Chi-square and Cramer's *V* results are based on the entire model of responses for each factor, not individual responses; [2] Cramer's *V* reported due to the contingency table being larger than 2 x 2 (Polit, 2010); ** $p < 0.05$

The primary interpersonal factors influencing support identified in Research Question 1 were concern about having increased numbers of injection drug users in the pharmacy and concern about how to interact with injection drug users. Pharmacists practicing in chain community pharmacies and pharmacists practicing in independent community pharmacies did not differ significantly on the overall proportions of responses about the extent of influence of either of these concerns. In general, more chain community pharmacists indicated that concern about having increased numbers of injection drug users in the pharmacy and concern about how to interact with injection drug users influenced their level of support to a great extent compared to independent chain pharmacists (Table 15).

Table 15

Differences Between Pharmacists Practicing in Chain and Independent Community Pharmacies in the Primary Interpersonal Factors Influencing Level of Support of Implementation of a Syringe Exchange Program in the Community Pharmacy Where Practice the Majority of the Time

Primary Interpersonal Factor	*N*	Chain Community Pharmacists *n* (%) [*]	Independent Community Pharmacists *n* (%) [*]	$X^{2\,1}$ *p*-value	$V^{1,2}$ *p*-value
Extent that concern about having increased numbers of injection drug users in the pharmacy influences level of support	275			10.45 0.063	0.195 0.063
Not at all		18 (11.3)	14 (12.1)		
To a small extent		19 (11.9)	23 (19.8)		
To a moderate extent		31 (19.5)	31 (26.7)		
To a fairly great extent		29 (18.2)	22 (19.0)		
To a great extent		61 (38.4)	26 (22.4)		

Table 15

Cont.

Primary Interpersonal Factor	*N*	Chain Community Pharmacists *n* (%) [*]	Independent Community Pharmacists *n* (%) [*]	X^{2} [1] *p*-value	V [1,2] *p*-value
Extent that concern about how to interact with injection drug users influences level of support	274			6.51 0.164	0.154 0.164
Not at all		36 (22.8)	33 (28.4)		
To a small extent		36 (22.8)	29 (25.0)		
To a moderate extent		38 (24.1)	32 (27.6)		
To a fairly great extent		24 (15.2)	15 (12.9)		
To a great extent		24 (15.2)	7 (6.0)		

Note. [*] Totals may not equal 100% for every response due to missing responses or rounding.
[1] Chi-square and Cramer's *V* results are based on the entire model of responses for each factor, not individual responses.
[2] Cramer's *V* reported due to the contingency table being larger than 2x2 (Polit, 2010).
[**] $p < 0.05$

Concern about the disapproval of colleagues and the disapproval of customers who are not injection drug users and receiving injection drug user cultural competency training did not meet the definition of a primary factor influencing pharmacists' level of support for the overall sample. However, receiving injection drug user cultural competency training was a primary factor for independent community pharmacists. Chain and independent community pharmacists differed significantly on the overall proportions of their responses about the extent to which receiving injection drug user cultural competency training would influence their support. More independent community pharmacists (32.8%) indicated that receiving injection drug user cultural competency training would influence their support to a moderate extent compared to chain community

pharmacists (17.5%). More chain community pharmacists (32.5%) compared to independent community pharmacists (20.7) indicated that receiving injection drug user cultural competency training would not at all influence their level of support. Overall, independent community pharmacists responded more frequently that the disapproval of customers who are not injection drug users influences their support to a moderate extent than chain community pharmacists. Finally, more than one-half of chain community pharmacists and two-thirds of independent community pharmacists indicated that the disapproval of colleagues did not influence their support (Table 16).

Table 16

Differences Between Pharmacists Practicing in Chain and Independent Community Pharmacies in the Non-Primary Interpersonal Factors Influencing Level of Support of Implementation of a Syringe Exchange Program in the Community Pharmacy Where Practice the Majority of the Time

Non-Primary Interpersonal Factor	*N*	Chain Community Pharmacists *n* (%) [*]	Independent Community Pharmacists *n* (%) [*]	$X^{2\,1}$ *p*-value	$V^{1,2}$ *p*-value
Extent that concern about the disapproval of colleagues influences level of support	277			2.878 0.580	0.102 0.580
Not at all		91 (56.9)	77 (65.8)		
To a small extent		42 (26.3)	24 (20.5)		
To a moderate extent		15 (9.4)	10 (8.5)		
To a fairly great extent		6 (3.8)	4 (3.4)		
To a great extent		6 (3.8)	2 (1.7)		

Table 16

Cont.

Non-Primary Interpersonal Factor	*N*	Chain Community Pharmacists *n* (%) [*]	Independent Community Pharmacists *n* (%) [*]	X^{2} [1] *p*-value	*V* [1,2] *p*-value
Extent that concern about the disapproval of customers who are not injection drug users influences level of support	275			5.49 0.241	0.141 0.241
Not at all		58 (36.7)	30 (25.6)		
To a small extent		29 (18.4)	30 (25.6)		
To a moderate extent		30 (19.0)	29 (24.8)		
To a fairly great extent		22 (13.9)	14 (12.0)		
To a great extent		19 (12.0)	14 (12.0)		
Extent that receiving injection drug user cultural competency training would influence support	270			13.89 0.008**	0.227 0.008**
Not at all		50 (32.5)	24 (20.7)		
To a small extent		42 (27.3)	26 (22.4)		
To a moderate extent		27 (17.5)	38 (32.8)		
To a fairly great extent		13 (8.4)	17 (14.7)		
To a great extent		22 (14.3)	11 (9.5)		

Note. [*] Totals may not equal 100% for every response due to missing responses or rounding.
[1] Chi-square and Cramer's *V* results are based on the entire model of responses for each factor, not individual responses.
[2] Cramer's *V* reported due to the contingency table being larger than 2x2 (Polit, 2010).
** $p < 0.05$

The primary organizational factors influencing support identified in Research Question 1 were concern about company/store policy, concern about the cost of supplies, concern about the time required to operate a syringe exchange program, having a company/store policy that allows implementation of a syringe exchange program, and receiving training on how to implement a syringe exchange program. There were

statistically significant differences in the overall proportions of responses for all organizational factors. In general, more chain community pharmacists (29.8%) indicated that concern about company/store policy influenced their level of support to a great extent compared to independent community pharmacists (8.4%), whereas more independent community pharmacists indicated that this concern did not influence their level of support. Independent community pharmacists indicated more frequently than did chain pharmacists that concern about the cost of supplies influenced their level of support to a moderate extent (25.0% vs. 9.6% respectively) and to a great extent (20.7% vs. 10.3% respectively), whereas chain community pharmacists indicated more frequently that this concern did not influence their level of support. More chain community pharmacists (36.8%) indicated that concern about the time required to operate a syringe exchange program influenced their level of support to a great extent compared to independent community pharmacists (12.1%). More chain pharmacists indicated that having a company/store policy that allows the implementation of a syringe exchange program influenced their level of support to a great extent compared to independent chain pharmacists. Overall, more chain community pharmacists responded that receiving training on how to implement a syringe exchange program would not at all influence their level of support, while more independent community pharmacists responded that this would influence their level of support to a moderate extent (Table 17).

