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PrEP Education Intervention

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DOCTOR OF NURSING PRACTICE (DNP) PROGRAM

A DNP PROJECT

TITLE: PrEP Education Intervention

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Abstract

Background: The nation's HIV infection rate is alarming, yet only a small percentage of eligible individuals are prescribed pre-exposure prophylaxis (PrEP). This sluggish PrEP uptake may be related to lack of knowledge among non-HIV specialist providers. Thus, interventions toexpand providers' use of PrEP as an HIV prevention strategy are needed.

Objectives: The project aim was to develop an intervention to improve retail nurse practitioners' (NP) knowledge for PrEP clinical practice, comfort screening for "at-risk HIV" patients, confidence prescribing PrEP, and likeliness to prescribe PrEP in the next six months.

Methodology: An online PrEP tutorial was implemented for retail clinic NPs. There were three phases: pre-survey, post-survey, and 30-day retention survey. Paired t-tests for differences between the pre- and post-surveys were performed. ANOVA was conducted to test differences between pre-, post-, and 30-day retention surveys.

Results: Paired t-tests revealed significant differences between pre- and post-surveys for knowledge, comfort, confidence, and likeliness to prescribe ($p < .05$). Similarly, the repeated measures ANOVA revealed a significant main effect of the intervention on all constructs ($p < .05$). Post-hoc analysis showed all constructs, except for comfort, increased betweenthe pre- and post-surveys and all constructs increased between pre- and retention surveys. There were no differences between post- and retention surveys for any constructs.

Conclusion: By increasing knowledge related to PrEP, online education can improve NPs consultation and prescribing practices to help confront the HIV epidemic.

Keywords: PrEP, HIV prevention, online PrEP education, provider knowledge

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The PrEP Education Intervention

According to the Centers for Disease Control and Prevention ([CDC], 2020a), there were 37,832 individuals in 2018 that were newly infected with the human immunodeficiency virus (HIV), accounting for more than 1.1 million HIV positive Americans. Despite the overall steady decline that was noted in the past decade, the recent trend of increased HIV diagnoses was most notable in the South, with 51% of the nation's new infections (CDC, 2019a). The recently launched national program, "Ending the HIV Epidemic: A Plan for America," with its mission to reduce 75% of HIV infections in the next five years and 90% by the year 2030, is intended to refuel the national effort to end this epidemic (HIV.gov, 2019). Specifically, the "Plan for America" is a national movement to decrease new HIV transmissions by increasing the uptake of the Food and Drug Administration (FDA) approved antiretroviral therapy (ART). Rationales for the plateaued HIV infection rate included the lack of access, uptake, and adherence to PrEP (Pinto et al., 2018). Thus, recent studies have carefully examined the existing barriers, including provider knowledge, comfort, and confidence along with patient access and cost (Clement et al., 2018; Edelman et al., 2019; Henny et al., 2019b; Pinto et al., 2018) that impact the uptake of daily pre-exposure prophylaxis (PrEP) for "at-risk HIV" individuals.

Background and Significance

Although the United States had an 11% decline in HIV incidence rates from 2010 through 2017, annual increases in certain groups of the population have recently been detected (CDC, 2020a). Gay, bisexual, and men having sex with men (MSM) groups of individuals were most affected, representing 69% of new HIV cases in 2018 (CDC, 2020a). For the same year, 24% of the diagnoses were from heterosexual individuals, and 7% were from injection drug users (CDC, 2020a).

Despite the screening strategies and advances with antiretroviral therapies, it was alarming that the nation's southern states were disproportionately represented, with almost 20,000 new HIV diagnoses in 2017 (CDC, 2019b). The 16 states and Washington, District of Columbia (DC) that make up the southern region of the nation, presented with the most significant burden of HIV and HIV related deaths. Washington, DC had the highest HIV incidence rate (46.3%), followed by Georgia and Florida, with rates of 24.9% and 22.9%, respectively (CDC, 2019b). Comparing for the same 2017-year, Virginia Department of Health's (2018) HIV incidence rate for Virginia was 10.4% with urban areas like Alexandria and Arlington counties with 19.4% and 14%, respectively. Many of these infections were notable among the urban areas. It is worth mentioning, however, that 24% of new diagnoses of HIV in the southern region in 2017 were reported from suburban and rural areas (CDC, 2019a).

Preexposure Prophylactic Therapy

The combination of tenofovir disoproxil fumarate (TDF) 300 mg and emtricitabine (FTC) 200 mg, which received FDA approval in 2012, was known to be highly effective for prevention of HIV (CDC, 2019d). As a single daily pill, known as Truvada, the efficacy of PrEP had been well documented to exceed 92% with consistent usage in multiple studies (CDC, 2019d; U.S. Preventive Task Force [USPTF], 2019; Zhang et al., 2019). Indeed, the CDC's 2017 PrEP Clinical Practice Guideline (CPG; CDC: U.S. Public Health Service, 2018) presented overwhelming evidence of PrEP's high efficacy and safety demonstrated through high quality randomized clinical trials. Additionally, a CDC report predicted that a 40% increased uptake of PrEP, over ten years, may potentially prevent 33% of new infections among the MSM subpopulation (Huang et al., 2018).

As reported by the well-known iPrEX clinical trial, the CDC supported the iPrEX modeling to predict a 99% reduction in the risk of HIV if Truvada was taken every day of the week (Anderson et al., 2012). Numerous research studies supported the safety and efficacy of the FDA approved PrEP (CDC: U.S. Public Health Service, 2018; Clement et al., 2018; Henny et al., 2019; Wilson et al., 2020; Wood et al., 2018; Zhang et al., 2019). Recently, the USPTF (2019) updated its final recommendation to offer the "A" rating for PrEP, declaring substantial net benefit of risk reduction for individuals with high HIV risk. Hence, researchers continued to question why prescriptions for PrEP have been lagging, despite its proven efficacy to reduce the risk of HIV transmission.

Purview Paradox and PrEP Affordability

Experts identified one of the critical barriers to successful PrEP implementation to be the "purview paradox." This notion suggested that neither infectious disease (ID) physicians nor primary care providers (PCPs) believed PrEP to fall within their specific scope of practice (Pinto et al., 2018). ID specialists had treated individuals with HIV diagnosis, while PCPs had not been familiar with HIV-related pharmacotherapy or management. For many years, the debate over identifying the appropriate providers to prescribe PrEP ensued while addressing the affordability of Truvada. These factors were previously studied to explain the less-than-optimal PrEP prescribing patterns (Edelman et al., 2019; Pinto et al., 2018; Zhang et al., 2019).

Although the high cost of Truvada has posed a barrier for those without health plans, the "Patient Assistance" program through the Gilead pharmaceutical company was available for many years (Gilead, 2020a). Moreover, the USPTF recently updated its PrEP recommendation to reflect patients' cost-sharing to zero copayments for the insured individuals. This change mirrored the Affordable Care Act's requirement that preventive medicine with USPTF's "A" or

"B" rating must be covered for patients without any cost-sharing (Keith, 2019). While exploring the "purview paradox" among PCPs, researchers simultaneously uncovered themes such as lack of knowledge and comfort among non-HIV specialized health care providers (Blackstock et al., 2016; Edelman et al., 2019; Hakre et al., 2016; Petroll et al., 2017; Wood et al., 2018b; Zhang et al., 2019).

Needs Assessment

The CDC's HIV prevention efforts endorsed by the federal government supported expanding the access and uptake of PrEP, especially in the rural and suburban communities of the southern United States (US; CDC, 2019a). To collaborate in this national effort, frontline providers that are not HIV specialists had to become the new champions to improve PrEP uptake for those individuals at risk for HIV. Retail clinics, ideally positioned in communities, employed frontline providers that can commit to reducing new HIV infections. Numerous researchers have supported the need for non-HIV specialists to improve their knowledge of PrEP, comfort to screen for at-risk HIV candidates, and confidence to prescribe PrEP therapy (Edelman et al., 2019; Henny et al., 2019a; Henny et al., 2019b; Wilson, 2020).

To further evaluate the needs for this quality improvement project, it was essential to evaluate the strengths, weaknesses, opportunities, and threats related to the organization and the topic of PrEP educational needs. The strengths, weaknesses, opportunities, and threats (SWOT) associated with the current project were analyzed (see Appendix A).

Internal Strengths and Weaknesses

A needs assessment was conducted for a retail clinic organization located in the southern region of the US to assess the need for an education intervention. With its mission statement, "helping people on their path to better health," the retail clinics of Northern Virginia and

Washington, DC are recognized for healthcare convenience and quality (Anonymous, 2020). The organization's values of "innovation, collaboration, caring, integrity, and accountability" were embedded in the quality services delivered seven days a week by dedicated nurse practitioners (NP) throughout the two regions (R22 and R23) (Anonymous, 2020). A significant strength of the organization was that most NPs were professionally committed and engaged in continuous educational opportunities to advance their knowledge and expertise.

