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## Provider Education to Increase Knowledge PrEP Prescribing in Older Adults who Identify as Members of the LGBTQ Community

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**Provider Education to Increase Knowledge PrEP Prescribing in Older Adults who Identify  
as Members of the LGBTQ Community**

A DNP Project Presented to the Faculty of the  
Nicole Wertheim College of Nursing and Health Sciences  
Florida International University

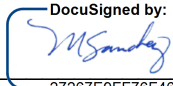
In partial fulfillment of the requirements for the Degree of Doctor of Nursing Practice

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### Abstract

**Background:** Reducing the spread of HIV can be facilitated through the use of pre-exposure prophylaxis or PrEP. Despite this, there are significant gaps in provider knowledge of PrEP prescribing. This problem is exacerbated when older adults, who are at greater risk for contracting the disease, require care.

**Objective:** The purpose of this quality improvement project was to increase provider knowledge of PrEP prescribing in older adult patients who identify as members of the LGBTQ community.

**Methods:** Using a pre-/post-intervention framework, providers working at a primary care clinic were recruited to participate in the project. Baseline knowledge of PrEP prescribing and sexual health care in older adults was assessed and this was followed by an educational intervention on these topics. Following education, provider knowledge was reassessed.

**Results:** A total of eight providers were recruited for the project including six females (75%). The mean pre-test knowledge scores before the educational intervention was 55 and increased to 95 following education. Inferential comparison of the scores using a Mann-Whitney U-test indicated that the change in scores was statistically significant ( $P < .001$ ).

**Conclusions:** Provider education of PrEP and PrEP prescribing in older adults is an evidence-based solution that can improve provider knowledge of the topic. The results suggest that action should be taken to maintain the project at the practice site while also seeking additional sites to expand provider education on PrEP.

*Keywords:* PrEP, pre-exposure prophylaxis, LGBTQ, older adult, sexual health, education.

## **Provider Education to Increase Knowledge PrEP Prescribing in Older Adults who Identify as Members of the LGBTQ Community**

Current data provided by the Centers for Disease Control and Prevention ([CDC], 2021) indicates that over the course of the last decade the number of human immunodeficiency virus (HIV) cases in the U.S. has declined. Despite this decline in HIV in the general population, additional evidence from the CDC does indicate that the incidence of new cases of HIV are primarily concentrated in specific groups. In particular, the CDC reports that in 2020, 68% of new HIV cases were in high-risk male populations including men-who-have-sex-with men (MSM), injection drug users, and sex workers. African American women have also been shown to be at increased risk for contracting HIV (CDC, 2021). In 2020, the CDC reported that 18% of new HIV cases were in women. New cases of HIV are also more common in adults between the ages of 25 and 34 years (CDC, 2021). However, older adults, 55 years of age and above, comprise 10% of all new HIV cases (CDC, 2021).

The prevention of HIV has long been an elusive goal. Since the first identification of the virus in the early 1980s, scientists have worked to identify effective treatments and vaccines to improve patient outcomes (Sweileh, 2018). The advent and proliferation of highly active antiretroviral therapy (HAART) in the 1990s provided an effective, if not expensive treatment for the virus that could markedly extend a patient's life (Lu et al., 2018). Although these medications were viewed as a reprieve by medical providers, efforts to eradicate the virus have also been supported (Sweileh, 2018). The failure to identify an effective vaccine has prompted public health officials to continue to advocate for barrier protections to prevent the spread of the virus (McCool-Myers et al., 2019). Barrier protections, while effective, are not always feasible for those at risk of contracting HIV (McCool-Myers et al., 2019). In 2012, the Food and Drug

Administration (FDA) added an additional medication for preventing the spread of HIV: PrEP or preexposure prophylaxis (Karletsos & Stoecker, 2021).

Preexposure prophylaxis is a medication that helps to prevent the spread of HIV in patients that do not have the disease (Karletsos & Stoecker, 2021). The medication can be taken once daily as a pill, Truvada or Descovy, or by injection, Apretude (Killelea et al., 2022). Studies regarding the use of PrEP in high-risk populations including MSM and injection drug users have shown that this medication significantly reduces the spread of HIV. For example, Estcourt et al. (2021) reported the results of a national study of PrEP that was conducted in Scotland for MSM. In this study a total of 3,256 MSM agreed to take PrEP and to have their health status monitored over the long-term. Results from this group were compared with a national cohort of 16,723 MSM who did not agree to take part in the study. The results did indicate that HIV diagnoses did decline from what was expected in the PrEP group: relative risk reduction (RRR) 35.6%, 95% CI 7.1–55.4. Seigler et al. (2018) further evaluated PrEP use in injection drug users, noting that HIV transmission was reduced by 61% with consistent use of PrEP.

Despite the availability and relative safety of PrEP, current evidence demonstrates that most patients are unfamiliar with PrEP, including those who are members of high risk groups (Sewell et al., 2021). Additionally, current evidence indicates that most providers lack knowledge of PrEP as well (Turner et al., 2018). A lack of provider knowledge does serve as a barrier for patients to access PrEP as many may need education about this topic (Turner et al., 2018). Recent data does indicate that PrEP prescriptions continue to lag, in spite of the fact that PrEP medications have been on the market for almost a decade (Clement et al., 2018). For public health officials, the situation is one that is somewhat perplexing as PrEP should provide a novel opportunity for healthcare providers and patients to curb the spread of HIV within the

community (Rutstein et al., 2017). Without efforts to increase the use of PrEP, eradicating HIV will continue to remain an elusive goal.

For older adults who identify as members of the LGBTQ community, the topic is clearly one of notable concern. Research on this population indicates that older adults, including those who identify as members of the LGBTQ community, are often overlooked in terms of their sexual health and sexual health needs (Malta et al., 2020). While the subject of sex is often viewed as being taboo to discuss with older adults, in actuality most healthcare providers hold various biases and stigma toward older adults when it comes to sexual health (Malta et al., 2020). Providers may believe that older adults are not interested in sex or that older adults do not have sex on a regular basis (Gewirtz-Meydan & Ayalon, 2017). These stereotypes do not fit with current data which indicates that as many as two-thirds of older adults remain sexually active well into their 70s (Syme et al., 2017). Consequently, failure to address the sexual health needs of older adults will have consequences for both individual and population health.

The challenges of providing comprehensive care for the older adult are further exacerbated by the patient's sexual identity. Current evidence suggests that patients who identify as members of the LGBTQ community often face notable stigma within the healthcare system (Srinivasan et al., 2019). This can lead to challenges with care including the disenfranchisement of the patient from the healthcare system (Caceres, 2019). When patients feel uncomfortable with their providers and the care that they receive, they may choose to forgo care, even when it is needed (Caceres, 2019). In terms of disease prevention and health promotion, which are the focal point of advanced practice nursing, the inability or unwillingness of patients to remain connected to the healthcare system prevents providers from performing their jobs effectively. To ensure the



best possible outcomes for patients, an effort must be made to ensure that patients are engaged in their care and willing work as partners with providers to achieve optimal health.

### **Purpose and PICO Question**

The evidence provided in the introduction to this work clearly indicates that HIV transmission is an issue of concern for older adults who may be at-risk for contracting the virus. To prevent the spread of HIV, providers could recommend the use of PrEP for patients. However, a lack of patient and provider knowledge of this treatment is adversely impacting its uptake. When this is combined with provider bias toward sexual health issues in older adults, members of this population are clearly at a deficit when it comes to preventing the spread of HIV. With these issues in mind, the purpose of this Doctor of Nursing Practice (DNP) quality improvement project was to educate providers about the use of PrEP in older adults who are members of the LGBTQ community. Provider education to increase knowledge of PrEP for older adults should increase uptake of this intervention to prevent the spread of HIV and to improve sexual health in this population. Based on this the following PICO (population, intervention, comparison, outcome) question was proposed:

- Among medical providers delivering care to older adults that identify as members of the LGBTQ community (**P**) does the use of an educational intervention to prescribe pre-exposure prophylaxis (PrEP) for the prevention of HIV (**I**) increase provider knowledge (**O**) compared with baseline knowledge of the topic (**C**)?

The population for the intervention included medical providers who regularly provide care for older adults who identify as members of the LGBTQ community while the intervention was focused on provider education with the outcome of increasing knowledge for providers. The

comparison for this quality improvement project included baseline knowledge of providers to determine if education increased the knowledge of providers on this topic following education.

### **Problem Statement**

According to Moran et al. (2020) the problem statement provides a clear understanding of what is occurring, what needs to be fixed, and a proposal for fixing the problem. To build an effective problem statement, Moran and coauthors note that there are several different elements that should be included. For the purposes of this problem statement, six elements are addressed including, problem identification, background, scope of the problem, consequences of the problem, knowledge gaps, and solution. Through a comprehensive review of these problem statement elements, it will be possible to fully articulate the issue of concern being addressed in this quality improvement project.

### **Problem Identification**

The problem being addressed through this quality improvement project was a lack of provider uptake of PrEP prescribing for older adults who identify as members of the LGBTQ community. As noted in the introduction to this work, PrEP prescribing has lagged for the last several years due, in large part, to a lack of patient and provider knowledge regarding this treatment (Sewell et al., 2021; Turner et al., 2018). A closer look at the literature on PrEP prescribing does indicate that many at-risk patients lack knowledge of PrEP as well as their risk for contracting HIV (Laborde et al., 2020). Many patients may believe that they will not contract the virus and, as a result, often do not believe that action is needed to prevent the spread of HIV (Laborde et al., 2020). Additionally, patients may be concerned about the side effects of the medication or may face challenges in terms of affording the medication (Garcia & Harris, 2017).

Efforts have been made to increase patient education as well as to make PrEP more affordable for at-risk patients (Marcus et al., 2019).

Although action has been taken to improve patient uptake of PrEP, one of the most significant barriers to PrEP adoption identified in the literature has been a lack of provider willingness to prescribe the medication (Skolnik et al., 2020). Surveys of medical providers including primary care physicians and those working in specialty care have consistently demonstrated that providers often lack a basic understanding of PrEP and its role in preventing the spread of HIV (Turner et al., 2018). This lack of knowledge will limit the ability of providers to recommend PrEP to patients and to educate them about the importance of preventing the spread of HIV (Turner et al., 2018). The problem is one that must be framed in the context of individual as well as public health. PrEP use in high-risk patient groups has been shown to be effective for preventing the spread of HIV in the community (Estcourt et al., 2021; Seigler et al., 2018). Further, current data from the CDC (2021) does indicate that 10% of all new HIV cases in 2020 were in adults over the age of 55 years. Further, 68% of new HIV cases in this year were among high-risk groups including injection drug users and MSM (CDC, 2021).

## **Background**

With an overview of the problem provided, it is also helpful to provide some background information on the topic. When looking at the problem of PrEP prescribing among older adults who identify as members of the LGBTQ community, two background issues stand out quite prominently: the challenges faced by members of the LGBTQ community in acquiring high-quality healthcare services and the challenges faced by older adults in having their sexual health needs met in the modern healthcare system. Looking first at the challenges faced by members of the LGBTQ community in acquiring high quality care, current evidence unequivocally confirms

that members of this population group continue to face ongoing difficulties in acquiring effective care services (Srinivasan et al., 2019). Scholars have even gone too far to argue that the problem with suboptimal care for members of the LGBTQ community has given rise to myriad health disparities in this group (Margolies & Brown, 2019). What is made clear in the literature is that negative attitudes, stereotyping, stigma, and bias to the LGBTQ community are quite common among healthcare providers.

The negative bias and attitudes of providers toward members of the LGBTQ community is an ongoing issue of concern and one that has been shown in research to adversely impact the patient's ability to acquire the care that is often needed (Nowaskie & Sowinski, 2019). Providers who hold negative views of LGBTQ patients may fail to build a relationship or connection with the patient to keep them tethered to their care (Nowaskie & Sowinski, 2019). When this happens, patients may not engage in care recommendations made by the patient and may forego healthcare services, even when they are needed (Kuzma et al., 2019). Thus, the failure of healthcare providers to effectively connect with patients and to build relationships with them can result in poorer health outcomes for the patient. Given that members of the LGBTQ community will have unique health needs and face myriad challenges in the areas of sexual and mental health, keeping these patients connected to the healthcare system will be imperative for improving health promotion and disease prevention.

While the stigma and bias impacting care of the LGBTQ patient will shape health outcomes for the patient, for older adults who identify as members of the LGBTQ community, age is also a factor that may result in stereotyping behavior on the part of medical providers. Although considerable research and evidence is available to help meet the health needs of the older adult, most resources to support geriatric patients do not focus on sexual health or the

patient's sexuality (Sinkovic & Towler, 2019). Current evidence indicates that most older adults continue to engage in sex across their lifespan including as they age (Syme et al., 2017). Unfortunately, few healthcare providers receive formal education to address the sexual health needs of patients (Sinkovic & Towler, 2019). This can create gaps in care for all patients, regardless of their age. However, for older adults, provider attitudes and views of sex often limit discussions about patient sexual health needs (Malta et al., 2020).

The lack of communication among providers and patients regarding sexual health represents a significant failure of the medical system to address important health issues with patients. Sex remains a taboo subject, except in the context of family planning and pregnancy (Dalmer & Marshall, 2022). Older adults may not feel comfortable speaking with their healthcare providers about sexual health needs (Dalmer & Marshall, 2022). This may be a reflection of generational values or social beliefs regarding discussions of sexuality (Dalmer & Marshall, 2022). Providers may also have their own biases and views toward sex and sexual health. These biases and attitudes may result in the inability of providers to address sexual health topics with patients (Beckie et al., 2022). When this is combined with views on aging, it is not surprising to find that providers face notable difficulties when it comes to discussing sexual issues with older adults.

Older adults who identify as members of the LGBTQ community face a complex array of negative social attitudes, stereotypes, and stigma when it comes to having their sexual health needs addressed. Even if providers are comfortable discussing sexual health issues with older adults who are members of the LGBTQ community, the reality is that these providers may lack the knowledge and information to fully educate patients about PrEP. What is evident here is that this is a multifactorial problem that is underpinned by recalcitrant views of the medical

community toward sex and the older adult and health needs of the LGBTQ community.

Consequently, this quality improvement project should challenge providers in different ways to overcome stereotypes, attitudes, and stigma that hinder their ability to provide patients with the best possible care.

### **Scope of the Problem**

The scope of the problem can be viewed by examining the spread of HIV at the global, national, and local levels. As noted in the introduction to this work the CDC (2021) does report that case of HIV in the United States have been declining for the last decade. This does indicate that progress is being made on reducing the spread of the virus within the community.

Unfortunately, a review of data from the global community suggest that efforts to contain the spread of HIV have not been as successful as what has occurred in the U.S. Data from the Kaiser Family Foundation ([KFF], indicate that in 2010 there were 30.8 million people globally living with HIV. This number increased to 38.4 million in 2021. Additionally, the KFF reports that there were 1.5 million new infections in 2021 which equates to approximately 4,000 infections per day. While the number of new infections is higher than for the U.S., evidence also indicates that one in six people with HIV do not know they are infected, suggesting that the actual number of individuals infected with HIV globally may actually be much higher (KFF, 2021).