Table 17

Differences Between Pharmacists Practicing in Chain and Independent Community Pharmacies in the Primary Organizational Factors Influencing Level of Support of Implementation of a Syringe Exchange Program in the Community Pharmacy Where Practice the Majority of the Time

Primary Organizational Factor	*N*	Chain Community Pharmacists *n* (%) [*]	Independent Community Pharmacists *n* (%) [*]	X^{2} [1] *p*-value	V [1,2] *p*-value
Extent that concern about company/store policy influences level of support	280			23.96 < 0.001[**]	0.293 < 0.001[**]
Not at all		40 (24.8)	52 (43.7)		
To a small extent		21 (13.0)	17 (14.3)		
To a moderate extent		25 (15.5)	24 (20.2)		
To a fairly great extent		27 (16.8)	16 (13.4)		
To a great extent		48 (29.8)	10 (8.4)		
Extent that concern about the cost of supplies influences level of support	272			26.38 < 0.001[**]	0.311 < 0.001[**]
Not at all		56 (35.9)	17 (14.7)		
To a small extent		36 (21.2)	24 (20.7)		
To a moderate extent		36 (23.1)	22 (19.0)		
To a fairly great extent		15 (9.6)	29 (25.0)		
To a great extent		16 (10.3)	24 (20.7)		
Extent that concern about the time required to operate a syringe exchange program influences level of support	271			23.49 < 0.001[**]	0.294 < 0.001[**]
		14 (9.0)	9 (7.8)		
Not at all		22 (14.2)	25 (21.6)		
To a small extent		31 (20.0)	40 (34.5)		
To a moderate extent		31 (20.0)	28 (24.1)		
To a fairly great extent		57 (36.8)	14 (12.1)		
To a great extent					

Table 17

Cont.

Primary Organizational Factor	*N*	Chain Community Pharmacists *n* (%) *	Independent Community Pharmacists *n* (%) *	$X^{2\,1}$ *p*-value	$V^{1,2}$ *p*-value
Extent that having a company/store policy that allows implementation of a syringe program would influence level of support	273			11.11 0.025**	0.202 0.025**
Not at all		34 (21.8)	28 (23.9)		
To a small extent		23 (14.7)	23 (19.7)		
To a moderate extent		27 (17.3)	31 (26.5)		
To a fairly great extent		32 (20.5)	22 (18.8)		
To a great extent		40 (25.6)	13 (11.1)		
Extent that receiving training on how to implement a syringe exchange program would influence level of support	270			14.08 0.007**	0.228 0.007**
Not at all		43 (27.9)	15 (12.9)		
To a small extent		34 (22.2)	22 (19.0)		
To a moderate extent		33 (21.4)	39 (33.6)		
To a fairly great extent		19 (12.3)	24 (20.7)		
To a great extent		25 (16.2)	16 (13.8)		

Note. * Totals may not equal 100% for every response due to missing responses or rounding.
[1] Chi-square and Cramer's *V* results are based on the entire model of responses for each factor, not individual responses.
[2] Cramer's *V* reported due to the contingency table being larger than 2x2 (Polit, 2010).
** $p < 0.05$

Open-ended Question

The open-ended question explored any other thoughts community pharmacists had about implementing a syringe exchange program in the community pharmacy where they practice the majority of the time. Of the 304 community pharmacists included in this

study, 103 provided responses to this question, representing one-third of the overall sample. Responses represented each model level (intrapersonal, interpersonal, and organizational).

Of the pharmacists providing a response to this question, 20 expressed some degree of support for implementing a syringe exchange program in their pharmacy, although some still had concerns associated with implementation. Several of the pharmacists expressing support indicated that implementation of a syringe program in their pharmacy was a good idea, could be useful in the community, and could have a public health impact. One pharmacist indicated that as healthcare providers most accessible to the community, pharmacists could make a public health impact by implementing a syringe exchange program. Another stated "Harm reduction, harm reduction, harm reduction. All that we can do to promote those efforts is right." A third pharmacist expressed "If the chain pharmacy I worked in would support a syringe exchange program then I would be 100% for implementation. I would like to be able to provide education and exchange for clean needles to prevent the spread and risk of diseases." Fifteen pharmacists expressed that they did not support implementing a syringe exchange program in their pharmacy; however, eight of those pharmacists supported the implementation of syringe exchange programs in places they felt were a better fit. Suggestions for places with a better fit included community health centers, local health departments, and other community places near their pharmacy.

Overall, pharmacists cited multiple concerns and ideas about implementing a syringe exchange program in their pharmacy. The most frequently cited concern was

related to time. A total of 20 pharmacists indicated that with their current workflow, their volume of work, or current staffing resources, they would not have enough time to add another service. One pharmacist indicated that time was already so limited that they worried about patient safety in general. Fourteen pharmacists cited concern about having increased numbers of injection drug users in the pharmacy, making other customers feel uncomfortable, and harm to their business when uncomfortable customers take their business elsewhere. Comments related to this concern included not wanting "those people" or "the crowd they tend to come with" in their pharmacy. One pharmacist stated, "I don't know about other pharmacists . . . but I'm trying to keep these drug users away from my patients . . . and to keep these people who have absolutely nothing to offer out of my store." Eleven pharmacists reported concerns about cost. Several indicated that there would need to be some type of reimbursement program for program supplies or for program supplies to be provided to the pharmacy free of charge. Several pharmacists commented that the program would have to be "cost neutral" or turn a profit. Prior negative experiences, including overdoses in the pharmacy or on the surrounding property, were an issue for 10 of the pharmacists providing responses. One pharmacist responded "Are the syringe users getting cultural competency training? The pill heads (insensitive, I know) in my store are very disruptive." Another pharmacist stated, "Multiple IV drug ODs, in and outside of the store . . . have tainted my response."

Nine pharmacists reported concern about the safety of pharmacy staff and pharmacy customers, and eight pharmacists reported concerns about the improper disposal of used syringes. Several pharmacists expressed concern about the risk of

accidental needle sticks for themselves, staff, and customers. Six pharmacists were concerned about increased theft/crime in their pharmacy, and six pharmacists expressed ethical concerns. One pharmacist communicated, ". . . I don't want to feel that I am helping people kill themselves. If the dirty syringe doesn't, the drug itself will." Another communicated, "I want to take care of the people that are willing to be taken care of." A third pharmacist commented, "By providing this you are enabling the very behavior that leads to other crimes against law abiding citizens." A total of four pharmacists indicated that company policy was an issue, and four pharmacists were concerned about the logistics of implementing a syringe exchange program. Several pharmacists expressed being unsure of how to train staff, how to dispose of returned used needles, how to store supplies in already limited space, and how to create private space to conduct syringe exchange services. One pharmacist was specifically concerned about the lack of private space to protect injection drug users from the stigmatization imposed by other pharmacy customers. Finally, two pharmacists indicated that more education and cultural competency training were needed. One pharmacist commented, ". . . More education among pharmacists, and dispelling misinformation, will help." Another pharmacist stated, "Technicians should be trained on cultural competency and the rest . . . I have had far too many techs judge what they don't understand" (Table 18).

Table 18

Additional Pharmacists' Thoughts About Implementing a Syringe Exchange Program in Their Pharmacy (*N* = 103)

Response About Support	n*
Some degree of support	20
Did not support	15
Supported implementation in other community places	8
Concern about time	20
Concern about increased numbers of injection drug users in the pharmacy/making other customers uncomfortable/harm to business	14
Concern about cost	11
Prior negative experiences with injection drug users	10
Concern about safety of pharmacy staff and pharmacy customers	9
Concern about improper disposal of used syringes	8
Concern about increased theft/crime	6
Ethical concerns	6
Company policy an issue	4
Concern about the logistics of implementation	4
Education/cultural competency training needed	2

Note. *Totals may exceed the total *N* due to some participants providing more than one item in their response.

Summary

A total of 304 NC community pharmacists were included in this study. The mean age of the pharmacists was 45 years, and the mean years of practice was 19 years. More than half of the sample was female and currently practiced in a chain community pharmacy. The proportions of pharmacists practicing at pharmacies in urban and rural

county locations were similar. Intrapersonal, interpersonal, and organizational factors were examined and found to be related to the support level for syringe exchange programs among the pharmacists using a variety of analyses tests. Responses to the open-ended questions provided specific examples of the three conceptual factor groups.