Another strength was the organization highly valued the Doctor of Nursing Practice (DNP) degree and supported DNP projects. Many changes to the current workflow were a result of past DNP projects conducted within the organization. Moreover, the chief executive officer (CEO) was a DNP leader who practiced engaging leadership.

The major advantage of the project was the retail clinic organization's commitment to innovative services while adhering to evidence-based practice (EBP) guidelines. The retail clinics also offered a variety of services, from minor episodic illnesses to routine health screenings that include screenings for sexually transmitted infections (STI). Most recently, a "Health Hub" theme was launched to offer more in-depth chronic care management and "young adult health" services. The Health Hub concept includes phlebotomy services that are needed for the full array of STI screening visits. Patients could conveniently get their blood work done in one setting instead of having to get to laboratory facilities. Thus, the internal strengths of the retail clinics presented the fuel to drive a PrEP education intervention towards improving provider knowledge that may ultimately delineate delivery of quality care.

The organization was well-structured with many layers of company oversight, which presented some challenges for a DNP student-led initiative. With its national branding well known to the public, the retail health clinic organization did not permit the use of any patient

data. This included de-identified, aggregate patient data, as well as heavily secured clinical practice guidelines. As a highly innovative organization, new updates were occurring every week that impacted the planned PrEP education intervention's timeline. Another weakness was the busy clinic setting that restricted the solo practitioner from becoming adequately engaged with learning activities in between patient visits. Newly graduated NPs with less than one year of experience faced more challenges of being inundated with overwhelming learning activities. Finally, retail clinics were not affiliated with infectious disease specialists and did not have relationships with these specialists. NPs, however, had collaborative medical directors they consulted when they needed further medical advice and guideline support. Despite these obstacles, the senior practice managers (SPM) for the Northern Virginia and Washington, DC regions fully endorsed this student-led PrEP education intervention.

External Opportunities

The current HIV epidemic has captivated the attention of the Federal and State government. Released in 2019, the federal project "Ending the HIV Epidemic: A Plan for America," was a blueprint for reducing new HIV infections by 75% in the next five years and over 90% for the next ten years (HIV.gov, 2019). This national movement has influenced more frontline healthcare providers to reflect on their knowledge regarding HIV infections, comfort in screening patients for PrEP, and confidence in prescribing PrEP. After losing its coveted patent, the generic version of Truvada became available last year (Fitzsimons, 2019). Equally important, the retail clinics were noted as "PrEP Providers" through the CDC's (2020b) "PrEP Provider" database link. Despite this title, PrEP service was underutilized in light of the concerning STI infection rates for the region. With metropolitan DC's alarming HIV incidence rate, retail clinics in this region were perfectly positioned to join the national efforts to reduce the transmission of

HIV.

External Threats

The Health Hub concept consists of chronic disease management and a broader scope of young adult health services. The individuals that are "at-risk" for HIV often encounter barriers such as medical stigma, medical mistrust and perceived payment barriers that prevent them from receiving STI preventive services. Many uninsured individuals will be challenged to seek PrEP therapy due to the ongoing need for clinic follow-ups. If the Health Hub transformation failed for any reason, NPs would not have the opportunity to provide young adult health needs and screenings. Thus, the PrEP education intervention's long-term desired outcomes will not be notable if clinics were faced with conditions that limited patient visit volume or unprecedented clinic closures. Despite these potential threats, the organization supported the current student-led PrEP training initiative as a pilot study for both Regions 22 and 23 that represent Washington DC and Northern Virginia.

Problem Statement

About 80% of HIV infections in 2016 were transmitted by individuals who were undiagnosed with HIV and not receiving HIV care (HIV.gov, 2019). Although more than one million Americans may potentially benefit from PrEP, fewer than 25% of them have been prescribed HIV prevention therapy (CDC, 2020c). As frontline providers, the retail health clinic nurse practitioners (NPs) must have knowledge to provide PrEP screening, appropriate treatment, and precise management for at-risk HIV individuals of the community.

PICOT Question

For retail health nurse practitioners, how does PrEP education/training affect providers' knowledge about PrEP clinical practice, comfort with screening, and confidence prescribing

PrEP for “at-risk HIV” individuals after the intervention period?

Aims and Objectives

The following aims were pertinent for the PrEP Education Intervention:

1) Evaluate NPs’ pre-intervention baseline composite scores and ratings on all constructs including clinical practice knowledge about PrEP, comfort identifying “at- risk HIV” patients, confidence with PrEP prescribing practices, and likeliness to prescribe PrEP in the next six months.
2) Implement an online education module on PrEP clinical practice knowledge, screening for “at-risk HIV” candidates, and PrEP prescribing practices.
3) Evaluate NPs’ post-intervention composite scores and ratings on all constructs.
4) Evaluate differences between NPs’ pre- and post-intervention composite scores and ratings on all constructs.
5) Thirty days after completion of the PrEP education, reevaluate NPs’ composite scores and ratings on all constructs and compare with pre and post intervention scores and ratings.

Smart Goals

These sound goals provided direction, motivation, and a clear focus for the project implementation. The following were “SMART” goals that were specific, measurable, achievable, realistic, and timely.

1) Develop and implement an online PrEP education module by July 24, 2020.
2) Obtain NP’s baseline and post-intervention composite scores (constructs of knowledge, comfort, confidence, and likeliness to prescribe PrEP in the next six months) by September 26, 2020.

3) Post-survey PrEP's composite scores and ratings on all constructs (clinical practice knowledge, comfort identifying at-risk HIV patients, confidence prescribing PrEP, and likeliness to prescribe PrEP within the next six months) will be improved from their baseline pre-survey scores following the education intervention and by the closure date of the post-survey period of September 26, 2020.
4) Composite scores and ratings on all constructs for knowledge, comfort, confidence, and likeliness to prescribe PrEP will be retained with less than 5% loss at the 30 days post-intervention completion date of November 7, 2020.

Review of Literature

A comprehensive literature review unveiled gaps regarding lack of knowledge, comfort, and confidence with clinical PrEP practice among non-HIV specialist healthcare providers. Evidence pointed to the positive value of delivering an education intervention to improve non-HIV specialist healthcare providers' knowledge related to these constructs. An evidence table summarizing the information related to each reviewed source is included as Appendix B.

Construct Definitions

Although the term "knowledge" is relatively clear, construct descriptions like "comfort," "confidence" and "willingness" need clarification. The phrase, "knowledge about PrEP" was also noted in the literature review as the "familiarity" or "awareness" about PrEP pharmacotherapy and/or its prescribing practice guidelines (Edelman et al., 2019; Petroll et al., 2017; Wilson et al., 2020; Wood et al., 2018b; Zhang et al., 2019). Additionally, words such as comfort, confidence, and willingness were used in numerous research studies that were evaluating the suboptimal uptake of PrEP (Edelman et al., 2019; Petroll et al., 2017; Wilson et al., 2020). For this purpose, this quality improvement project focused on the definitions reflected

in the online English dictionary. First, “confidence” as a noun describes the “belief in oneself and abilities” (Dictionary.com, 2021a, para 2). Next, the word “comfort” as a verb is described as, “to soothe, console or to reassure” (Dictionary.com, 2021b, para 1) while the verb usage as “comfortable” is defined as the physical and mental state of contentment and being “at ease” (Dictionary.com, 2021c, para 2). Since the word “willingness” can suggest consent or readiness and the preference to decide on one’s actions, it is important not to conflate comfort and willingness to prescribe PrEP since these are different constructs (Dictionary.com, 2021d).

Provider Knowledge of PrEP

Edelman et al.’s (2019) survey revealed that 85% of 240 general internists surveyed believed that PrEP practice should be integrated within the primary care setting instead of making referrals to specialists. To accomplish the integration of PrEP into clinical practice, most of the providers believed in training all providers at the practice site (42%) or employing an onsite PrEP provider (43%). Most of the surveyed providers in favor of enhancing their PrEP knowledge were practitioners who performed direct patient care (Edelman et al., 2019). The concept of the knowledge gap among non-HIV specialist providers has been explored in numerous articles. The term “knowledge” was broadened to include awareness or familiarity about PrEP, as well as the clinical concepts that support the management of PrEP therapy. Wilson et al. (2020) examined the poor uptake of PrEP for the US Navy despite Truvada’s availability at no cost. Out of the 432 Navy providers participating in the survey, most rated their knowledge as “poor” (41%) or “sufficient” (31%), compared to 17.1% who rated their knowledge as “good” or “excellent” (6.9%) (Wilson et al., 2020). Among providers that self-identified as being knowledgeable about PrEP, 29% were found to prescribe PrEP more often compared to those providers with poor knowledge ratings (6%) (Wilson et al., 2020). It is not

surprising that only 19% of Navy providers reported ever prescribing PrEP (Wilson et al., 2020).