In the United States, HIV cases are declining as per the CDC (2021) data. In 2020, a total of 30,635 new cases of HIV were reported, which is significantly lower than the 1.5 million that are being reported globally each year (CDC, 2021). Even though HIV case counts are declining, the data does indicate that for at-risk groups including injection drug users and MSM, the rates of HIV transmission and infection remain quite high (CDC, 2021). Reducing community transmission of HIV remains an important public health goal to help move toward eradicating the

virus completely (Rutstein et al., 2017). Because there is currently no cure for HIV, preventing the spread of infection within the community is the most effective means for preventing HIV from re-emerging as a significant public health threat.

At the local level, it is helpful to consider current HIV incidence and prevalence rates for both the State of Florida and the community of Miami. Information from the Florida Department of Health (2022) indicates that in 2021 the number of HIV new infections recorded in the state increased to 4,708, from 3,441 in 2020. Historical data from the state indicates that new diagnoses of HIV in the state have remained stable throughout the 2010s. In Miami-Dade county, data from the Florida Department of Health (2020) indicates that there are currently 27,319 persons in the area living with HIV. This accounts for 0.3% of the population. Interestingly, the Florida Department of Health also reports that in 2019, the total number of new HIV infections in Miami totaled 1,181. This suggests that Miami comprises close to 25% of all new HIV infections in the state. Overall, it is clear that there are a large number of adults living with HIV in Miami who may benefit from education about PrEP.

The scope of the problem can also be seen by reviewing how much the problem costs. Scholars reviewing this topic have provided different types of analyses to facilitate understanding of the scope of the topic. Tran et al. (2021) for example estimated the global lifetime costs of providing care for one patient with HIV. The results indicate that the lifetime costs were more than \$500,000. McCann et al. (2020) conducted a similar study and found that for every patient with HIV that takes HAART, the average annual cost is \$48,000 per year. Forsythe et al. (2019) further reported that between 1995 and 2030, HAART will have saved the lives of 34.9 million people. Preventing these deaths has and will result in \$4.02 trillion in

economic gains (Forsythe et al., 2019). Based on this data, treating HIV proves expensive but also produces notable gains for society in terms of economic productivity.

### **Consequences of the Problem**

Consequences of the problem must also be addressed to fully examine the topic.

Consequences of the problem can stem from myriad factors such as costs to provide care, increased community spread of HIV, and the potential for increased use of HAART to lead to HIV resistance in the near future. The costs of HIV were reviewed in the previous paragraph and clearly indicate that while treatment of HIV has economic benefits, the costs to provide care for patients with HIV is quite significant (Tran et al., 2021). What is of critical importance when reviewing costs is the fact that some of the costs noted for treating HIV could be avoided through the use of PrEP. The use of preexposure prophylaxis should help to reduce the spread of HIV within the community, negating the need to spend an exorbitant amount of money on the care of patients with HIV (Karletsos & Stoecker, 2021). In short, the spread of HIV can be prevented, potentially reducing the long-term cost burden of treating HIV.

Increased community spread of HIV is also a consequence of failing to address the problem. Increased community spread of HIV will result in the need for public health officials to take action to address the problem (Oster et al., 2018). This will increase costs and will have implications for the healthcare system for years to come (Brogan et al., 2019). Additionally, increased community transmission of HIV will result in the infection of healthy adults within the community that may not typically be at risk for spreading the virus, including heterosexual men and women who are less likely to come into contact with the virus (Sullivan et al., 2021). The spread of the virus within the community will make it more difficult for public health providers to effectively control the spread of the virus in the future (Sullivan et al., 2021). All of these



issues will collectively impair public health as well as creating bottlenecks in the healthcare system as more patients require care.

While increased costs and community transmission of the virus are indeed concerns for individual and population health, an emerging concern about the virus and its evolution have raised concerns that HAART may not remain an effective treatment for HIV (Wertheim et al., 2017). Current evidence indicates that increased community transmission and spread of HIV has led to evolutionary changes in the virus (Wertheim et al., 2017). These changes have, in some instances, resulted in drug-resistant HIV (Wertheim et al., 2017). As the virus continues to circulate within the community and more mutations of the virus occurs, the potential for HIV to become untreatable is a possibility in the near future (Capetti & Rizzardini, 2019). Stopping or limiting the transmission of the virus within the community, therefore, becomes imperative to help ensure that medications for the treatment of HIV continue to work and that patients newly infected with the disease are able to manage their health effectively.

### **Knowledge Gaps**

The knowledge gaps involved with this project can be discerned directly from the literature. As noted throughout this work, there is a significant gap in knowledge when it comes to PrEP awareness among patients (Sewell et al., 2021) as well as providers (Turner et al., 2018). Additionally, the evidence reviewed here demonstrates that when it comes to sexual health, especially in older adults, many providers lack the knowledge and skills needed to engage in this type of care (Sinkovic & Towler, 2019). Consequently, older adults who are members of the LGBTQ community may face some notable challenges when it comes to accessing PrEP or even acquiring the general support needed to manage sexuality as an older adult. What is evident is

that the knowledge gaps stem from the provider and, as a result, must be addressed at the provider level.

What is made clear from this assessment is the fact that older adults who are at risk for contracting HIV may find it difficult to have their sexual health needs met. What is perhaps most distressing about this situation is that this gap in care has been recognized within the literature (Hillman, 2017). Scholars have extensively noted the challenges facing older adults when it comes to their sexual health (Gewirtz-Meydan & Ayalon, 2017). Providers often overlook this subject when providing care for older adults and as demonstrated in this work, older adults are often reluctant to bring up issues related to sex due to generational or social taboos (Dalmer & Marshall, 2022). Collectively these issues impact the ability of patients to acquire the health services that they need. This could potentially result in increasing the patient's risk of contracting HIV or another sexually transmitted infection (STI). Providers do have an obligation to help reduce barriers to sexual health screening and care for patients who may be reluctant to discuss these issues (Gewirtz-Meydan & Ayalon, 2017). Providers need to learn important communication and collaboration skills to be able to work with the patient to identify sexual health issues of concern and address them proactively to help the patient achieve an optimal level of health.

Gaps in care for patients who identify as members of the LGBTQ community as well as gaps in care for meeting the sexual health needs of older adults are both important to consider when assessing the health needs of this population. Providers delivering care for patients will need access to resources and supports for improving the care of patients within this population. In addition to needing information about PrEP and its effective prescribing in older adults, providers will need knowledge of how to build effective interpersonal relationships with patients

to discuss patient health needs. Sexual health history taking skills are an identified deficit for most healthcare providers, making it imperative to comprehensively address these issues such that providers can effectively and holistically meet the needs of older adult patients who identify as members of the LGBTQ community (Petroll et al., 2017).

### **Proposed Solution**

The solution for fixing the problem involved provider education as a means to help reduce practice barriers to PrEP prescribing in older adults who identify as members of the LGBTQ community. Educational deficits for healthcare providers have been detailed in the literature. Petroll et al. (2017), for example conducted an online survey of 525 primary care providers working in 10 cities in the U.S. The results of the survey indicated that 76% of primary care providers lacked knowledge of PrEP and only 17% of these providers had prescribed PrEP in the last year. Most medical providers completing the survey did report being uncomfortable with PrEP and prescribing it to patients. Of the 525 providers surveyed, 75% also acknowledged feeling uncomfortable completing a sexual health history or providing patients with a new HIV diagnosis. This data confirms that there are significant gaps in knowledge for providers including knowledge of sexual health history taking and PrEP prescribing.

Although provider knowledge of the topic is clearly lagging, evidence-based practice does indicate that educational programs for healthcare providers can be effective for improving knowledge of the topic as well as for increasing PrEP prescribing. For instance, Clement et al. (2018) completed an online training of medical providers working at an academic medical center in North Carolina to evaluate PrEP knowledge and prescribing following an educational program on the topic. Before education, 60% of the 115 providers that responded noted a lack of knowledge and education as the most significant barrier to PrEP prescribing. Three months

following education, PrEP prescribing was noted to increase, odds ratio (OR 4.84, 95% confidence interval [CI 1.77–13.21]). This suggests that education worked to reduce barriers to PrEP prescribing.

Other scholars have demonstrated similar outcomes for provider training with regard to PrEP prescribing. In particular, Henny et al. (2019) completed a nationwide cross-sectional study of medical providers to assess both PrEP training and its impact on PrEP prescribing. In total, the authors received surveys from 820 providers. Of these, only 36.6% reported having PrEP training. Comparisons of PrEP training and PrEP prescribing among providers did show that training influenced prescribing. In particular, Henny et al. used adjusted prevalence ratio (aPR) to demonstrate that providers with formal PrEP education were more likely to prescribe PrEP compared with providers who did not receive training: aPR = 1.75, (95% CI 1.10, 2.78). Based on these results, Henny and colleagues argue that increasing provider training for PrEP may be critical for increasing the number of prescriptions for the medications that are written. Krakower et al. (2017) implemented a training program for 35 physicians working in a medical group to increase PrEP prescribing. Before the training none of the providers had prescribed PrEP. One year following the education, all providers reported prescribing PrEP and working with high-risk patients to discuss sexual health needs.

Providing education for clinicians is highlighted in the literature to be an evidence-based solution that clearly has implications for increasing PrEP prescribing. Provider education has also been noted to be an important resource for improving provider comfort level with completing patient sexual health histories (Taylor & King, 2021). Consequently, an educational module to increase provider education of PrEP prescribing in older adults who identify as members of the LGBTQ community should provide a comprehensive, evidence-based solution to

the problem with the potential to markedly improve patient health outcome and quality of life. Given the nature of the problem being investigated and the evidence to support education to address this complex topic, provider education is supported for building this DNP quality improvement project.

### **Summary**

Provider education to improve PrEP uptake has been shown in the literature to be an effective, evidence-based intervention to address current provider and patient knowledge gaps limiting the use of PrEP. Providers need to be aware of the importance of PrEP in improving individual and population health. Eradicating HIV will require efforts to stop its spread and PrEP has been shown to be highly effective for meeting this goal. Given the current gap in practice and the availability of an evidence-based solution to address the problem, there is an impetus for the advanced practice nurse to translate evidence into practice and to make a change to improve patient care and the healthcare system.

## Section Two: Literature Review

The sexual health needs of older adults in the United States are frequently overlooked by healthcare providers (Sinkovic & Towler, 2019). This gap in care can be exacerbated when patients identify as members of the LGBTQ community (Hillman, 2017). The sexual health needs of older LGBTQ patients may be overlooked by providers for myriad reasons including a lack of knowledge for providing care for members of this group along with stigma associated with providing care for patients who may be exposed to HIV (Ezhova et al., 2020). Improving healthcare for older members of the LGBTQ community is imperative for not only reducing health disparities experienced by this population but also for improving care outcomes for patients through the use of timely, evidence-based interventions. In particular, this quality improvement project aims to improve provider knowledge of PrEP (pre-exposure prophylaxis) to increase patient uptake of this medication and to help prevent the spread of HIV in the community.

The problem as articulated in the previous paragraph stems from a lack of knowledge among providers regarding PrEP for the prevention of HIV and this problem has been definitively outlined in the current literature (Pleuhs et al., 2020). The solution to the problem involves provider education, which has been shown in the literature to be an effective evidence-based approach that can increase provider knowledge and rate of PrEP prescribing (Lumsden et al., 2021). With the realization that the problem and solution are evidence based, it is helpful to thoroughly review the research that is being utilized to support this quality improvement project. With these issues in mind, the current essay includes a review of the literature to support the project including a review of the PICO (population, intervention, comparison, outcome) clinical question, an overview of the literature search process, a statement of the inclusion and exclusion

criteria used for building the evidence base, a review of a literature appraisal matrix, an evaluation of the characteristics of each study, and a synthesis of the literature by theme.

### **PICO Question**

To assist in directing this quality improvement project a PICO clinical question was formulated as follows: Among primary care providers delivering care to older adults that identify as members of the LGBTQ community (**P**) does the use of an educational intervention to prescribe pre-exposure prophylaxis (PrEP) for the prevention of HIV (**I**) increase provider knowledge (**O**) compared with baseline knowledge of the topic (**C**)? The population includes healthcare providers (physicians, advanced practice nurses, and physician assistants) who deliver care for older adult patients who identify as members of the LGBTQ community. The intervention involved the use of provider education to increase knowledge of PrEP. Increases in provider knowledge were used as the outcome measure for the question, and the comparison included the knowledge of medical providers before the initiation of the educational program.

### **Literature Search Process**

The literature search process began with the identification of scholarly peer-reviewed journal databases that could be used to locate peer-reviewed articles on the topic of interest. Five scholarly databases providing access to articles regarding healthcare and nursing were selected: CINAHL, PubMed, Ovid, SAGE and ScienceDirect. Following the selection of databases for locating articles, the search terms were identified. Search terms were based on the primary PICO elements including “PrEP,” “provider education” and “knowledge.” These search terms were combined with the Boolean operator AND to search each database. Subsequent searches were conducted using synonyms that matched the PICO elements. These synonyms were combined with the Boolean operator OR and used to search for additional articles. The search terms used

included: “PrEP” OR “pre-exposure prophylaxis” OR “HIV prevention” AND “provider education” OR “provider training” OR “clinician education” AND “knowledge” OR “skills” OR “competencies.”

Limiters were also placed on each of the searches in an effort to ensure that the most timely and relevant literature was acquired. The specific limiters used for this project included, articles published in the last five years (2017-2022) in peer-reviewed scholarly journals, which were available in full-text and written in English. Abstracts of full-text articles obtained from each keyword search were evaluated to determine if a primary research study had been used and if the results supported this quality improvement project. Abstracts meeting the inclusion criteria were placed in a folder for full text review. From the initial searches, 672 articles were identified as having relevance for inclusion in the project. A total of 229 articles were duplicates and were removed, leaving a total of 443 articles for abstract review. Following the abstract review, a total of 128 articles remained. Each of the articles was evaluated in full-text and a total of eight articles were selected for inclusion in this literature review.

### **Inclusion and Exclusion Criteria**

Inclusion criteria for article selection were briefly reviewed in the previous section. Articles were selected for inclusion if they were published in the last five years in a peer-reviewed publication that was available in English and in full-text. If the articles met this inclusion criteria, they were assessed to determine if they utilized a primary study and had findings that were relevant to the project problem and solution. Articles were excluded if they did not meet the limiters established for the search or if they did not include a primary study and/or included results that did not support this quality improvement project.



### **Literature Appraisal and Literature Matrix**

The literature identified to support this quality improvement project can be found in Appendix A to this work. The literature review matrix was constructed to review pertinent study elements of articles identified from the literature search detailed above. All of the articles identified for the project were assessed using the Johns Hopkins tool for evidence appraisal (Dang & Dearholt, 2017). Of the articles identified three were classified as Level I evidence including systematic reviews/meta-analyses and randomized controlled trials (Pleuhs et al., 2020; Turner et al., 2018; Zhang et al., 2018), three articles were classified as Level II evidence including experimental trials that involved prospective and quasi-experimental research (Falconi-McCahill et al., 2022; Lumsden et al., 2021; Sales et al., 2019), and two articles were classified as a Level III, non-experimental quantitative study (Petroll et al., 2017; Edelman et al., 2020). All of the articles were rated as being either A Quality (Edelman et al., 2020; Lumsden et al., 2021; Petroll et al., 2017; Pleuhs et al., 2020; Sales et al., 2019; Turner et al., 2018; Zhang et al., 2018) or B Quality (Falconi-McCahill et al., 2022), suggesting that each includes consistent results. A more expansive review of the literature is provided in the following sections.