CHAPTER V

DISCUSSION

Introduction

This study aimed to examine pharmacists' support of the implementation of syringe exchange programs in community pharmacies in North Carolina and the associated intrapersonal, interpersonal, and organizational factors by surveying NC licensed pharmacists practicing in this setting using an online survey. The social ecological model (SEM) guided the selection of variables and provided a framework for findings. The author used this chapter to critically examine the findings of this study, link with previous knowledge, and discuss conclusions, limitations, and implications for nursing practice, education, and future research.

The main sample characteristics, all of which were intrapersonal factors, were similar to the characteristics reported in the literature around nonprescription syringe sales and syringe exchange including age (Chiarello, 2016; Goodin et al., 2018; Meyerson et al., 2018; Pollini, 2017; Reich et al., 2002; Zaller et al., 2012) and gender (Goodin et al., 2018). However, the current study was different from other studies where the sample was equally male and female (Meyerson et al., 2018) or had more male pharmacists (Chiarello, 2016; Pollini, 2016; Reich et al., 2002; Zaller et al., 2012). The variation could be a result of sample size and geographic areas or the smaller sample sizes (e.g., 4) of the studies. More than half of the pharmacists in this study practiced in a

chain community pharmacy, which was similar to prior studies about nonprescription syringe sales and syringe exchange (Chiarello, 2016; Cooper et al., 2010; Deibert et al., 2006; Goodin et al., 2018; Meyerson et al., 2018; Reich et al., 2002; Tesoriero et al., 2012; Zaller et al., 2012). Similar to several prior studies, more than half of the pharmacists in this study had practiced for more than 10 years with a mean and median years of practice of 19 and 16, respectively (Deibert et al., 2006; Goodin et al., 2018; Meyerson et al., 2018). These findings were unlike those from two prior studies where the community pharmacists had a mean and median years of practice of 9.1 and 10, respectively (Pollini, 2017; Reich et al., 2002). The majority of pharmacists in this study worked as staff/dispensing pharmacists, which was consistent with two prior studies (Reich et al., 2002; Zaller et al., 2012), but inconsistent with two others (Meyerson et al., 2018; Tesoriero et al., 2012). The inconsistencies are likely due to sampling where the dissimilar studies specifically targeted and included pharmacy managers only. Similar to a prior study, the pharmacists in this study practiced at community pharmacies that were equally urban and rural in location (Goodin et al., 2018). This finding, however, was unlike previous reports where the community pharmacists practiced more frequently at pharmacies located in urban areas (Lewis et al., 2002; Meyerson et al., 2018; Singer et al., 1998).

Concerning chain and independent community pharmacists, the majority of chain community pharmacists in this study were female and practiced in a pharmacy in an urban county location. The majority of independent community pharmacists were male and practiced in a pharmacy in a rural county location. Chain and independent

community pharmacists differed significantly on gender, role, urban versus rural county location of their pharmacy, and years of practice. There were no prior similar studies that examined and compared chain and independent community pharmacists separately on sample characteristics.

Research Question 1 examined the primary intrapersonal, interpersonal, and organizational factors influencing community pharmacists' support of implementing a syringe exchange program in their pharmacy. Concern about personal liability was the leading primary intrapersonal factor influencing pharmacists' support, followed by receiving education on syringe exchange programs. A similar study demonstrated that pharmacists were eager for education on syringe exchange programs when being asked about their willingness to use their pharmacy as a program site (Reich et al., 2002). Concern about whether it is lawful to operate a syringe exchange program in a pharmacy was a primary intrapersonal factor that influenced support to a great extent for one fourth of the pharmacists. This result was similar to prior studies where being unaware of whether nonprescription syringe sales were legal affected the practice (Lewis et al., 2002; Pollini, 2017).

Primary interpersonal factors influencing support in the current study included concern about having increased numbers of injection drug users in the pharmacy and concern about how to interact with injection drug users. These results are similar to several previous studies where concern about having increased numbers of injection drug users in the pharmacy (Chiarello, 2016; Goodin et al., 2018; Lewis et al., 2002; Meyerson et al., 2018; Reich et al., 2002; Rose et al., 2014; Singer et al., 1998) and being unsure of

how to interact with injection drug users (Zaller et al., 2012) influenced nonprescription syringe sales to injection drug users. While receiving injection drug user cultural competency training was not a primary factor by definition in the current study, nearly one-fourth of the pharmacists in the sample indicated that this would influence their level of support to a moderate extent. This finding is similar to an earlier study where several participants expressed being unsure of how to interact with injection drug users during nonprescription syringe sales and where one of those participants expressing that having education on this would be helpful (Zaller et al., 2012).

The leading primary organizational factor influencing pharmacists' support in this study was concern about the time required to operate a syringe exchange program. Similar findings were noted in several previous studies where participants indicated time as an issue for nonprescription syringe sales, syringe disposal, and provision of safe injection education (Goodin et al., 2018; Rose et al., 2014; Singer et al., 1998). Concern about company/store policy was the second leading organizational factor influencing support. This finding is consistent with earlier studies where company/store policy was reported to affect nonprescription syringe sales and syringe disposal (Chiarello, 2016; Meyerson et al., 208; Ong et al., 2016; Pollini, 2017; Rose et al., 2014; Zaller et al., 2012). In the current study, more than one-fourth of the pharmacists indicated that receiving training on how to implement a syringe exchange program would influence their support to a moderate extent.

Research Question 2 examined the relationship between intrapersonal factors and community pharmacists' support of implementing a syringe exchange program in their

pharmacy. Beliefs about syringe exchange programs, concern about personal liability, and receiving education on syringe exchange programs were considered intrapersonal factors in the current study. Type of community pharmacy, role, gender, county location of pharmacy (urban/rural), and years of practice were considered intrapersonal factors as well.

Concerning beliefs about syringe exchange programs, the most frequent response to the belief about the extent to which syringe exchange programs promote injection drug across the overall sample of pharmacists, chain pharmacists, and independent pharmacist was not at all. However, pharmacists in all groups did believe that syringe exchange programs promote injection drug use to some extent, and this belief was more prevalent among chain pharmacists. Additionally, the majority of the overall sample, chain pharmacists, and independent pharmacists believed that syringe exchange programs are moderately to extremely effective in preventing HCV infection in injection drug users. Similarly, the majority of pharmacists in each group believed that syringe exchange programs are moderately to extremely effective at ensuring proper syringe disposal. However, chain pharmacists more frequently believed that syringe exchange programs are not effective or only slightly effective compared to independent pharmacists. Finally, the majority of the overall sample of pharmacists and chain pharmacists believed that syringe exchange programs are not effective or only slightly effective at connecting injection drug users to treatment or they did not know, compared to less than half of the independent pharmacists. These findings were similar to previous studies that examined beliefs around nonprescription syringe sales to injection drug users and syringe disposal

where the majority of participants believed that providing clean syringes was effective in preventing infectious diseases (Chiarello, 2016; Goodin et al., 2018; Ong et al., 2016), however, concern about promoting injection drug use remained to some degree (Chiarello, 2016; Goodin et al., 2018; Lewis et al., 2002; Pollini, 2017; Reich et al., 2002; Rose et al., 2014; Rose & Raymond, 2010).

All four of the beliefs about syringe exchange programs were significantly associated with pharmacists' support. Specifically, the more pharmacists believed that syringe exchange promotes injection drug use, the less support they had for implementation. On the other hand, the more pharmacists believed that syringe exchange programs are effective at preventing HCV infection in injection, are effective at ensuring the proper disposal of used syringes, and are effective at connecting injection drug users to treatment for substance use disorder, the more support they had for implementation. These results indicate that beliefs about the public health impact of syringe exchange programs are associated with pharmacists' support. Several previous studies with similar results support the results of this study. A study by Pollini (2017) revealed that being concerned about increasing injection drug use was negatively associated with nonprescription syringe sales to injection drug users. Chiarello (2016) revealed that participants who believed syringe exchange programs promoted injection drug use were hesitant to conduct nonprescription syringe sales. Rose and Raymond (2010) reported that participants were conflicted with providing a public health service and supporting continued drug use. Reich et al. (2002) found that participants who believed the provision

of syringes to injection drug users promoted injection drug use would not conduct nonprescription syringe sales.