Similarly, Henny et al. (2019b) conducted the "K-Bap Study" that explored HIV-related knowledge, behaviors, attitudes, and practices among providers in the southeast part of the country. The online survey of 820 PCPs revealed that more than 52% of the providers lacked familiarity with PrEP (2019b). Arising from the potential side effect profile, insufficient PrEP knowledge can predict hesitancy to prescribe even to eligible patients meeting the screening criteria. A recent meta-analysis conducted by Zhang et al. (2019) examined healthcare professionals' obstacles that blocked the optimal PrEP implementation. Aside from PrEP's cost, safety, and side effect that were identified as barriers, providers' lack of awareness, knowledge, skills, and lack of training were found to impact PrEP provision among healthcare professionals (Zhang et al., 2019). The pooled proportion of PCP with awareness of PrEP was 68% (95% CI 55-80%), and the rate of prescribing PrEP was 24% (95% CI=17-32%) (Zhang et al., 2019). These studies revealed the knowledge gap that exists among frontline PCPs and other healthcare professionals regarding PrEP prescribing practices.

Several studies revealed providers' lack of knowledge as a barrier to prescribing PrEP. Clement et al. (2018) found that 60% of the Duke Health System's PCPs, before the in-person education intervention, answered "lack of knowledge" as the reason for not having prescribed PrEP. Similarly, Irungu et al. (2019) found a lack of knowledge of ART and PrEP eligibility, indications, benefits, and side effects among Kenyan healthcare workers. Researchers found improved knowledge and confidence after presenting the two-day interactive training called, "Partners Scale-Up Project" for the public health facilities in Kenya (Irungu et al., 2019). The pre intervention's mean score of 61.7% suggested a lack of knowledge among various healthcare workers (Irungu et al., 2019). Moreover, Newman et al. (2018) conducted an educational

intervention for medical residents and found that 22% of the 45 residents surveyed were not at all familiar with PrEP before the education session.

Comfort with Screening for PrEP Eligibility

Providers' prescribing practices depend on knowledge of the drug and understanding the patients' ultimate benefit from pharmacotherapy options. Specifically, providers need to assess the PrEP eligibility with patients through the sensitive discussion of patients' sexual practices. Few studies have used the term "comfort" to address providers' attitudes about being engaged with PrEP practice and sensitive patient discussions (Clement et al., 2018; Irungu et al., 2019; Newman et al., 2019; Wilson et al., 2020). Newman et al. (2019) found that providers' comfort in assessing clinical eligibility across different clinical situations did not improve after their PrEP training session. Pre- and post-training results for comfort with assessing clinical PrEP eligibility, which included sexual risk categories, were not statistically significant. However, "comfort" with prescribing PrEP increased among the medical students, who had a pre-intervention score of 35% compared with the post-intervention score of 70% ($p = .015$) (Newman et al., 2019). Irungu et al. (2019) found that 30% of providers initially reported feeling "very uncomfortable" and "unsure" before the PrEP training for serodiscordant couples of Kenya. Likewise, Clement al. (2018) found 42% of PCPs, that had never prescribed Truvada, indicated "lack of comfort" as the reason for not ever prescribing PrEP. Not surprisingly, Wilson et al. (2020) found that Navy providers who were most comfortable assessing patients' sexual risk behaviors had increased knowledge about PrEP. Although these studies collectively suggested an unclear relationship between knowledge of PrEP, comfort in assessing patient risk behaviors, and PrEP prescribing practices, the results suggested that training improved providers' comfort with screening for "at-risk HIV" behaviors and prescribing PrEP.

Confidence with Prescribing PrEP

With an unclear picture of how knowledge influenced likeliness to prescribe PrEP and the role of comfort in assessing patient risk behaviors, it was worth exploring how education may improve provider confidence managing and prescribing PrEP therapy. The confidence to prescribe Truvada and manage patients on PrEP therapy stemmed from providers' PrEP knowledge and prior experience (Mayer et al., 2018). Several studies revealed that providers were not initially confident with Truvada's safety, effectiveness, and prescribing practices due to lack of awareness of the clinical PrEP guideline (Henny et al., 2019a; Newman et al., 2019; Wilson et al., 2020). For this purpose, numerous studies and PrEP experts emphasized the need for frontline providers to participate in PrEP educational or training sessions (Clement et al., 2018; Henny et al., 2019b; Wilson et al., 2020; Wood et al., 2018b; Zhang et al., 2019). Based on the research, it was important to establish whether educating healthcare providers about PrEP improved knowledge in prescribing PrEP therapy.

In short, many studies explored the provider barriers that can be addressed through increased education. The literature review uncovered a variety of PrEP related education interventions ranging from 20–60-minute presentation to weeks of ongoing support. In fact, Henny et al.'s (2019b) study highlighted the correlation between HIV-related training and familiarity with PrEP practice which in turn increased prescribing of PrEP. Focused provider training on PrEP implementation may improve knowledge, comfort, and confidence to improve their likeliness to prescribe PrEP therapy (Zhang et al., 2019).

Education to Improve PrEP Prescribing

Five recent quasi-experimental studies were systematically reviewed and assessed for evidence and quality. These studies evaluated whether educational interventions improved

provider knowledge, comfort assessing patient risk, confidence with PrEP therapy management, and the likelihood of providers to prescribe this pre-exposure antiretroviral therapy. Most studies resulted in notable improvements in PrEP knowledge following educational intervention(s) (Clement et al., 2018; Irungu et al., 2019; Newman et al., 2019; Sales et al., 2019; Wood et al., 2018b).

Wood et al. (2018b) found that incorporating PrEP telementoring support into an existing HIV project was feasible and beneficial for providers. More than 93% of the surveyed providers reported that knowledge topics for PrEP practice, such as pharmacologic side effects, candidacy, and adherence issues, were covered "extremely" or "moderately" well (Wood et al., 2018b). As a secondary analysis, Sales et al. (2019) found that 28 providers and staff from family planning clinics gained higher PrEP knowledge after a 1.5-hour training session (with a pre mean value of 3.26 and post-mean-value of 5.13, $p<.001$). Newman et al. (2019) also found increased knowledge among medical residents who participated in a PrEP education intervention, with the average posttest knowledge score of 92% compared to the pretest score of 66%. Likewise, Irungu et al. (2019) demonstrated an improvement of knowledge after a two-day training intervention with a significant gain in the posttest mean score (62% on pretest versus 86.4% on posttest).

In addition to knowledge improvement, Irungu et al. (2019) found that providers gained "comfort" treating HIV serodiscordant couples after the educational intervention (22.8% to 67.3%, $p<.001$). Besides the quantitative approach used to measure an increase in comfort following an educational intervention, Irungu qualitatively measured the providers' experience with the intervention and found that many participants reported "improved confidence" during post-intervention interviews. Similarly, in addition to improving PrEP knowledge, Sales et al.

(2019) found providers were more comfortable in their ability to identify appropriate candidates for daily Truvada therapy. The increase in knowledge, comfort, and confidence found in the literature also seemed to influence providers' likeliness to prescribe PrEP. For instance, Newman et al. (2019) noted an hour-long education intervention improved the subjects' likeliness to prescribe PrEP within the next six months from 32% (pretest) to 67% (posttest). Finally, Clement et al. (2018) demonstrated that after an educational intervention, providers prescribed PrEP to 35% of eligible patients, as compared to only 17% of patients before the intervention (with a statistical significance of $< .01$). Overall, the literature revealed that educational/training interventions can improve provider knowledge, comfort in assessing for PrEP candidacy, confidence in PrEP therapy, and likeliness to prescribe PrEP in the future.

Knowledge Gap

Education interventions, varying from one hour to two days in duration, were noted to reveal improved knowledge for a variety of providers. Specifically, the knowledge gap amongst the PCPs of the southeast region identified through the "K-Bap" survey underscored the need to strengthen HIV-related knowledge and practice guidelines for physicians, NPs and physician assistants (Henny et al. 2019b). This was especially alarming since the highest burden of HIV prevalence existed in the southern part of the nation. Numerous research findings consistently supported various forms of HIV-related training to improve the sluggish uptake of PrEP for those "at-risk" for HIV transmission.

Evidence-Based Practice Translation Model

Developed by the Iowa Model Collaborative group, the Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care Process (IMR) was applied to guide the PrEP Education Intervention. The path to solving the clinical problem included decision markers

with evaluation stages that acted as feedback loops with appropriate recommendations during the practice change implementation process (Buckwalter et al., 2017). The IMR's essential phases were as follows: identifying triggering issues, forming the interprofessional team, reviewing the evidence, accomplishing critique and synthesis of the evidence, piloting the implementation, integration of practice changes, and dissemination of outcomes (Iowa Model Collaborative, 2017).

Application of the Iowa Model Revised: Trigger Identification

The nation's capital, Washington, DC has one of the highest HIV incidence rates in the country. Individuals qualifying to receive PrEP therapy are likely to visit retail health clinics for minor episodic illnesses or routine screening needs. NPs' knowledge gap pertaining to PrEP was identified as a reason to conduct this project. Regardless of the NPs' inadequate PrEP clinical knowledge or experience, the retail clinics were already identified as "PrEP Providers" for the Washington DC metropolitan region (CDC, 2020b). Namely, PrEP encounters included screening those at high risk for HIV, as well as prescribing the daily therapy available on the market today. As an innovative organization, the retail health clinic organization approved the EBP initiative that was directed at improving PrEP knowledge, comfort, and prescribing practices for the NP providers. The Iowa Model Revised (IMR), depicted in a concise flow diagram (Appendix C), was used to describe the step-by-step process in implementing the PrEP education initiative.