### **Characteristics of the Included Studies**

To begin this review of the literature, it is first helpful to provide a critique of each of the individual studies identified for inclusion. To facilitate organization of the literature, two specific themes were identified. These included articles detailing the need for provider education as a gap in current practice (Edelman et al., 2020; Petroll et al., 2017; Pleuhs et al., 2020, Turner et al., 2018; Zhang et al., 2019) and articles detailing the success of educational interventions to increase provider knowledge and prescribing of PrEP (Falconi-McCahill et al., 2022; Lumsden et al., 2021; Sales et al., 2019). The literature is organized here along these two themes.

### **Provider Knowledge Deficits**

The first article located regarding provider knowledge deficits of PrEP use and prescribing was written by Edelman et al. (2020). In this study, the authors utilized a cross-sectional study to assess PrEP prescribing and implementation practices currently used by primary care physicians (PCPs) working across the country. This study utilized an online survey and enrolled 240 primary care providers working across the United States. Data collection occurred through a survey that had been created by the authors. Information from the survey indicated that at the time of the survey, only 24% of primary care providers working in the U.S. had prescribed PrEP. Of primary care providers that did not prescribe PrEP, 85% reported that a lack of knowledge and education to safely prescribe this medication were the most significant barriers to PrEP prescribing.

A closer look at the study conducted by Edelman et al. (2020) does demonstrate that study had important strengths including the fact that the results support the problem and data was provided by a nationally representative sample of PCPs. The study's limitations stem from the use of a non-experimental methodology which may limit the long-term relevance of the findings. The results may also not be generalizable to other provider groups given the fact that the sample was not randomly selected. The findings from the study do support the problem of provider knowledge and the need for education to help increase PrEP prescribing. This study was rated as a Level III study due to the fact that it used a non-experimental (cross-sectional) framework. An A Quality rating was provided for the article based on the consistency of the findings across the sample.

In a similar vein of inquiry, Petroll et al. (2017) also employed a cross-sectional study to assess healthcare provider awareness, knowledge, and experience with prescribing PrEP and,

comfort with and barriers to PrEP-related activities. Using a sample of 525 primary care and HIV specialist providers working in various healthcare facilities across the United States. The survey was provided online and included an instrument that had been created by the authors to assess provider PrEP knowledge and use in the clinical setting. Results from the project indicate that among primary care providers, only 76% had ever heard of PrEP and only 28% of providers had actually prescribed it. Lack of knowledge regarding PrEP was consistently noted across providers as the primary barrier limiting PrEP prescribing in practice.

A review of strengths and weaknesses for the article provides additional insight into the utility of the evidence for practice change. The strengths of the article stem from the ability of the authors to highlight the scope of the problem in a nationally representative sample. The weaknesses of the article are similar to those noted when reviewing the work of Edelman et al. (2020). In particular, the study only provides a brief snapshot of current trends in provider behavior. The results may not be generalized to other providers and the sample is not representative of all primary care providers working in the U.S. The results demonstrate the need for providers to have education by demonstrating how a lack of knowledge limits PrEP prescribing and, therefore, supports this quality improvement project. This evidence was graded as a Level III study because it did not use an experimental framework. However, the article was also given an A quality rating due to the consistency of the results (Dang & Dearholt, 2017).

Other scholars examining the topic of provider barriers to PrEP prescribing have also identified provider knowledge as an important factor of concern limiting the uptake of this intervention among patients. In particular, Pleuhs et al. (2020) conducted a systematic review of the literature to identify healthcare provider barriers for PrEP prescribing in clinical practice. This systematic review included 28 studies that were drawn from PubMed and published

between 2011 and 2018. Data was collected using the PRISMA diagram and through independent review from two of the authors. The results of the systematic review did indicate that a large number of providers (> 80%) lacked sufficient knowledge to prescribe PrEP or to initiate a conversation with a patient regarding the topic. While lack of education and awareness were noted as issues of concern, provider comfort with discussing PrEP was also noted to be an issue of concern. Increasing education could improve provider comfort with the subject matter, leading to increased conversations between patients and providers regarding PrEP.

Systematic reviews are noted to be one of the highest levels of evidence (Dang & Dearholt, 2017). This article was rated as Level I evidence with an A Quality rating (Dang & Dearholt, 2017). The study is methodologically strong and demonstrates notable consensus regarding the barriers to PrEP prescribing. However, the study only included articles from a single database and a restricted time period. This may have served to limit the scope of the data acquired and the results obtained. Additionally, a meta-analysis was not used to quantify the scope of the issues noted. The study does support the current quality improvement project and suggests that reducing provider education would be helpful for ameliorating the current gap in care that exists for PrEP prescribing.

Truner et al. (2018) also conducted a systematic review of the literature to investigate provider attitudes and knowledge regarding PrEP prescribing. More specifically, Turner and coauthors identified 11 articles from PubMed, CINAHL, Web of Science, and Scopus between November 2016 and January 2017 that were reviewed and integrated in this review. A PRISMA flow diagram was used to organize the data from the literature search and GRADE criteria were used by two independent reviewers to identify articles for inclusion in the study. The results indicated that among all healthcare providers who were included in the study, only 26%

prescribed PrEP for their patients. Providers noted that this was primarily attributed to the fact that they lacked knowledge regarding PrEP and how to safely prescribe this medication in clinical practice.

The article by Turner et al. (2018) was identified as a Level I study with an A Quality rating as per the Johns Hopkins evidence appraisal hierarchy (Dang & Dearholt, 2017). The strengths of the article stem from its methodological rigor and the ability of the authors to demonstrate strong, consistent results across all studies reviewed. Weaknesses associated with the article include the small number of databases searched and the limited timeframe for searching. No meta-analysis was included to quantify the effects and the results may not be generalizable to all provider groups. Despite these limitations, the results do support the need for provider education to increase PrEP prescribing. What is evident is that a lack of provider knowledge is a critical concern that must be addressed in order to improve PrEP prescribing for patients.

The final article located regarding this theme was written by Zhang et al. (2019) and also utilized a systematic review and meta-analysis. The purpose of this study was to understand trends in PrEP provision from the health care providers' perspective assessing key areas including awareness, willingness, consultation, and prescription. The sample included 36 articles on the topic drawn from PubMed/MEDLINE, Web of Science, PsycINFO, EMBASE, and Google Scholar databases. Combined the studies included 18,265 healthcare providers. A PRISMA diagram for systematic reviews was employed and data was independently evaluated by two authors and included based on identified criteria and consensus. The pooled prevalence of PrEP awareness was 68% [95% confidence interval (CI) = 55–80%], willingness to prescribe PrEP was 66% (95% CI = 54–77%), PrEP consultation was 37% (95% CI = 25–51%), and

prescription provision was 24% (95% CI = 17–32%). The primary barrier for PrEP consultation and prescribing was a lack of provider knowledge of the topic. This substantiates the need for provider education to help increase knowledge and prescribing of PrEP.

This systematic review and meta-analysis included the evaluation of randomized controlled trials and was therefore rated at a Level I study with a Quality rating of A (Dang & Dearholt, 2017). The methodology used in the article is the most rigorous and the statistically significant results obtained do demonstrate that a lack of provider knowledge regarding PrEP is a significant and pervasive problem. The primary limitation of the work is that the authors utilized a limited number of databases which may have limited the scope of the findings located from the literature. The results of the article demonstrate that provider knowledge regarding this topic is a significant issue of concern that must be addressed in order to increase PrEP prescribing for patients.

### **Efficacy of Educational Programs**

The second theme identified when conducting this literature review involved actual educational programs that were piloted to evaluate their impact on provider knowledge and PrEP prescribing practices. For instance, Falconi-McCahill et al. (2022) conducted a quality improvement project that utilized a quasi-experimental pre-/post-intervention design to assess the use of an educational program on increasing PrEP prescribing among medical providers working at a federally qualified health center. In this study a total of 24 healthcare providers working at a federally qualified health center were enrolled and received education. Data regarding PrEP prescribing was collected six months before and six months after the educational program. Following the educational program provider likelihood to prescribe increased for family medicine providers ( $p = .0001$ ) and for obstetrics and gynecology providers working at the health

center ( $p = .0034$ ). The authors conclude that in this setting, the educational module was successful at increasing provider knowledge to influence a change in practice.

This experimental framework was identified as a Level II study with a Quality rating of B for consistency in results despite having a small sample population (Dang & Dearholt, 2017). The study demonstrates that when an educational intervention is used it can positively influence provider prescribing of PrEP. The results were statistically significant which also highlights the strength of the findings. In spite of these strengths, the study is limited by the fact that it does not utilize a randomly selected sample. This limits the generalizability of the findings to other healthcare settings. It is possible that the same results would not be reported if the same educational program was utilized at another facility. The study also lacks a control group to demonstrate that a clear cause-effect relationship is present. The results support the implementation of a practice change to educate providers about PrEP to increase knowledge and to foster practice change that will improve patient care and health outcomes.

Lumsden et al. (2021) conducted a similar study using a quasi-experimental one-group, pre-/post-intervention design. In this study all medical providers working in a single multidisciplinary care practice including internal medicine and family medicine providers. Education was included to increase provider knowledge to prescribe PrEP. Data from the electronic health record was acquired before and following the educational intervention. Data regarding PrEP prescriptions per year between 2012 and 2017 were evaluated. Number of prescriptions following education was collected at six months. Before the intervention, only 78 patients per year received a prescription for PrEP and only 38% of PCPs prescribed PrEP. In the year following education, 190 prescriptions for PrEP were provided and 85% of these prescriptions were written by PCPs. The authors conclude that PrEP education had a positive

impact on the prescribing practices of providers. This suggests an increase in knowledge that influenced a practice change.

Much like the study conducted by Falconi-McCahill et al. (2022), this study conducted by Lumsden et al. (2021) was rated as a Level II study because it was experimental in nature. This study was given an A Quality rating due to the consistency of the results in a large population. The strengths of the study include the presence of robust clinically relevant results that have direct implications for improving clinical practice. The limitations of the study stem from the methodological weaknesses of the work. In particular, the study does not use a randomly selected sample which would limit the generalizability of the findings. Additionally, a control group was not used to demonstrate causality in the findings. Although the evidence does suggest that the results were significant, it is not possible to state with certainty if the educational program resulted in changes in practice. The results do demonstrate that the solution for this quality improvement project will be effective for increasing provider knowledge of PrEP.

Sales et al. (2019) also conducted a quasi-experimental one-group, pre-/post-intervention study to assess the impact of provider education on outcomes for PrEP prescribing and counseling among providers working at a family planning clinic in Atlanta, Georgia. In this study a total of 28 providers underwent training and data from 500 patients seen following education of the providers was recorded including counseling practices used by providers and PrEP prescribing practices. Providers reported higher levels of knowledge and patients reported a higher level of counseling provided by practitioners (66%) and more patients (76%) were willing to try PrEP than before the intervention (19%). The authors argue that the results support the use of a PrEP educational program for providers to positively influence knowledge and practice.



This study, much like the previous two, was graded as Level II evidence with an A Quality for the consistency of the results (Dang & Dearholt, 2017). The strengths of the study stem from the quantification of results following the educational program, demonstrating that education is effective. The results are statistically significant and prove that provider education has systemic benefits for providers and patients. The study did not include a comparison group and the sample was not randomly selected. These issues limit causality for the findings and the ability to generalize the results to other practice settings. In terms of the quality improvement project, this evidence supports the intervention to educate providers regarding PrEP.

### **Synthesis of the Literature**

The review of each individual study provided above facilitates a more complete understanding of the strengths and weaknesses of the evidence to support practice change. Although this aspect of evaluating the evidence is clearly important, what is also equally important to consider is a synthesis of the literature to identify current gaps or concerns that may influence the translation of evidence into practice. With these issues in mind, it is helpful to review both of the themes identified through the literature to determine where challenges may arise when translating the evidence into practice.

#### **Research Synthesis: Lack of Provider Knowledge**

As noted, five of the eight studies included in this literature review focused on the topic of barriers to PrEP prescribing. Across all five studies, it was noted that a lack of provider education was consistently identified as the primary barrier influencing PrEP prescribing (Edelman et al., 2020; Petroll et al., 2017; Pleuhs et al., 2020, Turner et al., 2018; Zhang et al., 2019). The problem is so significant that a large percentage of providers in many of the studies reviewed acknowledged this deficit and its implications for patient care. For example, Pleuhs et

al. (2020) found that as many as 80% of providers lacked the knowledge needed to safely prescribe PrEP for patients. Although this common theme was noted, highlighting the scope and intensity of the problem—there are some additional questions that remain after reviewing this literature.

Of concern when reviewing the results provided regarding clinician education for increasing PrEP knowledge and prescribing is the fact that while each of the studies does acknowledge the need for education, none of the studies specify what should be taught to providers. While some scholars support the need to educate providers about the medication and how it works (Petroll et al., 2017; Zhang et al., 2019) others acknowledge the interpersonal challenges that providers face when approaching patients to discuss the topic of PrEP and HIV prevention (Edelman et al., 2020; Pleuhs et al., 2020; Turner et al., 2018). Because the particular knowledge deficits for providers in prescribing PrEP are not specifically identified for building educational programs, making this change in practice may be complicated by the inability to provide clinicians with the educational tools and resources needed ameliorate knowledge gaps. Consequently, investigations into what content may be needed by providers (e.g., a needs assessment) may be useful to conduct before implementing an educational program on this topic.

Also of concern when reviewing this literature is that the samples used for evaluating provider knowledge included a diverse range of providers. The focus of this quality improvement project involves primary care providers. While some authors did specify the use of primary care providers as a target population for investigation (Edelman et al., 2018; Petroll et al., 2017) other authors utilized unique provider groups whose outcomes may not be applicable to the primary care site (Pleuhs et al., 2020; Turner et al., 2018; Zhang et al., 2020). This will need to be addressed when reviewing the types of educational programs that can be used for educating

providers. The ability to utilize a specific educational program at the primary care site would need to be assessed to determine if the educational needs of primary care providers regarding PrEP are similar to those of other types of care providers. While an assumption is being made that the educational needs of all providers will be similar, it is not possible to state this with certainty.

### **Research Synthesis: Provider Education**

Synthesis of the literature with regard to provider education is also needed. Three studies evaluating the effectiveness of a provider education program were reviewed in this literature review (Falconi-McCahill et al., 2022; Lumsden et al., 2021; Sales et al., 2019). Each of the articles robustly support the use of provider education as a useful means to increase provider PrEP prescribing. Because all three of the studies measured PrEP prescribing or provider behavior following education, it was assumed that provider knowledge increased following education. However, it is important to note that this specific finding was not confirmed in any of the studies reviewed. Consequently, the measure used for this quality improvement project— increase in provider knowledge—was not directly measured in the articles reviewed. Despite this all three of the articles demonstrate statistically significant results indicating that education to increase provider PrEP prescribing do work.