Another study demonstrated that pharmacists who agreed that they could have a significant public health impact by providing access to syringes for injection drug users were more likely to express willingness to provide syringe access and dispose of used syringes (Goodin et al., 2018). Meyerson et al. (2018) demonstrated that pharmacists who agreed that dispensing syringes to injection drug users reduced harm to addicts in their community had significantly higher odds of being comfortable with nonprescription syringe sales to injection drug users. Cooper et al. (2010) demonstrated that nonprescription syringe sales were more likely in pharmacists who agreed that access to syringes is an important public health measure. Finally, Deibert et al. (2006) noted that nonprescription syringe sales were more likely in pharmacists who agreed that syringes should be made available to injection drug users through pharmacies. Chain and independent community pharmacists differed significantly on three of the four beliefs. A similar study reported that ethical concerns about providing syringes to injection drug users for abuse or illegal drug use did not differ significantly between chain/supermarket and independent community pharmacists (Goodin et al., (2018). Differences in findings could be the result of geographic regions. Differences could be in the framing of the meaning of ethical concerns as well.

Concern about personal liability was associated with pharmacists' support, as was receiving education on syringe exchange programs. Pharmacists expressing higher levels of influence of concern about personal liability expressed lower levels of support for

implementing a syringe exchange program in their pharmacy. Pharmacists who indicated that receiving education on syringe exchange programs influenced their support to a higher extent expressed higher levels of support. There is a gap in the literature on these two factors.

Type of community pharmacy, gender, and years of practice were predictors of pharmacists' level of support. Pharmacists practicing at chain community pharmacies were significantly less likely to support implementing a syringe exchange program in their pharmacy to a great extent. Male pharmacists were nearly twice as likely to support implementation to a great extent compared to female pharmacists, and pharmacists who had worked 11 to 20 years were twice as likely to express support to a great extent compared to pharmacists who had worked more than 20 years.

Prior studies with similar results demonstrated that chain community pharmacists were more likely to refuse nonprescription syringe sales more often (Goodin et al., 2018; Stopka et al., 2017) and were less likely to participate in syringe disposal compared to participants at independent community pharmacies (Goodin et al., 2018). Additionally, earlier studies found that independent community pharmacists were more willing to participate in syringe distribution and syringe disposal compared to participants at chain community pharmacies (Goodin et al., 2018; Tesoriero et al., 2009). A final study indicated that participants at independent community pharmacies are more likely to agree that syringes should be available to injection drug users and that it is appropriate to sell syringes to injection drug users. Also, they are more likely to counsel injection drug users on the harm associated with injection drug use (Deibert et al., 2006). It is possible that the

lack of time was responsible for findings related to chain pharmacists in particular given this concern was a leading primary organizational factor for this group.

Of the prior studies with similar results, one study demonstrated that male pharmacists had significantly higher odds of being comfortable with nonprescription syringe sales to injection drug users compared to female pharmacists (Meyerson et al., 2018). Similarly, one study demonstrated that female pharmacists were less likely to express a willingness to participate in syringe disposal compared to male pharmacists (Goodin et al., 2018). Unlike the current study, a previous study examined years of practice and found no association with pharmacists' willingness to participate in syringe exchange activities (Goodin et al., 2018). Differences in findings could be the result of the comparison group. The previous study compared years of practice to the group with the least years of practice, whereas the current study compared years of practice to the group with the most years of practice.

Unlike an earlier study indicating that pharmacists practicing in rural pharmacies were less supportive of nonprescription syringe sales and participation in syringe exchange programs (Reich et al., 2002), urban/rural county location of the pharmacy in the current study was not a predictor of pharmacists' support of implementing a syringe exchange program in their pharmacy. Goodin et al. (2018) had similar findings as the current study where urban/rural location was not a predictor of willingness to participate in syringe exchange. The variation in findings could be the result of geographic regions and the uneven distribution of urban/rural pharmacies in the study by Reich et al. (2002).

Research Question 3 examined the relationship between interpersonal factors and community pharmacists' support of implementing a syringe exchange program in their pharmacy. Concern about the disapproval of colleagues, concern about the disapproval of pharmacy customers who are not injection drug users, concern about having increased numbers of injection drug users in the pharmacy, concern about how to interact with injection drug users, and receiving injection drug user cultural competency training were considered interpersonal factors in the current study. All of these factors, except for the concern about the disapproval of colleagues, were significantly associated with pharmacists' support. Specifically, as the extent of influence the concerns increased, the level of pharmacists' support decreased. At the same time, as the extent of influence of receiving injection drug user cultural competency increased, the level of pharmacists' support increased.

The findings of the current study are similar to several earlier studies. Previous studies revealed that concern about having increased numbers of injection drug users in the pharmacy negatively affected nonprescription syringe sales (Chiarello, 2016; Goodin et al., 2018; Lewis et al., 2002; Meyerson et al., 2018; Reich et al., 2002; Rose et al., 2014; Singer et al., 1998). Similarly, Meyerson et al. (2018) indicated that the disapproval of customers negatively affected nonprescription syringe sales. Additionally, Zaller et al. (2012) indicated that participants who were unsure of how to interact with injection drug users were less likely to support nonprescription syringe sales. Finally, one pharmacist in the study by Zaller et al. (2012) indicated that having education on how to interact with injection drug users during nonprescription syringe sales would be helpful.

Unlike the study by Meyerson et al. (2018), concern about the disapproval of colleagues was not significantly associated with pharmacists' support. Differences in findings could be a result of the sampling where the sample in the prior study was comprised of pharmacy managers only, while the sample of the current study was comprised of staff/dispensing pharmacists (majority) and pharmacy managers.

Research Question 4 examined the relationship between organizational factors and community pharmacists' support of implementing a syringe exchange program in their pharmacy. Concern about company/store policy, cost of supplies, the time required to operate a syringe exchange program, having a company/store policy that allows the implementation of a syringe exchange program, and receiving training on how to implement a syringe program were considered organizational factors in the current study.

Concern about the time required to operate a syringe exchange program, having a company/store policy that allows the implementation of a syringe exchange program, and receiving training on how to implement a syringe program were significantly associated with pharmacists' support. Specifically, as the extent of influence of the concern about time increased, the level of pharmacists' support decreased. Conversely, as the extent of influence of having a company/store policy that allows the implementation of a syringe exchange program and receiving training on how to implement a syringe exchange program increased, the level of pharmacists' support increased.

The findings of the current study were supported by earlier studies that demonstrated similar findings. Previous studies noted that a lack of time negatively affected nonprescription syringe sales and syringe disposal (Goodin et al., 2018; Rose et

al., 2014; Singer et al., 1998) and the provision of safer injection education (Rose et al., 2014). As well, prior studies indicated that having a company/store policy that allows nonprescription syringe sales (Chiarello, 2016; Deibert et al., 2006) or syringe disposal (Rose et al., 2014) is positively associated with participation. There is a gap in the literature on the association between receiving training on how to implement a syringe exchange program and pharmacists' support. However, Rose et al. (2014) indicated that there was an association between hesitancy to implement a syringe distribution coupon program with the need to train staff on how to implement the program, indicating training could be helpful. Unlike previous studies that demonstrated company/store policy as a factor associated with conducting nonprescription syringe sales and syringe disposal (Chiarello, 2016; Meyerson et al., 2018; Ong et al., 2016; Pollini, 2017; Rose et al., 2014; Zaller et al., 2012), the findings in this study indicated that the influence of concern about company/store policy was not associated with pharmacists' support for implementing a syringe exchange program in their pharmacy.