Application of the Iowa Model Revised Overview

1) Established a problem-focused trigger that created the PICOT statement.
2) Formed a team from the stakeholder group (Table 1).
3) Performed a literature review and synthesis and established the urgency for PrEP

education interventions.

4) Designed and developed an online, evidence-based PrEP education tutorial and utilized an evidence-based tool.
5) Implemented the Pilot PrEP Education Intervention for Regions 22 and 23.
6) Evaluated the Pilot Intervention's pre and post surveys for improved survey scores.
7) Administered post-intervention 30-day retention survey.
8) Reevaluated survey results that include the 30-day retention survey scores.
9) Raffled away gift cards for those that completed all three phases of the survey.
10) Disseminated outcomes with results to the organization.

Application of the IMR: Practice Integration and Dissemination of Outcomes

After completion of the 30-day retention survey, the goal was to record and disseminate the quality improvement project outcomes throughout the organization's two regions. The success of the intervention was shared with the regional quality representatives. The PrEP Education Intervention did receive approval to be posted in the organization's intranet site to encourage completion of this learning opportunity for all providers in the organization.

Methodology

Research Design

The PrEP Education Intervention was an online quality improvement project that aimed to improve provider knowledge, comfort and confidence regarding screening for patients that are at-risk for human immunodeficiency virus (HIV) and prescribing PrEP. The project evaluated providers' knowledge of PrEP clinical practice, comfort in screening "at-risk HIV" patients, and confidence in prescribing PrEP before and after an online educational tutorial. The online delivery of the educational intervention allowed busy practicing providers to obtain the needed

education on-demand, rather than trying to coordinate an in-person didactic session suitable for their schedules. The design of the study was a pre and post-test design in which participants first received a survey of their baseline PrEP clinical practice knowledge, comfort in screening for PrEP candidacy, and confidence in prescribing PrEP for "at-risk HIV" individuals (Price et al., 2015). Following the online educational intervention, the participants received a survey immediately post-training to measure their learning, comfort, and confidence related to clinical PrEP practice. It was essential to ensure that improvements in prescriber knowledge, comfort, and confidence were retained over time. After 30 days, participants received a follow-up survey to measure long-term knowledge retention, comfort, and confidence in PrEP clinical practice and prescribing. The surveys also measured the providers' likeliness to prescribe PrEP in the next six-month period.

Sampling Strategy

The target population for this initiative was health care providers (i.e., nurse practitioners) who were employed for a large retail health clinic organization throughout Northern Virginia (NoVA) and Washington DC. All eligible participants were contacted during recruitment. The sample, therefore, represented a convenience sample of family practice NPs in the target region.

Inclusion/Exclusion Criteria

All clinical nurse practitioners, who were full time, part-time, and committed casual part-time staff for the two regions, were eligible to participate in the learning session. Any NP with anticipated departure from the organization within three weeks of the survey launch date was excluded from participation.

Setting and Study Considerations

All parts of the survey were delivered in a remote fashion. The study included online surveys and an online educational tutorial that were sent via emails. Participation took place during providers' "down time" or during break times. Participants were able to complete the session anywhere they had internet and computer access and were able to pause and resume the tutorial at any time. The organization's official support was received from the DNP Project Committee on July 3rd, 2020.

This project received an approval from the Institutional Review Board of the George Washington University Ethics Committee on July 15th, 2020 (see Appendix E). As a QI project, there was no risk of harm to the subjects participating in the PrEP educational activity. All demographic information and survey responses were kept confidential and only available for the study's investigators until the end of December 2023.

Recruitment Strategy

Participant recruitment was elicited through emails. Also, senior practice managers (SPM) for the two regions, through the daily morning huddles, encouraged their regions' NPs to participate. Pre-intervention emails (Email #1) were sent to participants on multiple dates one week before the project launch date to explain and recruit participation for the upcoming study. This first email before the project launch date was directed at increasing awareness of the upcoming educational session. The e-mail contained the project syllabus and was sent to all NPs' work email at least two times during the first week. The syllabus included the learning objectives, length of training, the purpose of the education session, and appropriate contact information (See Appendix F). At the initiation of the project launch phase, participants were sent the "Pre-survey" emails (Email #2) to participate in the study with a web link to complete

the pre-survey. The pre-survey was launched during weeks two and three. This email included the link for the pre-survey and was sent at least two times weekly to ensure that NPs were able to access the weblink in a timely fashion despite job demands. During weeks four through six, "Education Intervention" emails (Email #3) containing the pre-survey, PrEP tutorial link and the post-survey were sent to invite participants to complete the intervention training. In an attempt to recruit additional participants, "Education Intervention" emails were sent out three times during week nine. This email presented a link that allowed the participants to advance to the intervention only if they had already completed a presurvey. Four weeks after the closure of the education training, the final "retention survey" emails (Email #4) were sent during weeks fourteen and fifteen. As an added incentive, five $20 Target gift certificates were raffled off for participants who completed the entire PrEP Education Initiative, including the pre- and post-survey, and 30-day retention survey. An overview of the completed recruitment strategy and data collection sequence can be found in the figure methodology map (Figure 2).

Sample Size

There were approximately 110 NPs that covered more than 42 retail clinics for the two regions across Northern Virginia and Washington, DC. The appropriate sample size needed for this study was determined by estimating the effect size necessary for adequate power using Cohen's d sample size conversion. A sample size of 27 was needed for a "moderate" effect size of .50 and a power of 0.80 in order to conduct a repeated-measures ANOVA with a significance level of 0.05 (Sullivan & Feinn, 2012). For possible sample size attrition factors, an additional 15% was considered for a total sample size of 31.

PrEP Education Intervention

The link to the education intervention included an "intro video" that introduced pertinent

background information about the current HIV epidemic and the nation's mission to improve PrEP uptake. The six-minute video was an optional background prelude to the PrEP tutorial. The PrEP for HIV Prevention e-learning tutorial was developed from the CDC's latest clinical guidelines on pre-exposure prophylaxis, identifying indications for PrEP, and the current evidence-based practice and PrEP therapy management. The five topics were as follows: "About PrEP," "PrEP Candidacy," "PrEP Eligibility," "PrEP Prescriptions," and "Practice Scenarios." The e-learning tutorial was designed to be engaging and interactive that allowed feedback for the chosen answers. The case scenarios promoted self-directed e-learning through making decisions based on the case presentations (Moore, 2021). The latest FDA-approved PrEP agent, Descovy, was also included to educate NPs on all pharmacologic agents available on the market (Gilead, 2020b). Upon completing the tutorial, participants were directed to complete the post-survey.

Project Timeline

The total duration of the PrEP Education Intervention was sixteen weeks long. Table 2 lists detailed weekly activities of the QI project. While waiting for the organizational approval, the Principal Student Investigator (PSI) developed the online PrEP educational tutorial. The final consent to launch this DNP project from the Retail Health Clinic's DNP Project Committee was received on July 3rd, 2019. Next, the DNP Project Proposal received approval from the George Washington Institutional Review Board Committee on July 15, 2019. Shortly after receiving the approvals, preparation was made to launch the project with support from the two regions' senior practice managers (SPM). On July 27th, the project started with one week of "pre-intervention" emails that described the intent of the study. For the next several weeks, emails were sent routinely to elicit interest and participation. The study ended with the closure of the retention survey and list of the ten raffle winners.

Survey Instrument

The PrEP Education Intervention included a survey instrument that was delivered in three phases: pre-survey, post-survey and retention survey. This survey tool was compiled from a combination of validated, previously used, and tested survey questions that were developed by expert researchers. A total of 21 items were taken from an existing survey instrument called PCP PrEP Survey that had been refined and piloted from an already existing Integrated Buprenorphine and HIV Care Evaluation (BHIVES) survey (Blackstock et al., 2016; Edelman et al., 2019; Edelman et al., 2017).

The original 57-item survey that was pilot-tested in an iterative manner by the authors was used as an online survey to the members of the Society of General Internal Medicine (SGIM). The PCP PrEP Survey conducted for this national professional organization's academic general internists contained provider sociodemographic, practice characteristics, self-rated knowledge, attitudes, and beliefs about PrEP and PrEP practice adoption (Blackstock et al., 2016). Consent was obtained to adapt the PCP PrEP Survey items from the principal investigator on March 28, 2020. Furthermore, Blumenthal et al.'s (2015) five-question PrEP Knowledge Survey that was modified from the Fenway Institute's previously utilized instrument was reviewed. Blumenthal et al. (2015) did mention its weak internal consistency (alpha score of 0.22) due to having only five questions and containing specific questions about various past clinical trials. Due to the current research advancements with PrEP, only two of the knowledge-based questions from Blumenthal et al. (2015) applied to the current PrEP survey. Upon requesting the use of this survey instrument, an email with the investigator's permission was received on April 3, 2020. Additionally, five questions were developed from the 2017 CDC's PrEP Clinical Guideline and recently updated CDC's PrEP website (CDC, 2019d).