A comparison of the three studies and the specific approaches used to deliver education indicate that there were myriad approaches used. For instance, Falconi-McCahill et al. (2022) note the use of provider-only training delivered to providers through a departmental meeting. The instruction was web-based and lasted for 30 minutes. Lumsden et al. (2021), on the other hand, note the use of an iterative educational framework that employed multiple educational sessions. The sessions were developed based on emerging needs for PrEP prescribing identified

by providers as part of expanding PrEP prescribing at the facility. Finally, Sales et al. (2019) note the use of a 1.5 hour training program provided to clinicians to increase PrEP prescribing.

The specific format used for provider education was noted to be different in each of the studies reviewed. Although each program seemed to have a beneficial outcome for providers and patients in terms of PrEP prescribing, this lack of consensus in the research regarding what method of education works best may have implications for the current project. In particular, it is possible that the lack of specificity regarding educational program content and format may limit the ability of the principal investigator to optimally provide education for clinicians. An investigation into what works best for enhancing nursing education and what modalities may work best to impart knowledge of PrEP may be needed. Identifying the best means for delivering this type of education will be important for ensuring that providers are able to benefit the most from training.

Also important to note when reviewing the literature regarding provider education is that in each of the studies reviewed, providers other than those working in primary care were included. What has not been fully delineated in the literature is whether primary care providers require specific knowledge or information to prescribe PrEP for patients. While research does indicate that primary care providers, and most healthcare providers for that matter, do have knowledge deficits when it comes to PrEP and its prescribing, what is not clear is if the educational needs of primary care providers are different from those of other providers. Thus, even though the current literature does suggest that provider education can be effective for improving PrEP prescribing among providers, the lack of standardized education and a lack of assessment of knowledge gaps for primary care providers may adversely influence the translation of this evidence in the practice site for this quality improvement project.

## **Conclusion**

A critical review of the current literature on the topic of PrEP prescribing among healthcare providers definitively demonstrates that providers lack knowledge of the topic, which does influence their willingness to prescribe PrEP. Educational programs to augment provider knowledge have unequivocally demonstrated that education works, regardless of how it is provided and to what provider groups, i.e., primary care, general internists, etc. Based on the level and strength of the evidence there is ample support for a practice change, suggesting that the quality improvement project is well-supported in the context of the current evidence base. Consequently, the current project should be considered as a viable means to help augment care quality while enhancing the role of the clinician and health outcomes and quality of life for patients.

### **Section Three: Methodology**

This quality improvement project focused on increasing provider knowledge of PrEP (preexposure prophylaxis) prescribing for older adults who identify as members of the LGBTQ community. Implementation of this project at the practice site required a consideration of the methodology that would be employed to achieve the desired goal. Quality improvement projects typically employ a pre-/post-intervention design (Ambroggio et al., 2018). Scholars reviewing the quality improvement framework argue that this approach is designed to have a direct impact on practice and to foster immediate improvements in the practice environment (Backhouse & Ogunlayi, 2020). Quality improvement is scalable and can provide a useful framework for improving outcomes both at the department and organizational level (Backhouse & Ogunlayi, 2020). Included in this section is a review of the methodology that was used to guide this quality improvement project including a review of the primary DNP project goal, the SMART (specific, measurable, achievable, relevant, and time) objectives used to guide the project, along with a review of the theoretical framework for the project, the setting and participants, procedures, and a discussion of the project results in terms of their implications for advanced nursing practice.

#### **Primary DNP Project Goal**

The purpose of this quality improvement project was to increase primary care provider knowledge of PrEP (preexposure prophylaxis) prescribing for older adults who identify as members of the LGBTQ community. Current evidence indicates that PrEP was first approved by the Food and Drug Administration (FDA) in 2012 to help prevent the spread of HIV (human immunodeficiency virus) (Karletsos & Stoecker, 2021). Although preexposure prophylaxis has been shown to be highly effective in high risk groups for markedly reducing the transmission of HIV, evidence does indicate that patient uptake of the medication continues to lag (Clement et

al., 2018). A closer look at the problem does indicate that a lack of healthcare provider knowledge regarding PrEP remains one of the most significant barriers for increasing PrEP use (Clement et al., 2018; Henny et al., 2019). When this is coupled with existing challenges in meeting the sexual health needs of older adults and older adults who identify as members of the LGBTQ community, it is not surprising to find that uptake of PrEP remains notably low among this patient population. Increasing provider knowledge of the topic has been shown to increase provider prescribing of PrEP and patient uptake of the medication (Krakower et al., 2017). Consequently, increasing provider knowledge of PrEP was the primary purpose of this quality improvement project.

### **SMART Objectives**

Although the primary goal of this DNP project is to increase provider knowledge of PrEP in older adults who identify as members of the LGBTQ community, the project also included specific objectives to help guide the project over the course of the next two semesters.

Specifically, three SMART objectives for the project were identified and are included here:

- By Spring 2023, create an educational module for providers to enhance knowledge of PrEP prescribing in older adult patients who identify as members of the LGBTQ community.
- By June of 2023, provide education for clinicians working at the primary care site to increase knowledge of PrEP prescribing.
- By August of 2023, complete the educational program and evaluate changes in knowledge that occurred for providers working at the primary care site.

### **Theoretical Framework/Conceptual Underpinning**

Also important to consider when developing this quality improvement project was the conceptual underpinning and theoretical framework that will be used to guide implementation. Conceptual and theoretical frameworks are noted in nursing to provide a formal framework for structuring thinking as it relates to providing nursing care (Heale & Noble, 2019). In the context of this project the conceptual and theoretical framework are being utilized to justify the focus of the study—i.e., provider education—and the help guide understanding of how education works to help ameliorate the current gap that exists in practice—i.e., project knowledge of PrEP. For the purposes of this project Orem’s self-care deficit nursing theory (SCDNT) was selected for use. To better understand how the theory will be applied in the context of this project, it is helpful to provide a review of the theory, its clinical fit, and an evaluation of the theory using Peterson and Bredow’s (2013) framework.

#### **Theory Overview**

As noted the theory being applied to the quality improvement project is Orem’s self-care deficit nursing theory. A review of the theory provided in the literature indicates that SCDNT is built on the concept of self-care agency (Yip, 2021). Orem argued that every individual has self-care agency or an innate motivation/ability to engage in self-care behaviors that promote health (Isik & Fredland, 2021). Although self-care agency is present for most individuals, there are instances in which self-care agency can be disrupted due to the presence of illness or injury (Isik & Fredland, 2021). When self-care agency is disrupted, this is defined as a self-care deficit (Isik & Fredland, 2021). Nursing care is provided to ameliorate the self-care deficit and to help restore the patient’s self-care agency (Yip, 2021). Following nursing care, the patient should have the



tools, supports, and resources needed to engage in proper self-care to maintain health without the need for nursing care.

Orem's SCDNT provides a framework for connecting the nursing care of the patient with the pragmatic realities of patient care. Scholars note that while nursing care can directly improve the patient's health—if a nurse bandages a patient's wound—nursing care should also look beyond direct medical interventions to connect the patient with their care (Isik & Fredland, 2021). What this means is that if a patient is prescribed a medication and cannot afford the medication or the medication is not covered by their insurance, the nurse needs to help connect the patient with an affordable treatment or with low-cost access to the medication. This indicates that nursing actions may go beyond simply providing direct medical care for the patient (Yip, 2021). Identifying where and why deficits in patient care occur becomes vital to improving the care of the patient and the outcomes that result (Isik & Fredland, 2021). Consequently, Orem's theory makes it clear that the role of the nurse extends far beyond the direct actions that are taken at the bedside.

### **Theory/Clinical Fit**

The clinical fit of the theory to the project can be seen when reviewing how Orem's self-care deficit nursing theory has been applied to current nursing problems. Scholars utilizing Orem's theory have employed the framework to structure interventions for patients including education to improve patient health promotion behaviors (Saeedifar et al., 2018). Additionally, Orem's theory has been used to structure healthcare provider education (O'Brien, 2022) including educational programs for nurses (Fernandez-Puebla et al., 2022). At the core of this research is an identified gap in knowledge or skills for patients and providers that is ameliorated through providing education to fill the gap. Orem's self-care theory as currently utilized in the

context of the research, demonstrates that researchers can use the theory to identify deficits that can be addressed through the direct action taken by medical providers or, in this particular case, nurses. Orem's theory not only connects problems and solutions, it prompts those who are actively involved in problem solving to identify what additional resources or tools are needed to connect the problem and solution such that the problem is fully ameliorated.

The use of Orem's theory in the current nursing and healthcare literature provides some important insight into the fit of the theory to the project. The project seeks to increase provider knowledge of PrEP prescribing such that providers will educate older adult patients seen in practice who identify as members of the LGBTQ community. This indicates that there is currently a deficiency in the ability of providers to deliver this education to patients at the present time. The literature confirms this gap as provider knowledge of PrEP has been identified as a significant barrier to limiting the uptake of PrEP in practice (Clement et al., 2018; Henny et al., 2019). Additionally, there is a deficit for patients that only providers can ameliorate through augmenting their knowledge of the topic (Clement et al., 2018; Henny et al., 2019). While the deficit impacts both patients and providers it has different outcomes. For providers the failure to prescribe PrEP may adversely harm patients that may benefit from this treatment. For patients, lack of access to PrEP may have a devastating impact on health, quality of life, and life expectancy. Only by filling this knowledge gap will providers and patients be able to correct this deficit, leading to better self-care behaviors including the potential to use PrEP to prevent the spread of HIV both for individual patients and within the community.

### **Theory Evaluation**

The final component of evaluating the selected theory for the project requires a review of the theory in the context of the evaluation framework proposed by Peterson and Bredow (2013).

The theory evaluation framework provided by these authors includes six questions to guide a more comprehensive assessment of the theory. The first question in the framework focuses on how the theory is operationalized to the clinical issue. Although there is a dearth of research regarding the application of Orem's theory to PrEP prescribing and the LGBTQ community, there is ample evidence demonstrating the use of the theory to guide nursing education and nursing interventions to augment patient care (Fernandez-Puebla et al., 2022; O'Brien, 2022). Because the primary intervention being used in this quality improvement project focuses on providing education to clinicians, the theory has a solid operational foundation in the literature.

Questions two and three in the Peterson and Bredow (2013) framework focus on how the theory has been applied in the past and how the theory has performed in predicting or explaining the phenomenon to which it relates. A review of the literature regarding Orem's self-care deficit nursing theory does indicate that it has been extensively used in building interventions to help patients that consistently experience gaps in their care that can lead to health disparities (Yip, 2021). Structuring care using Orem's self-care deficit nursing theory facilitates the ability of nurses to identify what is needed to connect the patient with care such that self-care deficits can be effectively managed by the patient (Yip, 2021). This can and has been measured through specific quantifiable outcomes such as glycemic control or the ability of the patient to manage chronic health conditions with consistency. What is demonstrated through the application of the theory is that by identifying true deficits in care and addressing them, care behaviors and health outcomes for patients can improve.

Questions four and five in the Peterson and Bredow (2013) framework focus on identifying the relationship of the theory to the clinical problem and how congruent the theory's assumptions are for the clinical issue. The clinical issue as identified is a deficit in provider

knowledge. This may not be viewed as a self-care deficit per-se; however when the deficit is evaluated in the context of the role of the advanced practice nurse, including the need to foster health promotion and disease prevention, it is possible that this could be viewed as a self-care deficit for nurses. This deficit, in turn, creates a deficit for patients, that can lead to the inability of the patient to truly engage in self-care. The theory thus, highlights two self-care deficits involved in the clinical problem. Assumptions of Orem's theory include that people are self-reliant and responsible for their own care (Younas, 2017). These assumptions are supported in this project by providing education to bolster the capabilities of medical providers who should change practice to enhance self-care agency among patients receiving care.

The final question in Peterson and Bredow's (2013) framework focuses on whether there are tools associated with the theory and if they are applicable for measurement in the clinical problem. A consideration of this issue in the context of the current literature does indicate that Orem's theory is noted to be a grand nursing theory (Younas, 2017). Consequently, the theory does not have any empirical referents (Younas, 2017). However, when looking at the literature on the application of Orem's self-care deficit nursing theory, it is evident that the focus of evaluation in these studies is typically on improving some element of patient self-care. As a result behavior changes that occur for the patient can be used as a means for quantifying the outcomes that occur when utilizing the theory in practice.

### **Setting and Participants**

The practice site where project implementation occurred was a primary care practice currently operating in Central Florida. A letter of approval to use this practice site to conduct this quality improvement project can be found in Appendix B. This practice provides care for community residents across the lifespan and currently employs 15 medical providers that

includes a mixture of physicians, advanced practice nurses, and physician assistants working full- and part-time. Current evidence indicates that as many as 90% of all community residents make contact with a community primary care provider over the course of a given year (Mallen et al., 2018). Consequently, this practice site is one in which providers will regularly encounter older adults as well as members of the LGBTQ community. The site also has 15 medical providers who could potentially benefit from the project through increasing their knowledge of PrEP and PrEP prescribing. The mission of the organization is focused on providing the highest quality care to improve individual and community health. This will facilitate the ability of the organization to achieve its vision to become a provider of choice within the community. Implementing the highest standards of quality in delivering patient care would be aligned with the mission and vision of the organization. Hence, this quality improvement project was aligned with the mission and vision of the organization.

Although exact data regarding PrEP prescribing at the primary care site is not currently tracked, an informal survey of providers at the practice site did reveal that most were unfamiliar with PrEP and among providers who had heard of the treatment, only two had actually written prescriptions for the medication following a patient's request. This suggests that PrEP is more than likely not being discussed with patients. Further, a review of the electronic health record (EHR) system at the facility indicated that electronic charting does not include a place for information regarding the patient's sexual health history. While providers can put this information in notes for the patient, sexual health history is something that is not regularly addressed in primary care. This is aligned with the current literature indicating that many healthcare providers lack the knowledge and competencies required to perform comprehensive sexual health histories for patients (Taylor & King, 2021).

As noted, there are currently 15 full- and part-time medical providers currently working at the practice site. Ideally, all medical providers were initially sought for participation in this quality improvement project. However, because the project utilized voluntary participants, it was not feasible to believe that all 15 medical providers at the facility would be willing and able to participate in the project. For this reason, a total sample size of 8 was obtained following recruitment. Current evidence indicates that study participation rate typically ranges between 40% and 60%, depending on the type of study (Smith et al., 2019). Although the sample is closer to 60% of the total population, this sample size should have a positive impact on provider knowledge to improve care for older members of the LGBTQ community.

### **Procedures**

As previously stated, the methodology underpinning this quality improvement project is a quality improvement pre-/post-intervention framework. This approach requires change agents to measure outcomes before an intervention, to implement the intervention, and to measure the outcomes that result (Stratton, 2019). The project sought to increase provider knowledge of PrEP prescribing in older adults who identify as members of the LGBTQ community. Education of providers has been identified as an evidence-based approach that could reasonably help the principal investigator achieve this goal. Placing this project into a quality improvement framework, it was possible to review the specific procedures or steps that were taken to achieve the desired project goal.