Similarly, unlike a previous study indicating that the cost of supplies was related to hesitancy in providing free syringe distribution and syringe disposal (Rose et al., 2014), cost was not associated with pharmacists' support in the current study. Differences in findings could be due to sampling and geographic regions. The current study included pharmacists only, while other studies included pharmacy staff and pharmacy policymakers. Different roles and geographic regions could result in different perspectives and concerns.

Research Question 5 examined the differences between chain and independent community pharmacists in their level of support for implementing a syringe exchange program in their pharmacy. In the current study, the majority of the overall sample of NC community pharmacists and the majority of chain and independent community pharmacists supported syringe exchange program implementation to some extent. While the majority of chain and independent community pharmacists supported implementation to some extent, the two groups differed significantly with more independent community pharmacists expressing support to some extent and more chain community pharmacists expressing no support. A previous study with similar results supported these findings. Goodin et al. (2018) established chain/supermarket community pharmacists and independent community pharmacists differed significantly on willingness to participate in syringe exchange activities. In pharmacies where nonprescription syringe sales were currently conducted, more independent community pharmacists were willing to participate in syringe distribution and disposal, and more chain/supermarket community pharmacists were not willing. Similarly, in pharmacies where nonprescription syringe sales were not currently conducted, more independent community pharmacists were willing to participate in syringe disposal, and more chain/supermarket community pharmacists were not willing. Also, more chain/supermarket pharmacists among all community pharmacists refused nonprescription syringe sales than did independent community pharmacists.

Research Question 6 examined the differences between chain and independent community pharmacists in the primary intrapersonal, interpersonal, and organizational

factors influencing their level of support for implementing a syringe exchange program in their pharmacy. Concerning primary intrapersonal factors influencing support, concern about whether it is lawful to operate a syringe exchange program in a pharmacy, concern about personal liability, and receiving education on syringe exchange programs were included. Chain and independent community pharmacists differed significantly on the overall responses about the extent of influence of concern about personal liability on their level of support. More chain community pharmacists expressed the influence of this concern to a great extent than did independent community pharmacists. It is possible that compared to independent pharmacists, chain community pharmacists relate concern about personal liability for implementing a syringe exchange program to the current NC nonprescription syringe sales laws. Similarly, it is possible that greater concern in this area for chain pharmacists stems from company policy that does not permit nonprescription syringe sales despite the fact that they are legal in NC. There is a gap in the literature on the influence of the concern about personal liability on pharmacists' support overall and specific to chain and independent community pharmacists. There were no significant differences in the remaining primary intrapersonal factors.

Concerning primary interpersonal factors influencing support, concern about having increased numbers of injection drug users in the pharmacy, concern about how to interact with injection drug users, and receiving injection drug user cultural competency training were included. Chain and independent community pharmacists differed significantly on the overall responses about the extent of influence of receiving injection drug user cultural competency training on their level of support. More independent

community pharmacists expressed that receiving this training would influence their support to a moderate extent, and more chain community pharmacists expressed that receiving this training would not influence their level of support. While Zaller et al. (2012) reported this as a potentially helpful intervention for participants who were unsure of how to interact with injection drug users in their pharmacy, they did not compare chain and independent pharmacists on this factor. In general, there is a gap in the literature in the examination of this factor.

Findings of the current study indicated that the concern about having increased numbers of injection drug users in the pharmacy did not differ between chain and independent community pharmacists. This was not consistent with a prior study in which Goodin et al. (2018) indicated that concern about the clientele who would frequent the pharmacy differed significantly between chain/supermarket and independent community pharmacists, with chain/supermarket community pharmacists reporting the concern more frequently. Variation in findings could be due to sampling and different geographic regions.

Concerning primary organizational factors, concern about company/store policy, concern about the cost of supplies, concern about the time required to operate a syringe exchange program, having a company/store policy that allows the implementation of a syringe exchange program, and receiving training on how to implement a syringe exchange program were included. Chain and independent community pharmacists differed significantly on the overall responses about the extent of influence of all factors on their level of support. Specific to the concern about company/store policy, more chain

community pharmacists responded that this concern influenced their level of support to a great extent, and more independent community pharmacists responded that it did not influence their level of support. These findings differ from a similar study that demonstrated conflict with city ordinance or company policy as a reported barrier to nonprescription syringe sales did not differ between chain/supermarket community pharmacists (Goodin et al., 2018). Variation in findings could be due to differences in the year associated with data collection for the current study (2019) and the prior study (2015). Since syringe exchange programs have been legal in NC for nearly 4 years and with the increased awareness of harm reduction efforts since that time, company/store policy may be less of an issue for pharmacists in general. Additionally, it is possible that more pharmacy managers with the ability to create and/or change company/store policy were included in the current study, thus mitigating it as an issue.

Focused on the concern about the cost of supplies, more independent community pharmacists indicated that this concern influenced their level of support to a moderate extent, and chain community pharmacists indicated that it did not influence support. There is a gap in the literature on the comparison between chain and independent community pharmacists in concern about the cost of supplies for implementing a syringe exchange program. It would be reasonable to consider this finding would be consistent, however, given that independent community pharmacists do not generally have the financial support of a larger corporation.

The concern about the time required to implement a syringe exchange program, more chain community pharmacists indicated that this concern influenced their level of

support to a great extent, and more independent community pharmacists indicated that it influenced support to a moderate extent. In a similar study, findings revealed that the concern about time did not differ between chain/supermarket and independent community pharmacists (Goodin et al., 2018). Differences in findings could be the result of geographic regions.

Specific to having a company/store policy that allows the implementation of a syringe exchange program, more chain pharmacists indicated that having a company/store policy that allows the implementation of a syringe exchange program influenced their level of support to a great extent compared to independent chain pharmacists. There is a gap in the literature around differences between chain and independent community pharmacists in the association of this factor with levels of support for implementing a syringe exchange program in community pharmacies. It is reasonable to consider that these findings would be consistent, given that independent community pharmacists are generally not governed by a larger corporation.

Specific to receiving training on how to implement a syringe exchange program, more chain community pharmacists responded that receiving training would not influence their level of support. However, more independent community pharmacists responded that it would influence their level of support to a moderate extent. There is a gap in the literature around differences between chain and independent community pharmacists in the association of this factor with levels of support for implementing a syringe exchange program in community pharmacies.

The open-ended question sought to explore any other thoughts that NC community pharmacists had about implementing a syringe exchange program in their pharmacy. Responses to this question validated and illuminated the quantitative findings of beliefs and concerns at each SEM level associated with pharmacists' level of support for syringe exchange implementation. Responses included ethical concerns (intrapersonal), concern about having increased numbers of injection drug users in the pharmacy/making other customers feel uncomfortable/harm to business (interpersonal), and concern about time (organizational).

Conclusions

Overall, NC community pharmacists supported implementing syringe exchange programs in community pharmacies to some extent; however, concerns remained. All three concept levels indicated support for syringe exchange programs among the pharmacists. The major intrapersonal factors of beliefs about the effectiveness of syringe exchange programs, practicing in an independent community pharmacy, male gender, and receiving education on syringe exchange programs validated support for syringe exchange programs. The major interpersonal factor of receiving injection drug user cultural competency training indicated support for syringe exchange programs among the pharmacists. Organizational factors that substantiated support for syringe exchange programs included having a company/store policy that allows the implementation of a syringe exchange program and receiving training on how to implement a syringe exchange program. The major intrapersonal, interpersonal, and organizational factors that indicated decreased support and concern about syringe exchange program

implementation among the pharmacists included practicing in a chain community pharmacy, the belief that syringe exchange programs promote injection drug use, concern about personal liability, having increased numbers of injection drug users in the pharmacy, and the time required to implement a syringe exchange program.