Consent and Survey Content

A simple information sheet explaining the project and consent process was attached to every email and available for all prospective participants (Appendix I). Advancing to the pre-survey link was synonymous with consent to participate in the study. This project's survey tool contained a total of 23 survey items that were compiled from the existing survey instruments and five items from the CDC's PrEP clinical practice guideline (see Appendix J). Along with the necessary items pertaining to demographics and prior experiences, the survey tool presented with 23 questions about the constructs of PrEP clinical practice knowledge, comfort, and confidence as well as providers' likeliness to prescribe PrEP in the next six months.

Demographics and Past Experience

The survey instrument started with basic demographic questions that included the subjects' prior experiences. The five demographic questions pertained to the following: age, years of experience as NP; race/ethnicity; education level; and gender. The next five questions, related to the subjects' prior experience with PrEP, earned categorical responses of "yes" or "no" as well as one 5-point Likert scale that expressed the NPs prior knowledge. These five questions were intended to understand the subjects' previous experience and one self-rated item about PrEP's potential side effects.

The "Knowledge" Construct

The knowledge questions were designed to test the basic PrEP clinical practice that had been standardized through the CDC's PrEP clinical guideline. There were three multiple-choice items included in the survey adopted from the existing PCP PrEP Survey with Likert-type choices to measure the providers' perception based on her/his knowledge of the effectiveness and safety of PrEP. The 4-point Likert Scale consisted of 1= "not at all," 2 = "slightly," 3 =

moderately," and 4 = "extremely." Only two items with multiple choice answers from Blumenthal's PrEP Survey were used. Five questions with multiple choice answers were developed from the CDC's clinical practice guideline. Knowledge related to these items was explained and reinforced in the online PrEP tutorial. All items received "1-point" for the correct answer for the maximum cumulative value of 10 points. An increased knowledge score between baseline (pre-survey) and post-intervention demonstrated improvement in knowledge. This section was intended to measure the pertinent knowledge regarding PrEP's clinical practice endorsed by the CDC clinical guideline and its continuously updated website.

The "Comfort" Construct

While knowledge about clinical PrEP practice was an essential component, assessing provider comfort to screen the clinical eligibility for daily PrEP was also important. Thus, the PrEP Education project evaluated if the education intervention improved providers' comfort in identifying patients with "at-risk" HIV behaviors that were eligible for PrEP therapy by comparing changes in pre- and post-intervention comfort ratings. Data for the comfort construct was collected using the pre-, post- and follow-up surveys distributed to the providers. The choice of answers was presented in a 4- point Likert Scale to accurately assess provider comfort levels before and after the educational intervention. A maximum of 16 points for comfort-related answers represented the provider's comfort level as "extremely comfortable" in identifying the various high "at-risk HIV" individuals. At the same time, a total of four points indicated "not at all comfortable" at identifying "at-risk HIV" individuals for the various risk behavior categories. Specifically, the 4-point Likert scale descriptions were as follows: 1 = "not at all comfortable"; 2 = "slightly comfortable"; 3 =" moderately comfortable"; 4 =" extremely comfortable."

The "Confidence" Construct

The self-confidence concept was a cumulative notion of "believing in oneself" and certainty that occurs with knowledge and experience (Dictionary.com, 2021a, para 2). Thus, the working definition for the confidence construct was the confidence to prescribe PrEP that can be attained with learned knowledge of the current clinical practice guideline that included the safety profile, side effects, and lab monitoring essentials related to the antiretroviral treatment. The original PCP PrEP Survey's questions used the word "willingness" to prescribe PrEP, and these questions were modified to say, "confidence" to prescribe. When Blackstock et al. (2016) surveyed the academic general internists in 2015, the adoption of PrEP practice among PCPs was a relatively novel idea. The authors used the terms "comfort and willingness" to ascertain PCPs' attitudes and beliefs associated with PrEP practice adoption (Blackstock et al., 2016). Historically, "willingness to prescribe" was measured when PrEP was a new therapy with limited guidance for non-HIV prescribing providers. Current evidence-based guidelines recommend PrEP as a standard of care, so it was more appropriate to assess "confidence" instead of "willingness" to prescribe.

This QI project evaluated if the education intervention improved providers' confidence in prescribing PrEP by comparing providers' pre- and post-intervention confidence ratings. Data for the confidence construct were collected using the pre-, post- and 30-day follow-up surveys distributed to the retail clinic providers. A 4-point Likert scale was used to assess the level of providers' confidence to prescribe PrEP based on information known about patients' sexual behaviors and drug use. In other words, the eight questions explored the NP providers' self-rated ability to identify those "at-risk HIV" patients that would benefit from the daily PrEP therapy as well as having the confidence about PrEP's pharmacology profile. A maximum of 32 points

indicated “extremely confident” rating versus eight points that revealed “not at all confident” with PrEP prescribing patterns and clinical practice. The confidence to prescribe PrEP for the “at-risk HIV” patients symbolized NPs’ confidence with the overall management and prescribing of PrEP therapy. Provider confidence scores were measured as a total composite score.

Likeliness to Prescribe PrEP in Six Months

This QI project evaluated if the education intervention improved the providers’ likeliness to prescribe PrEP by comparing baseline and post-intervention likeliness to prescribe PrEP. Data for likeliness to prescribe PrEP were collected using the pre-, post- and follow-up surveys distributed to the retail clinic providers. The providers’ likeliness to prescribe in the next six months were measured by one question on a 4-point Likert scale. Hence, this question revealed whether the intervention did pose an impact on the providers’ likeliness to prescribe. The participant responses were analyzed to determine the participants’ likeliness to prescribe PrEP after completing the online PrEP tutorial.

Primary Data Analysis

The anticipated outcomes were evaluated by measuring the constructs of PrEP clinical knowledge, comfort, confidence and likeliness to prescribe. The project’s variable table was created to evaluate retail NPs’ survey scores throughout the three survey phases (see Appendix K). A paired t-Test and repeated measures ANOVA were conducted to determine differences in pre, post, and 30-day post PrEP tutorial intervention. Thus, the outcomes being measured were the composite scores for pre- to post-surveys and for pre, post and retention surveys. Also, the final knowledge score was examined to assess the level of retention loss following 30 days after the post-survey period. The outcomes measured for this aim, as the essence of this project, were to compare the constructs’ composite scores to highlight if changes had occurred after delivery

of the education intervention. Furthermore, the retention survey was an evaluation of NPs' likelihood of retaining the benefit of the education intervention already received more than 30 days ago.

Description of the Software

All the surveys and the education tutorial were accessed through Survey Monkey links that were delivered through the organization's emails. Survey data were collected using the Survey Monkey platform. A data dictionary was created to organize the collection of the survey data (Appendix L). After the survey collection period, data was downloaded and stored in Excel spreadsheets. By using the Excel spreadsheet, data were "cleaned" to remove all incomplete surveys and organized according to the data dictionary. Data were organized with appropriate data codes, and each constructs' total scores were obtained using Excel's mathematical formulas. After organizing all valid data, the Excel spreadsheet's working datasheet was exported to Statistical Package for the Social Sciences (SPSS). The SPSS version used for data analysis was SPSS version 27. SPSS was used to analyze the data to generate descriptive statistics for the analysis of means, percentages and standard deviations. The statistical tests chosen for this project were the paired t-Test, one-way repeated measure ANOVA, and Friedman's Rank ANOVA.

Needed Resources

Resources required for the PrEP Education Intervention included time, dedication, and effort into developing the intervention and the overall project for the student investigator. The budget for implementing this project was minimal. As shown in the project's budget table, the total monetary budget for this project was less than $1,000 (see Appendix M). Aside from the learners' engagement time and effort, this education intervention did not need any organizational

resources. Despite the minimal cost spent, the potential of this project's impact may be monumental.

Results

Sample Characteristics

A total of 39 nurse practitioners participated in the pre- and post-surveys and completed the online educational tutorial. Participants' ages ranged from 28 to 56 years with a mean age of 39.0 years (*SD* = 8.89). On average, they had over six years of nurse practitioner experience (*M* = 6.35, *SD* = 8.98). Thirty-eight were females and one was male. Twenty-nine percent of the participants identified their race/ethnicity as African American or Black, 24% identified as Asian, 3% identified as Hispanic or Latino, 37% identified as White/ Non-Hispanic, and 8% selected "Other." Eighty-seven percent of the participants were employed full-time, whereas 3% were employed regular part-time, 8% were casual employees or committed part-time, and 3% selected "Other." For education status, 76% of nurse practitioners held an MSN or master's degree and 24% held a DNP/Doctorate (see Table 4).

Participants were asked about their prior experience with PrEP (see Table 5). Although over 97% of participants had heard about PrEP, less than 50% of participants had ever initiated a conversation about PrEP with a patient. More than 65% of participants indicated that they did have patients ask about PrEP, but almost half of the participants had never had any experience prescribing PrEP. Additionally, when participants were asked about their prior knowledge of the potential side effects of PrEP's, less than 50% rated their knowledge as "Good" or "Very Good."