The quality improvement project began through the acquisition of institutional review board (IRB) approval from Florida International University. IRB approval for the project was granted on April 7, 2032 and the IRB approval letter for the project can be found in Appendix C. Unfortunately, the initial faculty advisor for the project was unable to continue through project

implementation and an IRB modification had to be acquired. The IRB modification was approved by the IRB on May 10, 2023 and the modification approval letter can be found in Appendix D.

Once IRB approval for the project was secured, the project was initiated at the practice site and began with an assessment of provider knowledge of PrEP prescribing in the target population. An assessment tool for measuring knowledge on this topic was given to providers agreeing to participate in the practice change such that provider knowledge on the topic could be assessed before implementing the educational module. It was assumed, based on the literature, that providers would have a low level of knowledge regarding the topic (Zhang et al., 2019). Once baseline knowledge assessments of providers were complete, the educational intervention was provided to increase knowledge. The intervention consisted of an evidence-based PowerPoint presentation that was used to educate providers about PrEP and specific considerations for PrEP prescribing on older adults. Following the completion of the educational module, participants were asked to complete a post-intervention knowledge assessment. Knowledge following the intervention was then compared with baseline.

### **Participant Recruitment**

Participant recruitment occurred at the practice site and included emailing all medical providers (physicians, advanced practice nurses, and physician assistants) using an internal email directory at the facility. Appendix C includes an email recruitment letter that was sent to providers at the practice site to encourage them to participate in the project. The email directory for the site was obtained from the site preceptor. The email recruitment letter included basic information regarding the focus and purpose of the study, what would be required of providers to participate, and next steps in terms of contacting the principle investigator for participation in the

study. Medical providers working at the facility who were interested in participating in the quality improvement project were able to contact the principle investigator by email to acquire additional information about participation.

### **Data Collection**

Data collection for this project was done virtually to help minimize the risk of COVID-19 transmission while also allowing providers the flexibility to participate in a project based on their unique schedules. Data collection occurred via email before the educational intervention and after the educational intervention. Baseline or pre-intervention data collection included the acquisition of data regarding sample demographics and knowledge regarding PrEP prescribing among older adults before the educational intervention. Providers agreeing to participate in the project were emailed a demographic form (Appendix F) and a pre-intervention knowledge test (Appendix G). The knowledge test was based on the educational module developed for the project. Providers agreeing to participate in the project received these forms as fillable word documents. Providers were asked to download the forms, complete them, and return them to the principal investigator within one week.

Following the completion of the demographic survey and pre-intervention knowledge test, participants were asked to complete the educational module. After which, post-intervention data was collected. Post-intervention data will include knowledge scores from the knowledge test (Appendix G). The post-intervention knowledge test included the same questions and content as the pre-intervention knowledge test. The primary difference between the pre- and post-intervention knowledge assessments was the arrangement of the questions. To help reduce test bias, the questions on the pre-intervention knowledge assessment were rearranged for the post-intervention knowledge assessment. Test bias can have a positive influence on test results,



indicating that efforts to reduce this issue would be helpful for ensuring that gains in learning made by providers are accurately measured and not skewed by test bias (Sackett et al., 2021).

### **Data Analysis**

Data analysis for this quality improvement project included descriptive and inferential statistics. Descriptive statistics were used to assess the characteristics of providers participating in the project. These statistics included counts, frequency (percentage), mean, and standard deviation. Descriptive statistics were used to evaluate mean knowledge scores from the pre- and post-intervention assessments. Standard deviation for the scores were tabulated as well. This data provided an overview of the sample as well as participant knowledge and changes in knowledge, i.e., whether knowledge for providers increased, decreased, or remained the same as a result of the intervention.

Descriptive data analysis provided a general understanding of the demographic data and trends in knowledge scores. However, to determine if the change in knowledge scores was statistically significant, inferential statistics were needed. Inferential statistics can be used to compare the results from the pre- and post-intervention knowledge scores. To determine the appropriate inferential test, it was pertinent to consider the type of data collected from the knowledge assessments and further to assess whether the data is normally distributed (Mishra et al., 2019). The data that was collected will included ratio data that must be evaluated. This suggested that the use of a parametric t-test or a non-parametric Mann-Whitney U-test would be needed. To determine whether a parametric or non-parametric test should be used, some assessment of the normality of the data was needed.

Assessing the normality of the data can be done through various tests including the Shapiro-Wilk test (Mishra et al., 2019). However, as per the central limit theorem, it can be

assumed that samples with  $N = 30$  or larger will be normally distributed while samples with less than 30 participants will not be normally distributed (Mishra et al., 2019). As noted when reviewing the sample size for the quality improvement project, a total of 8 providers out of 15 working at the practice site was obtained. Given that this number is far below the 30 participants needed to assume a normally distributed sample, it seemed reasonable to believe that the sample would not be normally distributed. This necessitated the use of a non-parametric inferential test, i.e., the Mann-Whitney U-test. Consequently, this test was used in this project to assess statistical significance. A p value of  $< 0.05$  was the benchmark to determine statistical significance.

### **Protection of Human Subjects**

The protection of human subjects is foundational to building any research or quality improvement project. To protect human subjects in this project, IRB approval was sought and granted (Appendices C and D). IRB approval indicates that projects involving human subjects are ethically sound and do not harm participants or violate their rights (Spellecky & Busse, 2021). In addition to seeking IRB approval for the project, all participants were asked to voluntarily participate and to sign a letter of informed consent (Appendix H). Informed consent indicates that participants have been informed about the study procedures and are aware of the risk and benefits of participating in research (Hadden et al., 2018). Informed consent was required for any provider wishing to participate in the project.

While these basic provisions to protect human subjects were included as part of enrolling participants in the study, additional protections were put in place to protect participant privacy during the project. In particular, the project required the acquisition of email addresses from participants to send all project materials remotely. To protect participant identity the blind carbon copy (bcc) feature was used. Additionally, the project used a secure, password protected email

account to which only the principal investigator has access. The account was used through the duration of the project to help ensure that all participant information remained confidential. All data for the project was aggregated such that publication of the results would make it impossible to link a specific piece of datum to an individual participant.

Although a limited amount of personal identifying information was associated with participants in the project, the use of email addresses made it possible to identify individual participants. To protect the anonymity of the participants, subjects agreeing to participate in the project were assigned a random three digit code that will be linked to their email address. The three digit codes and corresponding email addresses were stored in a password protected Excel file on a password protected laptop to which only the principal investigator had access. The three digit codes were used to identify participant demographic data and knowledge scores such that pre- and post-intervention data could be paired for inferential analysis. These steps helped to maintain the confidentiality and anonymity of participants.

### **Data Management**

Data management for this project included several steps that involve securing the data during and following the project including how the data will be destroyed. During project implementation, all project materials including informed consent forms, demographic forms, and pre- and post-intervention knowledge assessments were collected and recorded electronically. To secure this data, password protected files for the data were used and these files were stored on a password protected laptop. In both cases, only the principal investigator had access to these materials. The laptop was stored at the practice site. Any hardcopy data that was collected or had to be printed from the project was stored in a locked filing cabinet at the practice site and was only accessible by the principal investigator. All electronic and hardcopy data for this project

will be stored on the password protected laptop or a locked filing cabinet following the completion of this project. The data will be retained for five years and will be destroyed. Any hardcopy data generated from the project will be shredded. Electronic data will be professionally removed from the hard drive.

## Section Four: Results

The focus of this DNP quality improvement project was to increase provider knowledge of PrEP prescribing in older adults. This project was deemed necessary due to provider knowledge deficits in the areas of PrEP prescribing and sexual health history taking in older adults. This section reviews the results from this project including the demographic composition of the sample and the knowledge test results. Although the sample was relatively small ( $n = 8$ ), evaluating changes in knowledge before and following the educational intervention is necessary to determine if this evidence-based change did have some impact on provider knowledge of the topic.

### Demographic Data

The demographic data collected for this quality improvement project is reviewed in this section. All data reviewed here was collected via a standard demographic survey which can be found in Appendix D. Data from the returned demographic surveys was entered into an SPSS spreadsheet for analysis. Descriptive statistics including mean, standard deviation, frequency, and range were tabulated based on the data type. As noted a total of 8 providers completed the educational intervention. Initially 9 providers agreed to participate. However, one provider asked to be removed from the project due to the inability to complete the educational module in the specified timeframe. The demographic data for the sample is reviewed in Table 1 below.

Information from Table 1 indicates that of the 8 providers who completed the project, the mean age was 39.8 years with a standard deviation of 8.21 years and a range between 29 and 61 years. A majority of the sample were women ( $n = 6$ , 75%) and racial composition of the sample was as follows: White ( $n = 4$ , 50%), African American ( $n = 1$ , 12.5%), and Latino ( $n = 3$ , 37.5%). In terms of current position within the organization, 4 of the participants (50%) were

advanced practice nurses, 2 of the participants (25%) were physician assistants, and 2 of the participants (25%) were physicians. Providers reported working an average of 5.6 years in primary care ( $SD = 4.89$ ) with a range between 2 and 28 years. None of the providers participating in the project had previous experience or training in prescribing PrEP and only 1 provider reported prescribing PrEP to a patient.

**Table 1**

*Demographic Data for Sample (n = 8)*

Characteristic	Result
Age ( <i>M, SD</i> )	39.8, 8.21
Gender	
Male	2 (25%)
Female	6 (75%)
Race	
White	4 (50%)
African American	1 (12.5%)
Latino/Hispanic	3 (37.5%)
Current Position	
Advanced Practice Nurse	4 (50%)
Physician Assistant	2 (25%)
Physician (MD, OD, etc.)	2 (25%)
Years Working in Primary Care ( <i>M, SD</i> )	5.6, 4.89
PrEP Training or Education	0 (0%)
Ever Prescribed PrEP	1 (12.5%)

### **Pre-/Post-Intervention Data**

Descriptive methods were also initially employed to evaluate knowledge scores from the pre- and post-intervention tests. The pre- and post-intervention assessments (Appendix E) included 20 questions that were each awarded 5 points for a correct answer and 0 points for an incorrect answer. Scores on the test could hypothetically range from 0 to 100. Descriptive data

captured from the analysis of the pre- and post-intervention knowledge assessments can be found in Table 2. Specifically, the data indicate that participant scores increased from an average of 55 ( $SD = 1.12$ ) on the pre-test to 95 ( $SD = 0.86$ ) on the post test. The standard deviation is of note for these scores as it was noted to be quite small, suggesting that test scores were closely clustered around the mean. This would be indicative of similarities in scores among the sample. To further illustrate the differences in scores for participants from the pre- to post-intervention phases of the project. Figure 1 includes a bar graph comparing pre- and post-intervention test scores for participants. Collectively, the results from Table 2 and Figure 1 do indicate that there was an overall increase in knowledge scores following the educational intervention.

**Table 2**

*Pre- and Post-Knowledge Scores (n = 8)*

	Mean	Standard Deviation	Range
Pre-Intervention Knowledge Score	55	1.12	45-60
Post-Intervention Knowledge Score	95	0.86	90-100

**Figure 1**

*Comparison of Pre- and Post-Test Knowledge Scores for Individual Participants (n = 8)*



Evaluation of the pre- and post-intervention knowledge scores also included an inferential analysis of the data. Due to the small sample size, the assumption was made that the data was not normally distributed. Consequently, the decision was made to use a Mann-Whitney U-test to evaluate the median scores to determine if there was a statistically significant difference in the results. A p-value of 0.05 was identified for determining statistical significance. The results of the Mann-Whitney U-test did indicate that the change in knowledge scores for providers from the pre- to post-intervention phase of the project was statistically significant:  $z = -1.34$ ,  $p < .001$ ,  $n = 8$ .



## **Section Five: Discussion**

This DNP quality improvement project sought to increase provider knowledge of PrEP prescribing in older adults who identify as members of the LGBTQ community. The results, reported in the previous section, provide a wealth of insight into the outcomes of the project. However, a more concise review of the results is needed. Based on this need, this section discusses the results in terms of their relationship to the literature, the future of the project, dissemination, and implications for advanced nursing practice.

### **Discussion of the Results**

To begin this discussion, it is first helpful to consider the results in terms of the current literature. Looking first at the demographic results, it is helpful to note that when project participants were asked about PrEP training and PrEP prescribing, the results indicated that only one of the eight providers had prescribed PrEP and none had received any type of training or education for PrEP use in providing patient care (Table 1). These findings are not surprising in the context of the current literature which clearly demonstrates that most primary care providers do not receive any training or support for prescribing PrEP in clinical practice (Edelman et al., 2010). In fact, provider knowledge has been widely acknowledged in the literature as a factor contributing to the hesitancy of healthcare providers to prescribe this medication for their patients (Petroll et al., 2017; Pleuhs et al., 2020). Consequently, the data collected for this project did demonstrate that in terms of provider background, there were clearly overlaps with what has been reported in the literature regarding provider use of PrEP.

Also important to note when reviewing the literature in the context of the results obtained from this project is the fact that the evidence does indicate that provider education can be effective for increasing knowledge of PrEP (Falconi-McCahill et al., 2022). Although the current

project was not long enough in duration to measure the impact of education on the direct practice of providers—i.e., to determine if education leads to an increase in PrEP prescribing—the current literature does indicate that this outcome is associated with increased provider knowledge of the topic (Lumsden et al., 2021). Hence, it is assumed that longitudinally, the project will result in an increase in PrEP prescribing among providers who completed the educational module. This change in practice is what will enhance outcomes for patients as providers will be aware of the need to address sexual health issues in older adults who identify as members of the LGBTQ community.

Also important to note when discussing the results of this project in the context of the current literature is that when reviewing educational programs used to increase provider knowledge and/or prescribing of PrEP is the fact that different educational techniques and programs were used (Falconi-McCahill et al., 2022; Lumsden et al., 2021; Sales et al., 2019). This is an issue of concern as it has implications for developing the educational program moving forward. The educational module as implemented in this project involved the use of a video that took approximately 30 minutes for providers to watch. Educational programs reviewed for this project indicated that some interventions required providers to attend workshops over several hours or days (Falconi-McCahill et al., 2022; Lumsden et al., 2021; Sales et al., 2019). Additionally, providers were given more time for measuring follow-up outcomes as PrEP prescribing was commonly used as the measure to evaluate the effectiveness of the educational programs (Lumsden et al., 2021). Pragmatically, being able to provide an optimal educational experience for providers in the shortest amount of time would be ideal to help minimize resource use while ensuring the practice change is achieved.

Synthesis of the results with the current evidence base for the project does suggest that the results are commensurate with what was expected for an evidence-based quality improvement project. Although long-term results including the impact of provider education on practice and patient outcomes has not been determined from this project, the congruity of the results with the literature does suggest that provider practice should improve as a result of education. Improvements in practice should result in increasing patient access to sexual health care and increasing opportunities for patients to have an informed conversation with their providers about reducing their risk of contracting HIV through PrEP. The results further demonstrate the salience of evidence-based practice and the importance of applying best practices to improve healthcare and the patient experience.