A lack of knowledge of the overall potential public health impact of syringe exchange programs existed to some extent based on some responses to beliefs about syringe exchange programs. Stigmatization of injection drug users was suggested based on the responses around the concern about having increased numbers of injection drug users in the pharmacy in the open-ended question. Stigmatization was suggested based on the concern about having increased numbers of injection drug users in the pharmacy being the leading primary interpersonal factor influencing community pharmacists' support and the intrapersonal factor most strongly related to support.

Pharmacists practicing at chain community pharmacies and pharmacists practicing at independent community pharmacies had differences in the levels of support for syringe exchange programs and in the factors associated with support. Beliefs about the effectiveness of syringe exchange programs at ensuring the proper disposal of used syringes and connecting injection drug users to treatment for substance use disorder, receiving injection drug user cultural competency training, having a company/store policy that allows the implementation of a syringe exchange program, and receiving training on how to implement a syringe exchange program were the major factors that differentiated support. Except for having a company/store policy that allows for the implementation of a syringe exchange program, these factors indicated higher support

among the independent community pharmacists. These were classified primarily as intrapersonal and organizational factors. Concerns and less support were higher among the chain community pharmacists. Specifically, personal liability, company/store policy, and the time required to implement a syringe exchange program concerns were related to greater concern and less support for a syringe exchange program among chain community pharmacists. These were classified primarily as organizational factors.

Implications

Practice

The development and implementation of multilevel strategies to mitigate concerns and increase knowledge about syringe exchange programs, including the public health impact and how to implement a syringe exchange program, are warranted. Training programs providing education on injection drug users and cultural competency around caring for these persons is needed. It may be necessary to consider chain community pharmacists and independent community pharmacists separately when addressing some concerns and other factors that could improve their support for and acceptance of implementing a syringe exchange program in their pharmacy. Given that type of community pharmacy in which pharmacists practice was a predictor of support for the implementation of a syringe exchange program, this consideration is important. Additionally, given that years of practice was a predictor of support, it is important to consider placing focus on community pharmacists that have practiced for more than 20 years and tailoring education and training accordingly. Public health nurses are in a

pivotal role to develop and implement these strategies. As such, it is important to increase awareness and engagement of public health nurses around this important topic.

Communities should create interdisciplinary teams that can be led by nurses and focus on ensuring optimal outcomes for syringe exchange program implementation. These teams should include community pharmacists, pharmacy policymakers, primary care providers, social workers, and operators of syringe exchange programs. Ideally, persons with lived experience (past or current injection drug users) would be included on these teams as well. Through leading the establishment and activities of these teams, Public health nurses are aligning practice with the ANA position statements (ANA, 1993, para. 1), the ANA Code of Ethics for Nurses (ANA, 2015, p. 1; ANA, 2015, p. 9; ANA, 2015, p. 31), the ICN Code of Ethics for Nurses (ICN, 2012, p. 2), and the Quad Council Community/Public Health Nursing Competencies (Quad Council Coalition of Public Health Nursing Organizations, 2018). Additionally, public health nurses are aligning practice with national initiatives focused on HCV infection prevention (CDC, 2019c).

Public health nurses are in a position to work with current operators of syringe exchange programs to train and assist them in collaborative efforts with community pharmacists in their county. For example, current syringe exchange program operators could share supplies and/or staff with community pharmacists willing to implement a syringe exchange program to mitigate concerns around time and cost. Additionally, for community pharmacists unable or unwilling to implement a syringe exchange program, current program operators could provide information on available program services for injection drug users and encourage program referrals.

Education

Implications for education include working with leaders to include curriculum content among development in nursing, pharmacy, and other healthcare provider education to include instruction in the area of injection drug user health and the role of interventions such as syringe exchange programs. Specific for nursing education, this content meets the population health, person-centered health, and interprofessional partnership domains in the new essentials for both baccalaureate and doctor of nursing practice degrees (American Association of Colleges of Nurses, 2019). Additionally, it is necessary to include content focused on injection drug user cultural competency to dispel misinformation and improve the care relationship. Given the current state of increased injection drug use and high rates of acute HCV infection, the inclusion of this information for future nurses, pharmacists, and other healthcare providers is essential. These activities will assist in meeting the National Academies of Sciences Engineering Medicine (NASEM) recommendations to deal with the opioid crisis and infectious diseases (NASEM, 2020). For nurses and other professionals, it is important to consider the continuing education of current nurses, pharmacists, and other healthcare providers by developing educational programs on these topics that meet the national recommendations and prepare the workforce for emerging health issues.

Research

Implications for research include conducting action or community-based participatory research with community pharmacists and other stakeholders such as pharmacy policymakers to aid in determining best practices for implementing a syringe

exchange program in community pharmacies (Richards & Morse, 2013; Streubert & Carpenter, 2011). As syringe exchange programs become more prevalent, studies with larger sample sizes, longitudinal measurement, and more robust analysis methods for prediction of outcomes for syringe exchange programs are needed. Cost analysis of syringe exchange program prevention of emergency department visits and mortality provide another avenue for research in this important health area. Another strategy to develop syringe exchange program knowledge is the examination of injection drug user acceptance and the potential use of pharmacy-based syringe exchange programs.

Examination of injection drug user thoughts around what barriers and/or facilitators exist to use of pharmacy-based syringe exchange programs is important as well. Research around personal liability concerns of community pharmacists would be helpful in better understanding the origin of these concerns and whether they are associated with existing NC syringe sales laws. Qualitative research to examine the perspectives of female community pharmacists is important in gaining a better understanding of why less support for implementing a syringe exchange program was indicated. Examination of the relationship between urban/rural county location of the pharmacy at which community pharmacists are employed and their levels of support using more detailed urban/rural areas is needed as well. Finally, the examination of the perspectives of community pharmacy customers who are not injection drug users to gain insight on views around pharmacy-based syringe exchange programs may add value to the existing knowledge. All of these types of research will assist in meeting the need for

new knowledge recommended by the NASEM and the CDC efforts to achieve better health of our communities.

Policy and Community Engagement

Nurses and other health professionals must be politically active and work with local and state policymakers to expand funding for syringe exchange programs to reduce the potential financial burden on community pharmacies willing to implement a program in their pharmacy. Liability laws that are state-legislated should be revised to protect pharmacies and providers who care for injection drug users. Additionally, community awareness campaigns of syringe exchange programs' positive outcomes and contributions to decrease HCV infection and improve the health of the community are needed. This is especially important given there are no existing pharmacy-based syringe exchange programs in the state of NC. Churches, health departments, home health agencies, federally qualified health centers, and primary care offices working with pharmacies and other syringe exchange program providers may educate, inform, and decrease stigma for HCV infection sufferers, injection drug users, and the syringe exchange program sites.

Limitations

This study employed a quantitative correlational design, and while useful in establishing and predicting relationships between variables and assessing the strength of those relationships, causal relationships cannot be explained. While the use of an online survey reduced the risk of response bias, protected privacy and anonymity, and was convenient, inexpensive, and useful when targeting a large population, self-reported data

may or may not have been subject to issues of accuracy. Some persons may or may not have answered sensitive questions due to personal beliefs or employment concerns. The setting of the completion of an online survey could not be controlled and may have been subject to outside influences such as distractions, interruption of Internet access, and limited time to complete the survey. Because this study examined factors associated with and influencing community pharmacists' support of the implementation of syringe exchange programs in community pharmacies in the state of North Carolina only, it may not represent factors associated with and influencing community pharmacists' support in other U.S. states.