Data accuracy was achieved by rechecking survey data against an Excel spreadsheet by two members of the project group. The refined Excel data was exported to SPSS 27 which was used for the statistical analysis. There was one survey with a missing composite score for the

comfort construct. This did not significantly impact the results of the analysis.

Pre- vs. Post-Survey Scores

A paired t-Test was performed to assess differences in the 39 participants' pre and post intervention knowledge of PrEP clinical practice, comfort screening at-risk HIV individuals, and confidence in prescribing PrEP (see Table 6). Analyses revealed a significant difference (t (38) = 5.16, $p < 0.001$) between the pre-survey scores (M = 6.44, SD = 1.37) and post-survey scores (M = 8.10, SD = 1.65) for knowledge of PrEP clinical practice. There was a significant difference in the pre-survey scores (M = 9.97, SD = 3.41) and post-survey scores (M = 11.74, SD=3.14) for comfort screening at-risk HIV individuals; t (37) =2.67, $p < .008$. Confidence in prescribing PrEP was significantly different based on the pre-survey (M = 19.54, SD = 6.79) andpost-survey scores (M = 24.18, SD = 5.70); t (38) = 4.29, $p < .001$). Overall, the online tutorial intervention had a significant effect on all three constructs: knowledge, comfort, and confidence.

Post- and Retention Surveys

Three one-way repeated measures ANOVA within-subjects analysis was performed to assess the effects of the PrEP education intervention on knowledge of PrEP clinical practice, comfort screening at-risk HIV individuals, and confidence in prescribing PrEP for the 31 participants who completed the pre-, post-, and retention surveys. Figure 3 presents the mean scores for the three survey phases in a diagram. Likewise, themean scores and descriptive data for the repeated measures of knowledge of PrEP clinical practice are depicted in Table 7. There was a significant main effect of the PrEP education intervention on providers' knowledge of PrEP clinical practice (F (2, 60) = 13.83, $p < .001$, $\eta_p^2 = 0.315$). Post hoc tests for pairwise comparisons using the Bonferroni correction revealed that participants' knowledge of PrEP clinical practice increased significantly between the pre-survey(M = 6.23; SD = 1.36) and post-

survey (M = 8.13; SD = 1.65; $p < .001$). Participants' knowledge of PrEP clinical practice also increased significantly between the pre-survey (M = 6.23; SD = 1.36) and retention phase (M = 7.19; SD = 1.78; p = .020). Participants' knowledge of PrEP clinical practice post-survey scores and retention scores were not significantly different (see Table 8).

Figure 4 depicts mean scores for the comfort construct measured at 95% confidence interval that was obtained from the three survey phases. Specifically, this construct assessed whether the PrEP education intervention affected providers' comfort screening "at-risk HIV" individuals. Table 9 presents the mean scores with the standard deviation for the 30 participants. There was a significant main effect of the PrEP education intervention on the participants' comfort screening at-risk HIV individuals (F (2, 58) = 8.26, p = .001, η_p^2 = 0.222). Post hoc tests for the pairwise comparisons using the Bonferroni correction revealed that participants' comfort screening "at-risk HIV" individuals increased significantly between the pre-survey (M = 10.0; SD = 3.57) and retention phase (M = 12.50; SD = 3.38; p = .001). Participants' comfort screening "at-risk HIV" individuals pre-survey scores (M = 10.0; SD = 3.57) were not significantly different from the post-survey scores (M = 11.67; SD = 10.41; p = .08) and their post-survey scores and retention scores were not significantly different. Table 10 presents the comfort construct findings that were notable in the repeated measures ANOVA analysis (see Appendix S).

Figure 5 represents mean scores for the confidence construct measured at the 95% confidence interval that was obtained from the three survey phases. The mean and the standard deviation for the 31 participants is shown in Table 11. As notable in Table 12, there was a significant main effect of the PrEP education intervention on confidence in prescribing PrEP (F (2, 60) = 21.50, $p < .001$, η_p^2 = 0.413). Post hoc tests for the pairwise comparisons using the

Bonferroni correction revealed that participants significantly increased their confidence in prescribing PrEP from the pre-survey scores (M = 19.65; SD = 7.00) compared to the post-survey scores (M = 24.90; SD = 5.47; $p < .001$). Participants significantly increased confidence in prescribing PrEP from the pre-survey scores (M = 19.65; SD = 7.00) compared to the retention surveys (M = 25.48; SD = 4.12; $p < .001$). Participants' confidence in prescribing PrEP post-survey scores and retention scores were not significantly different ($p > .999$). As shown in Appendix V's table, the improved confidence to prescribe PrEP following the intervention can be noted through the repeated measures ANOVA analysis. Figure 6 is a bar graph which depicts the mean scores across all phases of the survey for the knowledge, comfort and confidence constructs. Across all constructs, retention scores differed from pre-survey scores, but did not differ from post-survey scores.

Likeliness to Prescribe PrEP

A Friedman's rank ANOVA test was performed on data collected from the 31 participants who completed the pre-, post-, and retention survey to assess one ordinal item regarding likeliness to prescribe PrEP in the next six months. Figure 7 displays the mean rankings for the pre-, post- and retention surveys. The results indicated that rankings for likeliness to prescribe were rated significantly different in the three groups ($\chi^2(2) = 22.45$, $p < .001$). The Post hoc tests for the pairwise comparisons using the Bonferroni correction revealed that participants' likeliness to prescribe PrEP increased significantly from the pre-survey's mean ranking of 1.52 compared to the post-survey's mean ranking of 2.17 with $p = .04$. Participants' ratings of likeliness to prescribe PrEP significantly increased from the pre-survey's mean ranking of 1.52 compared to the retention survey's mean ranking of 2.32 with $p = .01$. Participant's likeliness to prescribe PrEP for the post-survey and retention survey were not significantly different (see Table 13).

Discussion

Many researchers have studied various forms of education and training to promote PrEP as an HIV prevention strategy. Specifically, there were many studies focused on targeted education for the frontline primary care providers. The current QI project was aimed at enhancing retail NPs' ability to perform PrEP related encounters, especially with the “at-risk HIV” patients. Indeed, the project’s online PrEP tutorial was effective in improving knowledge of PrEP clinical practice, comfort screening “at-risk HIV” patients, confidence in prescribing PrEP, and the likeliness to prescribe PrEP in the next six months for retail health clinic providers.

Pre-survey revealed demographic characteristics as well as valuable baseline scores. The diverse group of NPs was mostly females with over six years of advanced nursing practice experience. The average age of participants was 39 years. This “mature” age suggests that the practitioners had additional various clinical nursing experiences. While almost everyone had heard about PrEP, more than half of the NPs had ever initiated a conversation about PrEP with a patient. Survey results suggested that only about half of the participants had ever prescribed PrEP before. Less than 10% had “excellent” or “very good” knowledge about PrEP’s potential side effects. Despite the NPs’ veteran status, the participants lacked knowledge about PrEP’s prescribing practices. In addition to the participant characteristics, baseline scores for all constructs were obtained through the pre-survey.

Post-survey scores were evaluated against baseline scores to note the effects of the education intervention. Participants demonstrated improved scores for all constructs in the post-survey that immediately followed the education tutorial. Despite the online PrEP tutorial taking only 30-40 minutes to complete, the NPs’ increased knowledge score was most impressive. The presentation’s evidence-based content in an easy to access, engaging format with practice

scenarios may have been an important factor in achieving positive knowledge gain results. This finding is in line with many studies that used longer PrEP training sessions (Irungu et al., 2019; Sales et al., 2019; Newman et al., 2019). Another recent study by Phillips et al. (2020) also found effectiveness of an education intervention administered in California's federally qualified health centers. An impressive knowledge gain for all twelve providers with post-test scores of 90% or greater was noted after a weeklong comprehensive evidence-based PrEP training. More importantly, Phillips et al. (2020) found a significant increase of 67% in writing PrEP prescriptions. The study's positive outcome reinforces the need for PrEP education and training aimed at frontline providers in primary care settings (Phillips et. al., 2020). Hence, the post-survey results echo the positive results that were found in previous studies and reinforces the need to provide education and training to NP providers.

The third phase of the survey was unique to this PrEP Education project. Participants completed the retention survey anywhere from four to ten weeks after viewing the online PrEP tutorial. With only 31 subjects that participated in the 30-day retention survey, the mean knowledge score marginally declined (about 8%) between the post- and retention surveys. Since it is impossible to not forget newly acquired information, some loss of knowledge was to be expected. The infamous phenomenon discovered in the 1880s, the "Forgetting Curve" suggested that trainees forgot about 50% of the learned material in the first hour and about 70% within the first 2-hour period (Davidson, 2016). Hence, ongoing updates and educational refresher courses will be beneficial to retain and reinforce important clinical knowledge. Moreover, with a larger number of participants completing the retention survey, this study could have found the knowledge score loss not to exceed the 5%. The unexpected knowledge loss could also be related to the current pandemic that had affected the daily workflow. All clinics confronted revenue loss

with a very low number of daily patient visits as well as fewer patients seeking STI screening needs. At the same time, the organization focused on redirecting the clinic workflow to adopt new coronavirus-related services. All providers were inundated with new training material as well as adapting to the pandemic's unprecedented workflow.