### **Implementation Discussion**

Also important to address in the context of this discussion are the issues and challenges associated with implementation of the project. The first challenge with implementation involved recruiting subjects. When reviewing the methodology in Section 3, it was noted that the clinical site had a small population of providers available for participation in the project ( $N = 15$ ). Although providers were receptive to the project and did believe that that the educational module would be helpful for increasing their knowledge of the topic, some of the providers were not willing or able to participate in the project. This limited the recruited sample size, which has systemic implications for both the methodology and the results. With such a small sample it was not possible to analyze the data utilizing more robust parametric statistics. Additionally, the small sample will impact the ability to generalize the results of the study to other practice sites or provider groups. The recruitment of subjects for participation in research is noted in the literature

to be one of the more challenging aspects of the research process (Mattila et al., 2021). This challenge was realized in this project.

Also impacting the implementation of the project was the attrition or loss of one provider after enrollment and collection of pre-intervention demographic and knowledge data. As per the informed consent form and the IRB application, participants were informed that they could disenroll in the project at any time for any reason. Although the project began with nine providers, one provider was unable to complete the educational program in the allotted two week timeframe. Follow-up contact with the provider was made via email to assess willingness to continue with the project. At this time, the provider asked to be disenrolled in the project due to time constraints and the participant's data was removed from the project. Study attrition is also noted in the literature to be a challenging aspect of conducting research (Nunan et al., 2018). Recommendations for reducing study attrition include providing flexibility in data collection options and limiting the time required for participants to engage in the project (Nunan et al., 2018). Although these criteria appear to have been met in the project, attrition still occurred.

### **Influencing Factors**

Influencing factors must also be considered when discussing the project. Although it is not possible to state with certainty how influencing factors would have changed the trajectory of the project, there are two specific issues that may have changed the course of the project. The first factor involves the challenge of acquiring IRB approval. The time between applying for IRB approval and acquiring IRB approval, shifted the timeframe of the project. Although project implementation took place over a six week period, the time between final data analysis and completion of the project was shortened making it difficult to gain any insight into the project from participants. In short, there was limited time to understand the project from the viewpoint

of providers. While knowledge scores did increase, suggesting that there was some benefit to the project, it would have been helpful to acquire feedback from providers to access their views on the process and how they viewed the project in terms of its sustainability.

The second influencing factor for the project was the sample size. The sample size was limited due to the total number of providers (population) at the practice site that could participate in the project. Because the sample size was small, it was not possible to conduct a more robust statistical analysis on the results and this too will limit the generalizability of the findings. The Mann-Whitney U-test is a non-parametric test that provides an assessment of median rather than mean and does not have the statistical power of the pair t-test, i.e., the parametric equivalent of the Mann-Whitney U-test (Mishra et al., 2019). If a larger population for acquiring the sample had been available, it may have been possible to acquire a larger sample for the study and, along with a larger sample, normally distributed data for analysis. This would have strengthened the statistical results acquired from this project.

### **Monitoring**

Project monitoring was performed throughout the process of implementation and included two specific supports for facilitating project success: a structured project schedule and regular meetings with the project mentor at the practice site. The first support, a structured project schedule, made it possible to move all participants through the project at the same pace, to track data collection, and to ensure that any issues that occurred—i.e., a participant not receiving an email—were addressed in a timely manner. The project schedule was communicated with participants at the beginning of the project and all email communication was structured to ensure that participants received the same information on the same day. Developing the project schedule was essential for completing the IRB application and when applied during

project implementation, the project schedule ensured that the principal investigator was continually engaged when conducting the project.

In addition to developing and following the project schedule, monitoring of the project was also facilitated through consistent and regular communication with the clinical site preceptor. Throughout the project, the principal investigator had regular meetings with the site preceptor approximately every two to three weeks. Beginning with recruitment of subjects through the final post-intervention data collection process, formal in-person weekly meetings with the site preceptor were held to track project progress. During these meetings, I was required to inform the site preceptor about what actions had been taken in the previous week and to account for all project participants in terms of my data collection. Additionally, mid-week phone conversations with the site preceptor were held as needed to discuss any issues that were noted during implementation: i.e., the loss of one of the project participants. This consistent and structured approach to communication made it possible to quickly share project information and to ensure that the project remained on schedule to be completed in the time allotted. The implementation component of the project promoted collaboration to ensure success.

### **Project Maintenance**

Project maintenance must also be considered when discussing the results of this project. As noted when reviewing the influencing factors, IRB approval for the project did require more time than initially anticipated. As a result, it was not possible to speak with providers regarding their experiences with the educational program. Although provider knowledge scores did increase, it would be necessary to evaluate provider experiences to determine if additional changes or improvements should be made to optimize provider learning through the project. This

information would help to ensure that if the project is expanded, it would be useful for all providers completing the educational module.

While enhancing the program is clearly important, maintenance should also include some effort to ensure that provider knowledge and learning are uniform across the entire practice. This may mean requiring all providers to participate in the educational program. To make this change in practice, leaders at the facility may need to authorize a policy to make the training program mandatory. This policy would need to cover current medical personnel and all new hires at the practice site. The development of a formal policy should also bring with it a structure for regular program evaluation. This may include reviewing provider outcomes such as PrEP prescribing and dedicating resources such as staff to collect this data and to report it to staff and leaders on an ongoing basis. Including the metric of PrEP prescribing as part of all quality improvement data may be helpful for ensuring that the importance of education is sustained as a priority for the facility over the long-term.

What will also be important to consider when maintaining the project will be provider and patient satisfaction with care. If providers or patients note issues with sexual health care or PrEP prescribing for providers, it may be necessary to review program contents and to determine if additional changes in practice are warranted. Associated with this issue would be changes in best practices over time to provide PrEP education to providers. As demonstrated in the current literature, increasing PrEP prescribing is an important priority in primary care at the present time (Edelman et al., 2020). Consequently, it is believed that over the next several years, the amount of evidence supporting PrEP education for providers will proliferate. As this occurs, best practices for provider education will be more formally established in the literature. This will necessitate ongoing evaluation of the educational module to ensure that its contents remain

relevant over time. When needed, the educational module will need to be updated to keep pace with best practices for provider education as reported in the literature.

### **Project Limitations**

Although the results of this project clearly support the use of provider education to help increase knowledge of PrEP and PrEP prescribing in older adults, there are numerous limitations to this work that need to be addressed. Most of the limitations stem from the methodological structure of the project. For example, this quality improvement project utilized a one-group pre-/post-intervention design. This methodological approach does not provide a direct comparison or control group and does not allow for the assessment of a cause-effect relationship between the independent variable (the educational program) and the outcome (increased knowledge) (Miller et al., 2020). As a result, it is not possible to state with certainty that the educational program was solely responsible for the change in knowledge. While it is possible to argue that there is a correlation between the intervention and the outcomes, it is not possible from the methodology used to state that causality has been shown.

Methodological limitations further stem from the use of a small sample. As noted the total population of providers at the practice site was limited, impacting the number of providers available to participate in the project. The small sample has implications for the generalizability of the results. The statistical significance of the results is hampered by the use of non-parametric testing, which further limits the generalizability of the results. Because of this limitation, it is not possible to state with certainty that the educational program, when applied to other providers at the same site or other primary care providers working at different sites, would result in improvements in provider knowledge. This limits the conclusions that can be drawn and while



the results are valid in the context of this project, the results may not be valid outside of this project or practice site.

The final limitations that have implications for this project involve the short duration of the project and lack of long-term follow-up. As noted, the project's duration required evaluation of provider knowledge immediately following the educational intervention. No additional assessment of provider knowledge was made due to a lack of time, making it difficult to determine if the educational content was retained by providers. The lack of long-term follow-up also limited the type and amount of data that could be collected. In particular, it was not possible to assess changes in provider practice—i.e., increased PrEP prescribing—following the intervention. This long-term follow-up is of notable importance as increased provider knowledge should enhance patient care. Measuring this outcome is therefore quite germane to maintaining the project and improving it moving forward.

### **Areas for Future Research**

The limitations of the project noted above do provide an opportunity for identifying areas for future research. For instance, when reviewing the limitations of the project, it was noted that the lack of a control or comparison group made it difficult to demonstrate a causal relationship between the intervention and the outcomes. Designing a new investigation of the program utilizing a randomized controlled trial would facilitate a more methodologically rigorous approach to investigation that would allow for the identification of causality (Deaton & Cartwright, 2018). Further, the randomization of the sample would ensure that the sample was representative, addressing the specific issue of generalizability in the findings (Deaton & Cartwright, 2018). Arguably, a randomized controlled trial would require more time and

resources to complete. However, the findings from a study with this type of methodological framework would produce a higher level of evidence to support practice change.

Additional areas for future research would include expanding the sample size and the sites at which the intervention is trialed. As noted, the sample size for this project was quite small, limiting the robustness of the statistical analysis and the conclusions that can be drawn from the data analysis. Increasing the number of providers enrolled in the project would provide a stronger foundation for statistical analysis of the data. While including all 15 medical providers at the practice site would be a step in the right direction for future work on the topic, the limited number of providers at the practice site would necessitate the need to expand the project to similar primary care facilities operating in the area. Initially, the project could be trialed at primary care sites. However, to evaluate the efficacy of the project beyond primary care, other practice sites where providers regularly interact with high-risk patient groups could be included to assess differences in learning across practice sites.

### **Recommendations Based on the Findings**

Recommendations based on the findings need to be tempered with the limitations of the project and the potential for future projects to expand the reach of the project. What is revealed from an analysis of the data is that the knowledge level of providers regarding the topic did improve. Consequently, it is fair to argue that at the practice site, the educational program should be expanded to include all providers. Making this program mandatory for all providers and further requiring new hires at the facility to complete the training as part of onboarding will enable the principle investigator, site preceptor, and organizational leaders to more comprehensively evaluate program outcomes and to determine the best possible methods for maintaining results over the long-term.

Although it would be ideal to argue that that the educational module should be provided to all primary care practitioners outside of the practice site, the reality is that the findings from this single quality improvement project are not robust enough to support practice change. However, if the results are and can be combined with the existing evidence base on the topic, a strong case for making practice change at other primary care facilities to provide PrEP education for clinicians could be supported. To strengthen the statistical significance of the project, the principle investigator should work to expand trails including a randomized control study that will allow for a higher level of evidence to support system-wide change in primary care. In short, the results from this project should be used as a platform for further investigation as well as for strengthening the current evidence base for providers to acquire education and training for increase patient uptake and use of PrEP.

### **Interpretation of the Results**

While a discussion of the results in the context of the literature and implementation of the work provides a solid foundation for pragmatically sustaining and expanding the project, it is also helpful to consider how the interpretation of the results will influence outcomes in healthcare. More precisely, it is helpful to consider how the results of the project will shape patient care and healthcare settings where it is implemented. With these issues in mind, this section considers changes in patient care and the healthcare setting as a result of the project, the transferability of the results, cost effectiveness of the project, and recommendations based on the interpretation of the results.

### **Changes in Patient Care/Healthcare Setting**

Although the primary project goal for this quality improvement project was to increase provider knowledge of PrEP and PrEP prescribing in the older adult, education was used as a

potential catalyst to promote practice change among providers. More specifically, improvements in provider knowledge should result in changes to practice that enhance patient care. This would include the ability of providers to recommend PrEP and to educate older adults about their risks of contracting HIV. What was clearly seen in this project and articulated in the literature is that providers have a clear knowledge gap when it comes to PrEP and PrEP prescribing. Addressing this knowledge gap does improve provider knowledge and as reported in the literature, does increase provider awareness of PrEP while also increasing PrEP prescribing (Endelman et al., 2020; Sales et al., 2019).

The alignment of the results between the project and the literature, clearly indicates that there is a need to provide clinicians with information and training on the topic. While the specific structure of provider education has not been fully delineated in the literature, the results of this project seem to suggest that even a basic introduction to the topic of PrEP and PrEP prescribing would be helpful for providers to change practice. Based on these findings, it would seem that the action that efforts should be made by practitioners working in clinical care to review the literature on the topic and to identify what type of educational program would be best suited to meet the needs of providers and patients when it comes to PrEP knowledge. While the specific methods used to provide education may vary from practice site, there is ample evidence to support the conclusion that the education of providers will be effective and, if anticipated changes in provider practice occur, this would serve to increase PrEP uptake among patients with the potential to reduce the spread of HIV within the community.

To realize positive gains from the project, change agents in primary care including advanced practice nurses would need to review the evidence and translate it into practice site through provider education. Once education was provided, some effort to measure outcomes—

such as a knowledge test—will be needed to determine if provider knowledge did increase. Assessment of long-term outcomes both at the practice site and any site where the change is implemented will also be needed. This will include an evaluation of provider and patient satisfaction with the program as well as metrics to assess change in provider behavior such as increased PrEP prescribing. Evaluation and reporting of these findings will strengthen the evidence base and may lead to recommendations in the standards of care including state or national policies to include provider PrEP education as part of continuing education or recertification requirements for clinicians.

### **Transferability of the Results**

When reviewing the transferability of the results of this project, it is possible to argue that the results of this specific project cannot be easily transferred to other clinical settings. As noted, the sample size was small ( $n = 8$ ), limiting the generalizability of the findings to other practice sites. It is possible, but not likely, that the results of the project were only realized due to the uniqueness of the primary care setting where the intervention was implemented. As a result, it is not possible to unequivocally state that if the project were implemented in another primary care site, even one with similar features as the clinical site used for this project, that the results would show an improvement in provider knowledge. Expanding the project to include all providers and utilizing a more rigorous methodological approach such as a randomized controlled trial would expand the transferability of the results from this project.

Even though the transferability of the results from this specific quality improvement project are limited when the results are combined with the existing literature on the topic this produces a strong evidence base upon which to make practice change. The current quality improvement project positively contributes to the evidence support the use of provider education

to increase clinician knowledge, to increase PrEP prescribing, and to increase patient uptake of PrEP to prevent the spread of HIV. What this indicates is that the results of this project are transferable when synthesized with other findings from the literature. Recognizing the strength of the evidence base does provide a helpful foundation for making recommendations for transferability.

Also important to consider when addressing transferability is the fact that most of the research conducted on provider education regarding PrEP has been completed in the primary care setting. While this does not limit the ability of researchers and change agents to apply the findings from the literature and this project to other types of practice sites, this does limit transferability of the results. In particular, the results and literature are conclusive for improvements in provider knowledge occurring mostly among primary care providers and their practices (Lumsden et al., 2021; Sales et al., 2019). Additional research would be needed to confirm the effectiveness of the intervention in other practice settings. However, it would seem that for providers who lack knowledge on the topic regardless of the setting, education would be helpful for addressing this deficit. Recognizing this limitation is important as it may help identify differences in practice settings that may improve or reduce the efficacy of education on this topic.

### **Cost Effectiveness**

When reviewing the project scope and implementation, cost issues were not extensively considered for the project. The budget developed for the project indicated that most of the project resources would be an in-kind donation made by the principal investigator. What this indicates is that the project does not require extensive costs for implementation at a practice site. While the decision to implement a randomized controlled trial at multiple sites for comparison would

require the dedication of financial resources to coordinate staff and data collection, here again, the costs should be minimal as education would represent a one-time cost as opposed to an ongoing cost for the organization. Further, project monitoring could be integrated as part of quality monitoring in the organization—i.e., measuring PrEP prescriptions provided each quarter—further reducing the overall costs to implement and sustain this project over the long-term.