Summary

The main characteristics of the community pharmacists included in this study were similar to the characteristics reported in the literature. Findings were consistent with the literature and supported the three conceptual model levels of intrapersonal, interpersonal, and organizational. Findings contributed new knowledge to the current state of the science on community pharmacists' support for implementing syringe exchange programs in community pharmacies. Implications for practice include the development of multilevel strategies to mitigate concerns influencing community pharmacists' support. Implications for education include incorporation of injection drug user cultural competency and injection drug user health information training in nursing education and other health professional curriculum. Implications for research include more robust designs to evaluate syringe exchange program outcomes and impact, examining injection drug user acceptance and potential use of pharmacy-based syringe

exchange programs. Policy and community engagement provide the foundation for increasing access to important health promotion and disease prevention services for a very high-risk population. As the acute HCV infection incidence continues to rise, there is a need to develop and implement new strategies to provide care in the community. Syringe exchange programs are a modality of care that may alleviate or lessen the HCV infection issues and impact on individuals, families, and communities. To mitigate issues of access and augment existing syringe exchange programs, it has been suggested that incorporation of syringe exchange programs in community pharmacies is needed.

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APPENDIX A

SURVEY INSTRUMENT

Information About Survey*

Title: Community Pharmacists' Perspectives on Syringe Exchange Programs and the Public Health Impact

Requirements for Participation
Participants should be a NC licensed pharmacist currently practicing in a NC chain community pharmacy, NC independent community pharmacy, or both; 18 years of age or older; and able to read and write English language to be eligible for participation.

What is this all about?
I am asking you to participate in this study because you are a community pharmacist and your perspectives on syringe exchange programs and the public health impact is needed to better inform community-based healthcare providers, including pharmacists, nurses, and other professionals who work directly with the public. This study should take less than 10 minutes of your time and will involve you completing an online survey using your computer or mobile device. Your participation in this study is voluntary.

How will this negatively affect me?
Other than the time you spend on this survey there are rare risks associated with this study including possible feelings of embarrassment or discomfort when answering questions about sensitive topics. If you experience any of these feelings, you can take a short break from the survey. No one will know the answers you provide. You can stop participation at any time.

What do I get out of this research study?
There is no direct benefit to you for participating in this study. You, other community healthcare providers, and your community members may, however, benefit in the future from the knowledge obtained with this study.

Will I get paid for participating?
There is no compensation for participation in this study. At the conclusion of the online survey, you will have the option to enter your email address for a chance to win one of four $50 Amazon gift cards. A random drawing for the gift cards will include all participants that complete the survey and ask to be included in the drawing. Participation in the gift card drawing is completely optional. The information you provide will be collected through a separate link provided at the end of the survey and will ***not*** be associated with the survey responses.

What about my confidentiality?
All data will be collected anonymously to protect confidentiality and reduce risks associated with study participation such as disclosure of viewpoints around sensitive topics. No identifying information about you or your employer will be obtained. No IP addresses will be recorded or collected during the online Qualtrics survey process. All data will be stored securely on the principal investigator's (PI's) personal password and firewall protected computer and on a secure university server. Password protected files will be used. Email addresses obtained for the gift card drawing will be permanently deleted from the PI's computer. The results of this study will be published, however, you or your employer will not be identified as being associated in any way. Absolute confidentiality of data provided through the Internet cannot be guaranteed due to the limited protections of Internet access. Please be sure to close your Internet browser when finished so that no one will be able to see what you have been doing.

What if I do not want to be in this research study?
You do not have to be part of this study. This study is voluntary, and it is up to you to decide to participate. If you agree to participate in this study, you may stop participation at any time without penalty.

What if I have questions?
You can ask Heather Roberts, RN, MSN, PhD Student (hhrobert@uncg.edu or 704-607-5260) or her faculty advisor, Dr. Debra C. Wallace (dcwallac@uncg.edu or 336-256-0572) anything about this study. If you have concerns about how you have been treated in this study, call the Office of Research Integrity Director at 855-251-2351.

By clicking the **Next** button, you indicate that you understand the information provided and that you agree to participate in the study.

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2. Are you a NC licensed pharmacist currently practicing in a NC chain community pharmacy, NC independent community pharmacy, or both; 18 years of age or older; and able to read and write English language?

   Yes
   No

If yes, begins survey questions.

If no, receives end of survey message "We thank you for your time spent taking this survey. Your response has been recorded."

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1. Which of the following best describes the type of community pharmacy where you currently practice the majority of the time? Select one.

   Chain
   Independent

2. What best describes your role at the community pharmacy where you practice the majority of the time? Select one.

   Staff/dispensing pharmacist
   Pharmacy manager

For the remainder of the survey, please keep the following information in mind.

In North Carolina, syringe exchange programs are programs that offer:

- Needles, hypodermic syringes, and other injection supplies at no cost;
- Disposal of used needles and hypodermic syringes;
- Educational materials on overdose prevention, communicable disease prevention, and referrals to mental illness and substance use disorder treatment; and
- Naloxone or referrals to programs that provide naloxone.

For the following questions, there are no right or wrong answers, and no one will know how you personally answer. Your opinion is important and valued.

7. To what extent do you believe that syringe exchange programs promote injection drug use?

1	2	3	4	5	
Not at all	To a small extent	To a moderate extent	To a fairly great extent	To a great extent	Don't know

8. How effective do you believe syringe exchange programs are at preventing Hepatitis C Virus infection in injection drug users?

1	2	3	4	5	
Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Don't know

9. How effective do you believe syringe exchange programs are at ensuring the proper disposal of used syringes?

1	2	3	4	5	
Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Don't know

10. How effective do you believe syringe exchange programs are at connecting injection drug users to treatment for substance use disorder?

1	2	3	4	5	
Not at all effective	Slightly effective	Moderately effective	Very effective	Extremely effective	Don't know

11. To what extent do you support the implementation of a syringe exchange program in the community pharmacy where you practice the majority of the time?

1	2	3	4	5	6
Not at all	To a small extent	To a moderate extent	To a fairly great extent	To a great extent	Don't know

12. To what extent does concern about company/store policy influence your level of support of implementing a syringe exchange program in the community pharmacy where you practice the majority of the time?

1	2	3	4	5
Not at all	To a small extent	To a moderate extent	To a fairly great extent	To a great extent

13. To what extent does concern about the disapproval of colleagues influence your level of support of implementing a syringe exchange program in the community pharmacy where you practice the majority of the time?

1	2	3	4	5
Not at all	To a small extent	To a moderate extent	To a fairly great extent	To a great extent

14. To what extent does concern about the disapproval of customers who are not injection drug users influence your level of support of implementing a syringe exchange program in the community pharmacy where you practice the majority of the time?

1	2	3	4	5
Not at all	To a small extent	To a moderate extent	To a fairly great extent	To a great extent

15. To what extent does concern about having increased numbers of injection drug users in the pharmacy influence your level of support of implementing a syringe exchange program in the community pharmacy where you practice the majority of the time?

1	2	3	4	5
Not at all	To a small extent	To a moderate extent	To a fairly great extent	To a great extent

16. To what extent does concern about how to interact with injection drug users influence your level of support of implementing a syringe exchange program in the community pharmacy where you practice the majority of the time?

1	2	3	4	5
Not at all	To a small extent	To a moderate extent	To a fairly great extent	To a great extent

17. To what extent does <u>concern about whether it is lawful to operate a syringe exchange program in a pharmacy</u> influence your level of support of implementing a syringe exchange program in the community pharmacy where you practice the majority of the time?

1	2	3	4	5
Not at all	To a small extent	To a moderate extent	To a fairly great extent	To a great extent

18. To what extent does <u>concern about personal liability</u> influence your level of support of implementing a syringe exchange program in the community pharmacy where you practice the majority of the time?

1	2	3	4	5
Not at all	To a small extent	To a moderate extent	To a fairly great extent	To a great extent

19. To what extent does <u>concern about the cost of supplies</u> influence your level of support of implementing a syringe exchange program in the community pharmacy where you practice the majority of the time?

1	2	3	4	5
Not at all	To a small extent	To a moderate extent	To a fairly great extent	To a great extent

20. To what extent does <u>concern about the time required to operate a syringe exchange program</u> influence your level of support of implementing a syringe exchange program in the community pharmacy where you practice the majority of the time?