Overall, participants demonstrated improved comfort screening "at-risk HIV" patients after viewing the PrEP education tutorial. However, there were no significant differences in providers' pre-and post-survey ratings regarding their comfort in screening "at-risk HIV" patients. Likewise, Newman et al. (2019) found the medical residents' comfort assessing PrEP's clinical eligibility did not achieve a statistical significance despite their improved comfort prescribing PrEP after the 1-hour education session. The four-item section presented sensitive case scenarios of screening patients based on his/her gender and sexual preferences. By the third phase of the survey, NPs did increase their comfort level in asking the PrEP screening questions that explored patients' sexual practices. Interestingly, the organization launched its updated HIV prophylaxis guideline in late September 2020. More emails and reminders about the updated clinical guideline were being announced just before the retention survey was sent out. This could have encouraged providers to revisit their comfort level about the topic of PrEP and STI screenings. By the third phase of the survey, the participants increased their ratings for their comfort level to identify the "at-risk" HIV patients. Hence, this finding may be related to providers who had some time with repeated exposure to the PrEP topic that encouraged more consideration to become "comfortable" with this sensitive subject.

Participants' confidence with PrEP prescribing practices showed improved scores throughout the survey phases. Indeed, the PrEP tutorial promoted knowledge about potential side effects and required laboratory data for ongoing PrEP follow-up visits. NPs' improved

confidence with PrEP prescribing practice suggested the knowledge gained about the national PrEP clinical guidelines.

Participant responses to the likeliness to prescribe in the next six months showed favorable results. There was a steady increase for all phases of the survey. Compared to the baseline, participants were more likely to prescribe PrEP immediately following the intervention and 30 days following the intervention. Phillips et al. (2020) demonstrated a 67% increase in PrEP prescriptions following a week-long educational intervention based on the national PrEP clinical guideline. Although this QI project did not conduct a retrospective review of the organization's electronic medical record, the study's data signaled a promising perspective. This relevant finding suggested that participants did gain knowledge, comfort, and confidence related to PrEP practices after participating in the PrEP tutorial intervention. Their intent to confidently prescribe PrEP was recognized to symbolize improved care for the "at-risk HIV" patients.

Educational Implications

Nurse practitioners are lifelong learners that will seek ongoing education and training throughout their careers. Online education in various shapes and forms have become widely available and acceptable to meet the nursing professional needs and development. Quality online educational design that is engaging and interactive will be more suitable in engaging learners that promote a positive learning experience. Rouleau et al. (2019) conducted a systematic review on effects of e-learning on nursing care activities. Using the Kirkpatrick model's levels of evaluation, Rouleau et al. (2019) found 59% of reviewed studies had positive outcomes related to e-learning. Specifically, e-learning interventions improved nurses' knowledge in many subjects such as medication administration and calculation (Rouleau et al., 2019). Likewise, the PrEP tutorial's interactive design with clinical case scenarios had a positive impact on NPs. When

compared to the pre-intervention baseline, NPs had learned many aspects about PrEP clinical practice that instilled their confidence and likeliness to prescribe PrEP in the near future. Overall, the online PrEP tutorial provided a low cost, yet robust way to educate NP providers about PrEP.

Implications for Practice

The PrEP education project's findings supported the value of increasing providers' knowledge through participation in an online training tutorial. Based on the CDC's PrEP clinical guideline (CPG; CDC: U.S. Public Health Service, 2018), the self-paced online training had a significant impact on the organization and the community. Study results suggested that the Retail Clinic's NPs were better equipped to engage in PrEP discussions with more patients with an improved ability to initiate PrEP. Their improved ability to screen for PrEP candidacy also implied their confidence with PrEP's national CPG (CDC: U.S. Public Health Service, 2018).

NPs' increased understanding of PrEP is critical to delivering enhanced quality care for patients that may be "at-risk" for HIV. Retail clinic NPs' improved ability to offer safe PrEP related patient encounters ultimately benefits the communities and the nation. Instilling NPs with the knowledge to fuel comfort about screening candidacy and confidence about prescribing PrEP should reveal improved patient outcomes that predict lower HIV infection rates.

Implications for Healthcare Policy

The national initiative to dramatically lower HIV infections had spiraled the urgency for broader PrEP uptake. The "A Plan for America" involved prevention as one of its four key strategies along with "diagnosis," "treatment" and "respond" themes. Under the prevention topic, PrEP was highlighted with an emphasis on the national clinical PrEP guideline, educational campaigns, and the PrEP Locator program (CDC, 2020c). Interestingly, the Kaiser Family

Foundation's report revealed that 34.8 billion was spent on HIV-related efforts in 2019 with only 3% of the total federal budget towards domestic HIV prevention efforts (Kaiser Family Foundation, 2019). Since the national plan parallels the current HIV epidemic, more funding should be allocated towards education aimed at improving provider knowledge about PrEP and the CDC's national clinical guideline. All primary care practices should encourage their frontline providers to engage in an online self-paced training opportunity that may enhance their current knowledge on PrEP clinical guidelines. Also, national credentialing organizations for nursing education may influence advanced practice nursing programs to make curriculum enhancements that mirror the current public health efforts. Nurse practitioner programs could easily incorporate a brief online PrEP module to improve NP students' knowledge about PrEP clinical guidelines and their role in ending the HIV epidemic for the nation.

Implications for Executive Leadership

Clinical leaders must continuously evaluate evidence-based practice and disseminate research findings that reinforce new practice protocols. With any newer guideline updates, the education team should offer training sessions. Organizational leadership should provide the needed resources that are required to develop engaging education tutorials. Since certain sensitive health topics will require various forms of training, the executive leadership should make a PrEP tutorial available on its intranet for the newer providers.

Implications for Quality/Safety

Recent trends in healthcare highlight the urgency to provide safe patient care that can deliver measurably improved outcomes. Education tutorials that can enhance providers' ability to convey better patient care should be recognized. The improved composite scores for knowledge, comfort, and confidence constructs suggest that NPs could influence better outcomes for patients

"at-risk" for HIV. With improved ability to screen for candidacy, NPs will be knowledgeable about how to safely treat these patients prophylactically to prevent HIV infections. The "at-risk HIV" patients who meet the criteria for PrEP will receive safe quality-driven care. Measurable outcomes for communities will support the national goal to lower 75% of HIV infections by the year 2025 (HIV.gov, 2019).

Limitations

This quality improvement project delivered for two regions in the mid-Atlantic area of the country lacks the ability to generalize for the entire nation. The study's findings pertained to one retail clinic organization's small group of NPs that were not recruited through a random sampling method. Also, the current analysis cannot conclude which construct variable best predicts NPs' likeliness to prescribe in the next six months.

Plans for Sustainability

This QI project's tutorial should be available on the organization's intranet site. Other NP staff pursuing DNP degrees will have the opportunity to learn about the details of the study. The tutorial link can be available to offer to new onboarding staff who are new to retail clinic or newly graduated from NP programs. Other possible ideas for further dissemination of the PrEP tutorial are to current family practice nurse practitioner students who are in their final semester ready to graduate from their programs and dissemination to local nurse practitioner organization chapters.

Future Direction

A larger random sample size from various regions of the country may provide better insight into the value of delivering an online PrEP tutorial for retail clinic nurse practitioners. Advanced statistical regression analysis could predict whether the knowledge, comfort, or

confidence construct might best influence NPs' likeliness to prescribe PrEP. Additionally, retrospective analysis of aggregate patient data to evaluate the number of actual PrEP prescriptions would highlight further insight into the intervention's impact on improving PrEP uptake.

Conclusion

Despite the proven efficacy of PrEP, the uptake has been less than desirable in confronting the HIV epidemic. The organization's retail health clinics located throughout the communities are the "PrEP Providers" answering the nation's call to reduce the HIV infections that disproportionately affect the southern part of the country, including the capital, Washington DC. The evidence-based PrEP Education Intervention online tutorial was designed to instill knowledge, comfort and confidence for busy frontline nurse practitioners. This quality improvement project successfully demonstrated improved post-intervention survey scores to reflect enhanced PrEP knowledge, comfort identifying at-risk HIV candidates, and confidence with PrEP prescribing practices. Moreover, an improved score for NPs' likeliness to prescribe PrEP in the next six months signified increased opportunities to prescribe PrEP to the "at-risk HIV" patients. Hence, this intervention contributed to building a team of NP champions ready to conduct quality-driven PrEP encounters and prescribe PrEP for those meeting the criteria.