Despite the challenges of estimating the total project costs and cost effectiveness, it would seem that consistent use of provider PrEP education provided across all primary care practice sites would result in marked cost savings for the healthcare system and society in general through the prevention of HIV. As noted at the outset of this project, older adults represent the second largest group of HIV infections each year, accounting for 10% of all new cases (CDC, 2021). Further, although treatment for HIV is highly effective, treatment averages \$48,000 per year (Tran et al., 2021) for a total of an average of \$500,000 across the lifespan of the patient (McCann et al., 2020). These costs will only continue to increase over time. Consequently, reducing the spread of HIV will significantly reduce treatment costs. Given that provider education would not carry such significant costs, it would seem that the project is cost effective and could potentially reduce the amount of financial resources needed to treat patients with HIV infections.

### **Recommendations Based on Interpretation of Results**

Based on an interpretation of the results, the primary recommendation that is made is to combine the data from this project with current literature on the topic to provide clinician education in primary care. While the results of this study do suggest that the educational program was effective at the practice site, the results from this project alone would not be enough to

support a practice change. Consequently, to transfer the results to other practice sites, evidence from the current literature would need to be combined. In addition, a review of the insight provided in this section does indicate that efforts should also be made to expand the project such that the strength of the evidence can be enhanced. While the transfer of the results to other primary care settings should be successful, especially when combined with other evidence on the topic, transferring the results to sites other than primary care practice may prove challenging based on the limited evidence on PrEP provider education outside of primary care.

### **Plans for Dissemination**

The dissemination of results from research and evidence-based practice is noted to be an important component of improving healthcare and patient outcomes (Patterson et al., 2017). Dissemination of the results from this project requires a consideration of how the data will be shared internally and externally. Internal dissemination of the results from this project will include an abstract that will be emailed to all staff working at the facility. This abstract will detail the project and highlight the gains made by participants. Leaders at the practice site including the clinical site preceptor will receive a copy of the full report of the work, similar to what would be submitted to a journal for publication. Having a hard copy of the results will provide leaders with access to concrete data to support the project in the future. Additionally, arrangements would be made to provide a podium presentation to staff. The presentation will be scheduled at the site and will enable staff at the facility to attend and ask questions about the project. Engaging staff in the project will be important for building long-term support for change.

Plans for internal dissemination of the project are important; however, plans for external dissemination of their work will help to expand the reach of the project beyond the practice site. Publication of the work in a peer-reviewed scholarly journal would be sought. In particular, an



effort would be made to publish the results in the *Journal of the Association of Nurses in AIDS Care*. Information regarding the journal provided by Wolters Kluwer (2023) does indicate that the journal does accept manuscripts on research and quality improvement projects conducted by nurses. The journal is circulated internationally and would provide a good opportunity to have the work from this project reviewed and integrated by other practitioners to improve provider knowledge and patient care.

External dissemination of the results would also occur through a poster presentation of the work at a conference. In particular, the International Conference on HIV/AIDS Prevention and Treatment sponsored by the World Academy of Science, Engineering and Technology (2023) would be considered. This conference will be held in Houston, Texas between October 25-26, 2023. What is unique about this conference is that it brings together medical professionals from across myriad disciplines to discuss what is being done to prevent the spread of HIV and to treat AIDS and its associated health conditions. By participating in this conference, it should not only be possible to share the results of this project to foster practice change at other clinical sites, but also the experience should provide the principal investigator with access to new information and resources that could be used to further augment provider education for PrEP prescribing.

### **Implications for Advanced Nursing Practice**

Although this proposal is awaiting approval, it is helpful to consider the implications of undertaking this quality improvement project in the context of advanced nursing practice. In particular, it is helpful to consider the implications of this project for advanced practice nursing in the areas of education, practice, administration, and leadership. A consideration of the implications for advanced practice nursing in these areas should highlight the importance of this project for both the practice site and for advancing nursing and the healthcare system.

## **Nursing Education**

Looking first at the implications of the project for advanced practice nursing education, it is helpful to consider that the project involves the education of providers, suggesting that evidence-based education should provide a useful foundation upon which to improve care quality and, ultimately, patient health outcomes. Advanced practice nurses can serve in the role of educator and should be proactive in their efforts to use knowledge to help both providers and patients improve care practices (Davidson & Raham, 2019). While the project is focused on educating providers, the project also demonstrates the importance of educating staff about evidence-based practice change and its implementation in practice. The quality improvement project requires the translation of evidence into practice and the education of all organizational stakeholders to contribute to and to support the project. Educating leaders, managers, and staff about the project will be imperative to its successful implementation at the practice site.

## **Clinical Practice**

In terms of nursing practice, the project has important implications for the advanced practice nurse in terms of designing and implementing evidence-based practice. The project follows a strongly supported evidence base and requires translational science for successful implementation. Based on the evidence, the intervention should produce the desired results, reinforcing the importance of making evidence-based practice change. Therefore, the success of this project should warrant its adoption in practice and should foster a change in operations such that additional evidence-based practice projects are implemented at the clinical site. Expanding evidence-based practice and working to make it a foundation for all aspects of patient care is an important and integral component of the advanced nursing role (Harbman et al., 2017).

## **Nursing Administration**

The implications of the project for advanced nursing practice administration are also important to consider. The implementation of the project and its success should indicate to leaders in the facility that quality improvement and evidence-based practice are needed to help advanced and improve healthcare. Recognition of the value and importance of evidence-based practice and quality improvement at the site should prompt a change in culture to support more practice change initiatives. Leadership support for advanced practice nursing is noted in the literature to be critical for making these changes in practice (Ost et al., 2020). Administrators provide various financial and psychological supports to guide practice change (Ost et al., 2020). Once administrators recognize the value of practice change to improving all aspects of care including patient outcomes and costs, there will be a greater impetus to continue this process in pursuit of the best possible outcomes for patients predicted upon an evidence-based foundation.

## **Leadership**

The final area to consider the implications of project is with regard to leadership in advanced nursing practice. This DNP project represents the culmination of learning in clinical nursing practice. As such this project promoted the leadership of the DNP scholar to design, develop, implement, and evaluate this project. Leadership is noted in the literature to be an integral part of advanced nursing practice (Lamb et al., 2018). Professionals working in this role have an obligation to identify problems and solve them such that patient care and healthcare outcomes can improve (Lamb et al., 2018). In addition to utilizing leadership as a foundation for making this project a reality, leadership in the advanced practice nursing role should also include expanding the project, initiating new projects and working to disseminate and share the findings

of this project. As a leader, the advanced practice nurse can spearhead practice change while educating and engaging others to participate in the process.

### **Conclusion**

Although cases of HIV in the U.S. are declining in the general population, there are certain population groups that are at higher risk for contracting this disease. In particular, older adults, including those who identify with the LGBTQ community are at higher risk for contracting HIV and, current data indicates that older adults comprise 10% of all new HIV cases each year. The burden of HIV in older adults is compounded by two factors: provider beliefs that sex is not important to older adults limiting sexual health screening and a lack of knowledge regarding HIV prevention methods including PrEP medications. PrEP has been shown to reduce the transmission of HIV in high risk groups including MSM and injection drug users. Despite this, primary care provider prescribing and patient uptake of PrEP have been lackluster.

In an effort to bridge this gap in provider knowledge and further increase knowledge of the topic, this quality improvement project was implemented. The project employed a single group pre-/post-intervention design and sought to determine if provider education on PrEP, PrEP prescribing, and sexual health in older adults would significantly increase knowledge of these topics. Although the penultimate goal of the project should have included evaluating increases in PrEP prescribing among providers, the short duration of the project limited the ability of the principal investigator to evaluate this outcome. However, sufficient data was collected to demonstrate that provider education was effective in producing a statistically significant increase in knowledge scores following the intervention. Although the sample size was small ( $n = 8$ ), the results confirm that education did increase provider knowledge, leading to the assumption that this will change provider practice and increase patient access to PrEP.

Although the project did demonstrate the efficacy of provider education, the project also included some pertinent limitations do have implications for the conclusions that can be drawn. The project, as designed, did not produce statistically robust results that would enable the principal investigator to apply the findings to other practice sites. However, the results, when combined with the current evidence base on the topic do definitively support change. This suggest that other primary care practice sites should review the literature and consider a practice change based on the current evidence. The results from this project also provide a broad foundation for additional research on the topic which would, in turn, strengthen the evidence base for provider education for PrEP. Thus, even though the results are limited in terms of their application, when combined with the current evidence, the results support the need for practice change in the primary care setting.

The results of this project have merit for both improving outcomes at the practice site and for changing primary care practice to ensure that providers have the knowledge to educate their patients about PrEP. Even though the project is limited in terms of its application beyond the practice site, the project offers multiple opportunities for further exploring education for providers and for supporting evidence-based practice in general. What is evident is that this evidence-based quality improvement project worked, suggesting that similar projects should be trialed in the future. By identifying problems in clinical practice and further identifying evidence based solutions patient health, healthcare practice, and population health can be simultaneously improved.

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## Appendix A: Literature Matrix

First Author/Year	Purpose/ Problem/ Objective/ Aims	Study Design	Sample (Setting)	Data Collection Measures	Results	Strengths/ Limitations	Relationship to Project	Level of Evidence/ Quality Ranking
Edelman et al. (2020)	To assess the PrEP prescribing and implementation practices currently used by primary care physicians (PCPs) working in the U.S.	This was an online cross-sectional study.	This was an online survey that was conducted with 240 primary care providers working in different facilities across the U.S.	Data collection was undertaken using an online survey created by the authors.	At the time of the survey only 24% of providers had prescribed PrEP. Of those surveyed 85% believed that in order to safely prescribe this treatment all providers at the facility need to have education to steward the medication effectively.	<b>Strengths:</b> Results demonstrate the scope of the problem, nationally representative sample used. <b>Limitations:</b> Study provides a snapshot of what is occurring, results may not be valid beyond the current time period, generalizable to other provider groups.	The results of this study not only demonstrate that a lack of PCP knowledge is a barrier to PrEP prescribing. Further, the research indicates that providers view PrEP education as an important component of improving and expanding practice in this area.	Level III Quality A
Falconi-McCahill et al. (2022)	The purpose of this project was to assess the use of an educational program on increasing PrEP prescribing among medical providers working at a federally qualified health center.	This was a quality improvement (before-after) project.	A total of 24 medical providers currently working at a federal qualified health center were enrolled in the project and received education.	Data was collected regarding PrEP prescribing before the intervention and six months following the intervention.	Following the educational program provider likelihood to prescribe increased for family medicine providers ( $p = .0001$ , $p = .0001$ ) and for obstetrics and gynecology providers working at the health center ( $p = .0034$ , $p = .0034$ ).	<b>Strengths:</b> Demonstrates practical clinical results, intervention statistically significant. <b>Limitations:</b> Small sample, results not generalizable, methodologically weak.	Results demonstrate that education can work to increase provider awareness and ability to prescribe PrEP which is the focus of this project.	Level II Quality B
Lumsden et al. (2021)	The purpose of this project was to increase the number of patients seen in practice who were prescribed PrEP.	This was a one-group pre-/post-intervention design.	All medical providers working in a single multidisciplinary care practice including internal medicine and family medicine providers. Education was included to increase provider knowledge to prescribe PrEP.	Data from the electronic health record was acquired before and following the educational intervention. Data regarding PrEP prescriptions per year between 2012 and 2017 were evaluated. Number of prescriptions	Before the intervention, only 78 patients per year received a prescription for PrEP and only 38% of PCPs prescribed PrEP. In the year following education, 190 prescriptions for PrEP were provided and 85% of these	<b>Strengths:</b> Robust results, clinically relevant results, practical application of data. <b>Limitations:</b> Results may not be generalizable, results not inferentially validated, no control group.	Results support the use of the proposed intervention for this quality improvement project.	Level II Quality A

Petroll et al. (2017)	The purpose of this study was to assess healthcare provider awareness, knowledge, and experience with prescribing PrEP, and barriers to PrEP-related activities.	This research used a cross-sectional study.	The sample included 525 primary care providers and HIV providers working in various facilities across the United States.	following education was collected at six months.	Among primary care providers, only 76% had heard of PrEP and only 28% had prescribed it. Primary care physicians reported a lack of knowledge as the primary barrier limiting PrEP use.	prescriptions were written by PCPs.	<b>Strengths:</b> Results demonstrate the scope of the problem, nationally representative sample used. <b>Limitations:</b> Study provides a snapshot of what is occurring, results may not be valid beyond the current time period, results may not be generalizable to other providers groups.	Results support the problem and demonstrate that the proposed solution (education for providers) would be useful for addressing the problem in practice.	Level II Quality A
Pleuhs et al. (2020)	The purpose of this study was to identify healthcare provider barriers for PrEP prescribing in clinical practice.	Systematic review of the literature.	The sample included 28 studies that were retrieved from PubMed and published between 2011 and 2018.	Data was collected through the PRISMA flow process and through evaluation of articles by two independent reviewers.	The results indicate that among providers a large majority (< 80%) lacked the knowledge needed to prescribe PrEP or to have a conversation with patients about the topic. While lack of education and awareness were noted as issues of concern, provider comfort with discussing PrEP was also noted to be an issue of concern.	Results demonstrate that the problem of provider knowledge and the solution (provider education) are both evidence-based, supporting the proposed project.	<b>Strengths:</b> Methodologically strong study, demonstrates consensus across multiple articles. <b>Limitations:</b> No meta-analysis used, limited number of databases, results may not be generalizable.	Results demonstrate that the problem of provider knowledge (provider education) are both evidence-based, supporting the proposed project.	Level I Quality A
Sales et al. (2019)	To assess the impact of provider education on outcomes for PrEP prescribing and counseling among providers working at a family planning clinic in Atlanta, Georgia.	Quasi-experimental pre-/post-intervention study.	A total of 28 providers working in a single family planning facility and 500 patients enrolled to assess provider management of PrEP in practice.	Pre- and post-visit assessment of counseling practices and prescribing practices. This was done through an observational survey.	Providers reported higher levels of knowledge and patients reported a higher level of counseling provided by practitioners (66%) and more patients (76%) were willing to try PrEP than before the intervention (19%).	Results demonstrate the positive impact of education on provider knowledge and behavior, supporting the proposed quality improvement project.	<b>Strengths:</b> Quantifies outcomes, has systemic benefit for providers and patients. <b>Limitations:</b> Lack of generalizability, no causality, weak methodology.	Results demonstrate the positive impact of education on provider knowledge and behavior, supporting the proposed quality improvement project.	Level II Quality A

Turner et al. (2018)	The purpose of this study was to investigate provider attitudes and knowledge regarding PrEP prescribing.	Systematic review of the literature.	Sample included 11 articles drawn from PubMed, CINAHL, Web of Science, and Scopus between November 2016 and January 2017. Study samples ranged from 9 to 9,000 participants.	PRISMA and GRADE criteria were used for data collection.	The results indicated that among all healthcare providers, prescribing for PrEP was only 26%. This was attributed primarily to a lack of knowledge regarding PrEP and how to approach the topic with patients in clinical practice.	<b>Strengths:</b> Methodologically strong, demonstrates statistically relevant results. <b>Limitations:</b> Small number of databases used, small timeframe for searching, no meta-analysis.	Supports the problem for the project, highlighting the need for the proposed solution: provider education.	Level I Quality A
Zhang et al. (2019)	This purpose of this project was to understand trends in PrEP provision from the health care providers' perspective assessing key areas including awareness, willingness, consultation, and prescription.	Systematic review/meta-analysis.	The sample included 36 articles on the topic drawn from PubMed/MEDLINE, Web of Science, PsycINFO, EMBASE, and Google Scholar databases. Combined the studies included 18,265 healthcare providers.	PRISMA diagram for systematic reviews. Data independently evaluated by two authors and included based on criteria and consensus.	The pooled prevalence of PrEP awareness was 68% [95% confidence interval (CI) = 55–80%], willingness to prescribe PrEP was 66% (95% CI = 54–77%), PrEP consultation was 37% (95% CI = 25–51%), and prescription provision was 24% (95% CI = 17–32%). The primary barrier for PrEP consultation and prescribing was a lack of provider knowledge of the topic.	<b>Strengths:</b> Strong methodology, statistically significant results, large sample. <b>Limitations:</b> Limited number of databases, limits scope of findings.	Results support the problem of lack of provider education for PrEP prescribing. Indicates that the intervention (provider education) is needed.	Level I Quality A

## Appendix B: Site Approval Letter

From: Dr. Kimberly Ayala Vega, DNP, FNP-C

Address: 691 Douglas Avenue, Suite 103,

Altamonte Springs, FL 32714

Telephone: 407-335-4055

Subject: Letter of Acknowledgement of Approval for Research Project at Golden Rose Wellness and Medical Spa for doctoral student Enrique Mendoza-Rojas.