1	2	3	4	5
Not at all	To a small extent	To a moderate extent	To a fairly great extent	To a great extent

21. To what extent would <u>having a company/store policy that allows implementation of a syringe exchange program</u> influence your level of support of implementing a syringe exchange program in the community pharmacy where you practice the majority of the time?

1	2	3	4	5
Not at all	To a small extent	To a moderate extent	To a fairly great extent	To a great extent

22. To what extent would <u>receiving education on syringe exchange programs</u> influence your level of support of implementing a syringe exchange program in the community pharmacy where you practice the majority of the time?

1	2	3	4	5
Not at all	To a small extent	To a moderate extent	To a fairly great extent	To a great extent

23. To what extent would receiving training on how to implement a syringe exchange program influence your level of support of implementing a syringe exchange program in the community pharmacy where you practice the majority of the time?

1	2	3	4	5
Not at all	To a small extent	To a moderate extent	To a fairly great extent	To a great extent

24. To what extent would receiving injection drug user cultural competency training influence your level of support of implementing a syringe exchange program in the community pharmacy where you practice the majority of the time?

1	2	3	4	5
Not at all	To a small extent	To a moderate extent	To a fairly great extent	To a great extent

25. Do you have any other thoughts about implementing a syringe exchange program in the community pharmacy where you practice the majority of the time?

    Free text in text box

26. In what county is the community pharmacy where you practice the majority of the time located?

    _____

27. Approximately how many years have you worked as a practicing pharmacist?

    _____ years

28. Approximately how many full-time pharmacists are employed at the community pharmacy where you practice the majority of the time?

    Less than 3
    3 – 5
    More than 5

29. What is your age in years?

    ___ years

30. What is your gender?

    Male
    Female
    Prefer not to answer

31. Thank you for your time and assistance in helping to better understand this important topic.

    If you would like to be included in the drawing for one of the four $50 Amazon gift cards, please check **Yes** below, then click the **Next** button to advance the page. This will take you to a separate screen, where you can enter your email information. This information will be in a different survey, so no one will know what you told us, and no one can link your email with your responses.

    If you do not wish to be included in the drawing, please check **No** below, then click the **Next** button to submit your responses and exit the survey.

    Yes, I would like to be included in the drawing for a gift card.
    No, I would not like to be included in the drawing for a gift card.

    a. If yes, participant is taken to a separate survey link.

       Please enter your email address below and click the **Next** button to submit.

       Free text in text box

       Once email address has been submitted, receives end of survey message "We thank you for your time spent taking this survey. Your response has been recorded."

    b. If no, receives end of survey message "We thank you for your time spent taking this survey. Your response has been recorded."

*Questions 1, 5, and 6 were not applicable to the survey instrument. Questions 1, 5, and 6 provided important information to the participants and was automatically assigned a question number by Qualtrics.

APPENDIX B

MEASUREMENT TABLE

Social Ecological Model Level	Variable	Measure	Response Set
Intrapersonal Level	Type of community pharmacy where currently practice the majority of the time	Q3	Independent Chain
	Role at community pharmacy where practice the majority of the time	Q4	Staff/dispensing pharmacist Pharmacy manager
	Belief about the extent to which syringe exchange programs promote injection drug use	Q7	(1) Not at all, (2) To a small extent, (3) To a moderate extent, (4) To a fairly great extent, (5) To a great extent, (6) Don't know
	Belief about the effectiveness of syringe exchange programs at preventing HCV infection in injection drug users	Q8	(1) Not at all effective, (2) Slightly effective, (3) Moderately effective, (4) Very effective, (5) Extremely effective, (6) Don't know
	Belief about the effectiveness of syringe exchange programs at ensuring the proper disposal of used syringes	Q9	(1) Not at all effective, (2) Slightly effective, (3) Moderately effective, (4) Very effective, (5) Extremely effective, (6) Don't know
	Belief about the effectiveness of syringe exchange programs at connecting injection drug users to treatment for substance use disorder	Q10	(1) Not at all effective, (2) Slightly effective, (3) Moderately effective, (4) Very effective, (5) Extremely effective, (6) Don't know
	Support of implementation of a syringe exchange	Q11	(1) Not at all, (2) To a small extent, (3) To a moderate extent, (4) To a fairly great extent, (5) To a great extent

Social Ecological Model Level	Variable	Measure	Response Set
	program in the community pharmacy where practice the majority of the time		
	Concern about whether it is lawful to operate a syringe exchange program in a pharmacy	Q17	(1) Not at all, (2) To a small extent, (3) To a moderate extent, (4) To a fairly great extent, (5) To a great extent
	Concern about personal liability	Q18	(1) Not at all, (2) To a small extent, (3) To a moderate extent, (4) To a fairly great extent, (5) To a great extent
	Receiving education on syringe exchange programs	Q22	(1) Not at all, (2) To a small extent, (3) To a moderate extent, (4) To a fairly great extent, (5) To a great extent
	County location of community pharmacy where practice the majority of the time (urban/rural)	Q26	County name
	Approximate number of years worked as a practicing pharmacist	Q27	Number of years
	Approximate number of full-time pharmacists employed at community pharmacy where practice the majority of the time	Q28	Less than 3 3 – 5 More than 5
	Age	Q29	Age in years
	Gender	Q30	Male Female Prefer not to answer
	Any other thoughts about implementing a syringe exchange program in the community pharmacy	Q25	Free text

Social Ecological Model Level	Variable	Measure	Response Set
	where practice the majority of the time		
Interpersonal Level	Concern about the disapproval of colleagues	Q13	(1) Not at all, (2) To a small extent, (3) To a moderate extent, (4) To a fairly great extent, (5) To a great extent
	Concern about the disapproval of customers who are not injection drug users	Q14	(1) Not at all, (2) To a small extent, (3) To a moderate extent, (4) To a fairly great extent, (5) To a great extent
	Concern about having increased numbers of injection drug users in the pharmacy	Q15	(1) Not at all, (2) To a small extent, (3) To a moderate extent, (4) To a fairly great extent, (5) To a great extent
	Concern about how to interact with injection drug users	Q16	(1) Not at all, (2) To a small extent, (3) To a moderate extent, (4) To a fairly great extent, (5) To a great extent
	Receiving injection drug user cultural competency training	Q24	(1) Not at all, (2) To a small extent, (3) To a moderate extent, (4) To a fairly great extent, (5) To a great extent
	Any other thoughts about implementing a syringe exchange program in the community pharmacy where practice the majority of the time	Q25	Free text
Organizational Level	Concern about company/store policy	Q12	(1) Not at all, (2) To a small extent, (3) To a moderate extent, (4) To a fairly great extent, (5) To a great extent
	Concern about the cost of supplies	Q19	(1) Not at all, (2) To a small extent, (3) To a moderate extent, (4) To a fairly great extent, (5) To a great extent
	Concern about the time required to operate a syringe exchange program	Q20	(1) Not at all, (2) To a small extent, (3) To a moderate extent, (4) To a fairly great extent, (5) To a great extent
	Having a company/store policy that allows	Q21	(1) Not at all, (2) To a small extent, (3) To a moderate extent, (4) To a fairly great extent, (5) To a great extent

Social Ecological Model Level	Variable	Measure	Response Set
	implementation of a syringe exchange program		
	Receiving training on how to implement a syringe exchange program	Q23	(1) Not at all, (2) To a small extent, (3) To a moderate extent, (4) To a fairly great extent, (5) To a great extent
	Any other thoughts about implementing a syringe exchange program in the community pharmacy where practice the majority of the time	Q25	Free text

Note. Questions 1, 5, and 6 were not applicable to the measurement table. Questions 1, 5, and 6 provided important information to the participants and was automatically assigned a question number by Qualtrics.