To Whom It May Concern:

This letter will acknowledge that I have reviewed a request by Doctoral Student Enrique Mendoza-Rojas to conduct a research project entitled, "Provider Education to Increase PrEP Use among Older Adults who Identify as Members of the LGBTQ Community: Proposal for a Quality Improvement Project" at Golden Rose Wellness and Medical Spa.

When the Researcher has received approval for his project from the Florida International University Institutional Review Board received approval from the Researcher Review Committee, and upon presentation of the approval research project. If we have any concerns or need additional information, the project researcher will be contacted.

Sincerely,



Dr. Kimberly Ayala Vega, DNP, FNP-C

Owner and Medical Director

Golden Rose Wellness and Medical Spa

## Appendix C: IRB Approval Letter

**MEMORANDUM**

**To:** Dr. Arturo Gonzalez  
**CC:** Enrique Mendoza Rojas  
**From:** Carrie Bassols, BA, IRB Coordinator  
**Date:** April 7, 2023  
**Proposal Title:** “Increasing Provider Knowledge of PrEP Prescribing for Older Adults Who Identify as Members of the LGBTQ Community: A Quality Improvement Project”

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The Florida International University Office of Research Integrity has reviewed your research study for the use of human subjects and deemed it Exempt via the **Exempt Review** process.

**IRB Protocol Exemption #:** IRB-23-0158      **IRB Exemption Date:** 04/07/23  
**TOPAZ Reference #:** 112901

As a requirement of IRB Exemption you are required to:

- 1) Submit an IRB Exempt Amendment Form for all proposed additions or changes in the procedures involving human subjects. All additions and changes must be reviewed and approved prior to implementation.
- 2) Promptly submit an IRB Exempt Event Report Form for every serious or unusual or unanticipated adverse event, problems with the rights or welfare of the human subjects, and/or deviations from the approved protocol.
- 1) Submit an IRB Exempt Project Completion Report Form when the study is finished or discontinued.

**Special Conditions:** N/A


For further information, you may visit the IRB website at <http://research.fiu.edu/irb>.

**Appendix D: IRB Modification Approval Letter**

**Office of Research Integrity  
Research Compliance, MARC 414**

**MEMORANDUM**

**To:** Dr. Eric Fenkl  
**CC:** Enrque Mendoza Rojas  
**From:** Maria Melendez-Vargas, MIBA, Coordinator  
**Date:** May 10, 2023  
**Proposal Title:** "Increasing Provider Knowledge of PrEP Prescribing for Older Adults Who Identify as Members of the LGBTQ Community: A Quality Improvement Project"  
**Approval #** IRB-23-0158-AM01  
**Reference #** 112901

A handwritten signature in black ink, appearing to be "WV", is located to the right of the "From:" line.

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The Florida International University Office of Research Integrity has approved the following modification(s):

- Dr. Eric Fenkl replaced Dr. Arturo Gonzalez as PI.

***Special Conditions:***

For further information, you may visit the FIU IRB website at <http://research.fiu.edu/irb>.

MMV/em

### **Appendix E: Recruitment Email**

Greetings Staff and Prospective Participants,

My name is Enrique Mendoza-Rojas and I am currently enrolled as a Doctor of Nursing Practice (DNP) student at Florida International University. As part of my education, I am required to complete a quality improvement project to improve some aspect of patient care in my practice setting. For my project, I chose to focus on provider education to increase knowledge of PrEP prescribing in older adults who identify as members of the LGBTQ community. More specifically, I have created an education module for staff to increase knowledge regarding evidence-based PrEP education for the target population. The goal of the project is to increase your knowledge of this topic such that you can integrate this knowledge into care and provide older adult patients with better guidance to prevent the spread of HIV.

It is my hope that you will be willing to participate in this project. In order to participate you will be asked to sign a letter of informed consent; to complete a demographic survey; to complete a pre- and post-intervention assessment of knowledge; and to view an online educational module regarding the topic. It is anticipated that the project will take four weeks to complete. However, all of these activities that you are required to participate in should only take 70-80 minutes to complete over this time period. This educational project has been approved by the Florida International University Institutional Review Board and the presentation should benefit you in terms of improving your knowledge of the topic and ability to provide effective patient care for the prevention of HIV among high-risk groups.

If you are interested in participating in this project, I would request that you respond to this email within one week to confirm your interest. An informed consent form for participating in the project has been attached to this email. If you are interested in participating, please read and return a signed copy of the informed consent form when replying to participate in the project. By participating in this project you will have the opportunity to improve patient care and expand your understanding of a very important topic. If you have any further questions about the project, I can be contacted by email at [enriquemendozarojas@yahoo.com](mailto:enriquemendozarojas@yahoo.com) or by phone at (573)-239-1317. I look forward to hearing from you and educating you about this important and timely topic.

Regards,

*Enrique Mendoza-Rojas*



### Appendix F: Demographic Questionnaire

**Instructions:** Please complete the following form by circling the correct answer or entering the correct answer on the line provided.

1. What is your age in years? \_\_\_\_ years

2. What is your gender? Please circle one.

Male

Female

Nonbinary

Prefer Not to Say

3. What is your race? Please circle one.

White/Non-Hispanic

African American

Hispanic/Latino

Asian/Pacific Islander

Other

Prefer Not to Say

4. How many years have you been working in primary care? \_\_\_\_ years

5. What is your current position? Please circle one.

Advanced practice nurse.

Physician Assistant.

Physician (MD, OD, etc.)

6. Do you have any training or experience in prescribing PrEP?

\_\_\_\_ Yes

\_\_\_\_ No

7. Have you prescribed PrEP in the past?

\_\_\_\_ Yes

\_\_\_\_ No

### Appendix G: Pre-/Post-Test Knowledge Assessment

**True and False:** Please review the statement and check the correct box indicating if the statement is true or false.

1. PrEP should be prescribed in patients that are HIV+.  
 True  False\*
2. Consistent PrEP use can reduce HIV infection from sex by 90%.  
 True  False\*
3. PrEP is often not prescribed because providers lack knowledge of the medication and how to prescribe it.  
 True\*  False
4. Older adults over the age of 55 are the third leading group in new HIV infections each year.  
 True  False\*
5. Two-thirds of all older adults remain sexually active into their 70s.  
 True\*  False
6. On-demand PrEP is a useful alternative for gay and bisexual males who do not want to take regular medications to prevent HIV.  
 True\*  False
7. Patients can only benefit from PrEP if they take it every day.  
 True  False\*
8. Providers often believe that older adults are no longer having sex.  
 True\*  False
9. Descovy® is a new injectable PrEP medication.  
 True  False\*
10. Gastrointestinal symptoms, headache, and fatigue are among the most common side-effects of PrEP.

True\* False

**Multiple Choice:** Review each question/statement and check the box with the correct answer.

11. If a patient is willing to take PrEP, what additional considerations must be addressed? (select all that apply).

 A: Kidney function\* B: STI screening\* C: Liver function D: Hepatitis B\*

12. Which medications for PrEP can be used in injection drug users? (select all that apply).

 A: Truvada\* B: Descovy C: Apretude D: Hydroxychloroquine

13. What is the primary contraindication for using Apretude for PrEP?

 A: The patient must be HIV+. B: The patient has a BMI over 30. C: The patient weighs less than 77 lbs.\* D: The patient has a history of gout.

14. If a patient expresses an interest in PrEP, their kidney function should be:

 A: > 90 mls/min B: > 80 mls/min C: > 70 mls/min D: > 60 mls/min\*

15. On-demand PrEP requires what dosing schedule?

 A: 2-1-1\* B: 1-2-1 C: 1-1-2 D: 2-2-1

16. In patients taking PrEP, kidney function tests should be ordered:

- A: At every follow-up visit.
- B: Every 3 months
- C: Every 6 months\*
- D: Annually

17. Which models will be helpful for discussing sexual health with an older adult patient? (select all that apply).

- A: PLISSIT framework.\*
- B: 3M model of change.
- C: 5 A's model.\*
- D: All of the above.

18. If a patient refuses to discuss sexual health, what action should the provider take?

- A: Continue to ask the patient until they clearly state "no".
- B: Respect the patient's wishes, make a note in the chart, and do not re-approach the patient.
- C: Respect the patient's wishes, make a note in the chart, and re-approach the patient at the next office visit.\*
- D: Find another provider who would make the patient feel comfortable discussing the topic.

19. What percentage of new HIV cases are diagnosed in older adults each year?

- A: 5%.
- B: 10%\*
- C: 15%
- D: 20%

20. When PrEP is used in injection drug users, it has been found to be \_\_\_% effective at reducing HIV infection.

- A: 55%
- B: 67%
- C: 74%\*
- D: 83%

**Appendix H: Informed Consent Form****ADULT CONSENT TO PARTICIPATE IN A RESEARCH STUDY****PrEP Prescribing for Older Adults Who Identify as Members of the LGBTQ Community:  
A Quality Improvement Project****SUMMARY INFORMATION**

Things you should know about this study:

- **Purpose:** The purpose of this Doctor of Nursing Practice (DNP) quality improvement project is to educate primary healthcare providers about PrEP and PrEP prescribing in older adults (those over the age of 55) who identify as members of the LGBTQ community.
- **Procedures:** If you choose to participate, you will be asked to complete an initial assessment of knowledge and demographic questionnaire, to review an educational module, and to complete a post-intervention assessment of knowledge.
- **Duration:** Your participation in this project will take between 70-80 minutes over the course of a four week period.
- **Risks:** The main risk or discomfort from this research is potential for you to become uncomfortable while completing the educational module.
- **Benefits:** The main benefit to you from this research is to increase your knowledge of PrEP prescribing to enhance patient care.
- **Alternatives:** There are no known alternatives available to you other than not taking part in this study.
- **Participation:** Taking part in this research project is voluntary.

Please carefully read the entire document before agreeing to participate.

**PURPOSE OF THE STUDY**

The purpose of this Doctor of Nursing Practice (DNP) quality improvement project is to educate primary healthcare providers about PrEP and PrEP prescribing in older adults (those over the age of 55) who identify as members of the LGBTQ community.

**NUMBER OF STUDY PARTICIPANTS**

If you decide to be in this study, you will be one of 10-15 people in this research study.

**DURATION OF THE STUDY**

Your participation will involve 70-80 minutes total over the course of a four week period.

**PROCEDURES**

If you agree to be in the study, we will ask you to do the following things:

1. Provide your email address and consent to being contacted via email for the project. All data collection and education will occur remotely in your home or a place that is comfortable to you. You will have one week to complete this task.
2. Complete a demographic form and pre-test knowledge assessment via email. This should take between 20-30 minutes. You will have one week to complete this task.
3. Watch a training module that will be available on YouTube with the link emailed to you directly. This should take approximately 30 minutes and you will have two weeks to view the module.
4. Complete a post-test knowledge assessment. This should take about 20 minutes and will be sent via email. You will have one week to complete this task.
5. The study duration will four six weeks. During this time you will need to spend about 80-90 minutes engaged in activities related to the project.

**RISKS AND/OR DISCOMFORTS**

The study has the following possible risks to you: First, you may become uncomfortable during the time required to review the educational presentation. This is unlikely to happen but if it does, you can take a break during education. Second, there are threats to privacy and confidentiality. This is unlikely to happen but may occur.

**BENEFITS**

The study has the following possible benefits to you: increased knowledge about the topic, the ability to provide better patient care, enhanced confidence in managing older adults to manage sexual health issues. Benefits to society include reducing the spread of HIV in the general population, lowering costs to provide care, and improving the quality and safety of patient care.

**ALTERNATIVES**

There are no known alternatives available to you other than not taking part in this study.

**CONFIDENTIALITY**

The records of this study will be kept private and will be protected to the fullest extent provided by law. In any sort of report we might publish, we will not include any information that will make it possible to identify you. Research records will be stored securely, and only the

researcher team will have access to the records. However, your records may be inspected by authorized University or other agents who will also keep the information confidential.

### **USE OF YOUR INFORMATION**

Your information collected as part of the research will not be used or distributed for future research studies even if identifiers are removed.

### **COMPENSATION & COSTS**

There are no costs to you for participating in this study.

### **RIGHT TO DECLINE OR WITHDRAW**

Your participation in this study is voluntary. You are free to participate in the study or withdraw your consent at any time during the study. You will not lose any benefits if you decide not to participate or if you quit the study early. The investigator reserves the right to remove you without your consent at such time that he/she feels it is in the best interest.

### **RESEARCHER CONTACT INFORMATION**

If you have any questions about the purpose, procedures, or any other issues relating to this research study you may contact Enrique Mendoza-Rojas at Florida International University, (573)-239-1317, [enriquemendozarojas@yahoo.com](mailto:enriquemendozarojas@yahoo.com).

### **IRB CONTACT INFORMATION**

If you would like to talk with someone about your rights of being a subject in this research study or about ethical issues with this research study, you may contact the FIU Office of Research Integrity by phone at 305-348-2494 or by email at [ori@fiu.edu](mailto:ori@fiu.edu).

### **PARTICIPANT AGREEMENT**

I have read the information in this consent form and agree to participate in this study. I have had a chance to ask any questions I have about this study, and they have been answered for me. I understand that I will be given a copy of this form for my records.

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Signature of Participant

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Date

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Printed Name of Participant

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Signature of Person Obtaining Consent

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Date