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Appendix A

SWOT Analysis

	Strengths (To achieving the objectives)	**Weaknesses** (To achieving the objectives)
Internal Origin	• Strong branding; Retail clinicsnationwide • Well-known for convenience and quality; high patient satisfaction rate • Innovative retail health concept usingEBP clinical guidelines; experienced and engaged leadership • Dedicated clinicians; educational &professional advancement opportunities • Magnet status and encourages "newknowledge, innovation and improvements"	• Inexperienced providers withknowledge and skill deficit • Busy clinic setting and little timeto engage in new learning activities • Lack of NP interest with PrEPtopic • Organization does not permit use of any deidentified patient data orrevealing company name for DNPprojects • No network of infectious diseasespecialists for potential referrals
External Origin	• DC with high HIV incidence rate • Increased public awareness about PrEP with the national HIV preventioneffort • Projected population growth for DCmetro region • Public familiarity with retail healthclinics • Generic version of Truvada available • USPTF's PrEP recommendationupdated to an "A" rating	• Uninsured patients unable toafford cost of clinic visits • Failure of Health Hub initiative toincrease "young adult" health services • Decreased overall patient volume

Appendix B

Evidence Table

Article #	Author & Date	Evidence Type	Sample, Sample Size, Setting	Findings that help answer the EBP Question	Observable Measures	Limitations	Evidence Level & Quality
1 (non-research)	Centers for Disease Control and Prevention (CDC) (2018)	Clinical Practice Guideline (update from 2014) RCT's and pilot studies	Multiple settings and sample sizes, including international studies Males, females & transgender (n=20 to >1250)	Evidence of need for additional HIV prevention; Evidence of safety and efficacy of antiretroviral (ARV) prophylaxis; Identification for PrEP indications; PrEP practice (goals of therapy and monitoring needs)	Safety and efficacy of ARV use in clinical trials	No validated tool for risk assessment; Lack of PrEP eligibility algorithm in a visual format	Level I & A Quality
2	Clement, M.E., Seidelman, J., Wu, J., Alexis, K., McGee, K., Okeke, N.L., Samsa, G., & McKellar, M. (2018)	Quasi experimental	Primary care providers (PCP) of the Duke University Health System in Durham, NC for pre & post	An educational initiative improved PrEP knowledge and prescribing practices for PCPs	Pre and post education intervention survey results (PrEP practice patterns: Likeliness to prescribe PrEP, knowledge &	Selection & response bias: Lack of generalizability due to respondents at university-affiliated institution in South; pre & post	Level II & B quality

Article #	Author & Date	Evidence Type	Sample, Sample Size, Setting	Findings that help answer the EBP Question	Observable Measures	Limitations	Evidence Level & Quality
			intervention survey; pretest n=33; intervention n=30 & n=79 for post intervention survey only		comfort with PrEP practice) 60% cited lack of knowledge as reason Reported prescribing; 42% lack of comfort as reason for not prescribing; PrEP prescribing pre intervention was 17% vs 35% post education intervention	surveys were not linked	

Article #	Author & Date	Evidence Type	Sample, Sample Size, Setting	Findings that help answer the EBP Question	Observable Measures	Limitations	Evidence Level & Quality
3	Edelman, E.J., Moore, B.A., Calabrese, S.K., Berkenblit, G., Cunningham, C.O., Ogbuagu, O., Patel, V.V., Phillips, K.A., Tetrault, J.M., Shah, M. & Blackstock, O. (2019)	Cross Sectional online survey (Descriptive Study)	240 urban primary care physicians affiliated with academic institutions Members of Society of General Internal Medicine (SGIM)	Provider training and clinic-specific PrEP protocols may promote PrEP implementa-tion towards improving wider PrEP uptake	Practice characteristics: Provider preferred PrEP implementation model (All provider training vs inhouse PrEP specialist vs refer out) 85% of physicians favored PrEP integration through: Training (42%) Onsite specialist (43%) Refer out (15%)	Original survey was from 2015 using a convenience sample; all respondents were associated with academic institutions; lack of generalizability to non-academic and community-based providers and non-urban settings; did not include other providers such as NPs, family physicians; lack of descriptions for response values for the Likert scales (i.e., “2” & “3” explanation)	Level III & B Quality

Article #	Author & Date	Evidence Type	Sample, Sample Size, Setting	Findings that help answer the EBP Question	Observable Measures	Limitations	Evidence Level & Quality
4	Henny, K. D., Duke, C.C., Buchacz, K., Brooks, J. T., Samandari, T., Sutton, M. Y. (2019)	Cross Sectional online survey (Descriptive Study)	820 PCPs practicing in South Eastern high HIV burden areas (Atlanta, GA, Baltimore, MD, Baton Rouge, LA, Miami, Fl, New Orleans, LA, Washington, DC)	PCPs who prescribed PrEP had self-reported good understanding of PrEP and more likely to prescribe provide primary care for persons with HIV Use of antiretroviral therapy (ART) may be increased with provider comfort and familiarity	PCP's practice of prescribing nPEP; PrEP & ART PCP demographics; prior HIV training; knowledge, behaviors, attitudes and practices of HIV related care More than 52% providers lacked knowledge Adjusted prevalence rate for PrEP's familiarity was (aPR=4.35, 95% CI 2.63, 7.14)	Possible measurement error since survey response choices were all dichotomous categories (i.e. yes/no)	Level III & B Quality

Article #	Author & Date	Evidence Type	Sample, Sample Size, Setting	Findings that help answer the EBP Question	Observable Measures	Limitations	Evidence Level & Quality
5	Henny, K. D., Duke, C.C., Buchacz, K., Brooks, J. T., Samandari, T., Sutton, M. Y. (2019)	Cross Sectional online survey (Descriptive Study)	820 PCPs practicing in South Eastern high HIV burden areas (Atlanta, GA, Baltimore, MD, Baton Rouge, LA, Miami, Fl, New Orleans, LA, Washington, DC)	Positive correlation exists between provider training and delivery of PrEP services Educational intervention is needed in the South to strengthen PrEP familiarity for PCPs	Only 1/3 of PCPs reported any HIV related training in the last 24 months; PCPs with HIV-related training were likely to provide PrEP➔ PCPs with HIV related training compared to no training were more familiar with PrEP (aPR-1.67, 95% CI 1.19, 2.38) and to ever have prescribed PrEP to patients) aPR=1.75, 95% CI 1.1., 2.78)	Possible measurement error since survey response choices were dichotomous categories (i.e. yes/no)	Level III & B Quality

Article #	Author & Date	Evidence Type	Sample, Sample Size, Setting	Findings that help answer the EBP Question	Observable Measures	Limitations	Evidence Level & Quality
6	Irungu, E.M., Ngure, K., Mugwanya, K., Mugo, N., Bukusi, E., Wamoni, E., Odoya, J., Morton, J.F., Bernabee, G., Mambo, B. Masyuko, S., Mukui, I., O'Malley, G. & Baeten, J.M. (2019)	Quasi experimental	541 health workers (HW) of Kenya's public health facilities participated in a 2-day PrEP for HIV serodiscordant couples; Pre-test and post-test study design called, "Partners Scale-UP Project"	Standardized training improved PrEP knowledge and confidence of HW to provide PrEP to HIV serodiscordant couples	Among all HW that completed both pre & post-tests, Pretraining mean of 61.7% increased to post training of 86.4% (SD 12.7); increase of 24.7% (95% CI 23.3-26.1, $p<0.001$) in mean scores 30% HW felt very uncomfortable prior to training and post training, number was reduced to 11.7% Providers gain in comfort post intervention (from 22.8 % to 67.3%, $p<.001$)	Study did not assess the retention of knowledge and skills after the training; also, did not measure the effect of training on quality of PrEP service delivered to the community	Level II & B quality

Article #	Author & Date	Evidence Type	Sample, Sample Size, Setting	Findings that help answer the EBP Question	Observable Measures	Limitations	Evidence Level & Quality
7	Newman, R., Katchi, T., Karass, M., Gennarelli, M., Goutis, J., Kifayat, A., Solanki, S., Yandrapalli, S., Forman, L. & Nabors, C. (2018)	Quasi experimental	48 medical residents in an academic internal medicine residency program that participated in the educational session; 45completed pre-test and 36 completed post-tests following an hour-long intervention	Pre-test awareness of PrEP was 22%. 78% believed PrEP was effective, 66% believed PrEP was safe 62%; had fair or poor knowledge of side effects Post-test revealed - 94% believed PrEP was effective, 92% for PrEP safety; likeliness to prescribe PrEP pre-test was 32% & post-test revealed 67% to prescribe in the next 6 months	Pre and post education intervention survey results (PrEP practice patterns: Likeliness to prescribe PrEP, knowledge & comfort with PrEP practice) 22% out of 45 surveyed were not at all familiar with PrEP prior to education intervention Reported likeliness to prescribe PrEP - pre intervention was 35% vs 67% post education intervention	Selection & response bias: Lack of generalizability due to respondents at university-affiliated institution in South (medical students); pre & post surveys were not linked	Level II & B quality

Article #	Author & Date	Evidence Type	Sample, Sample Size, Setting	Findings that help answer the EBP Question	Observable Measures	Limitations	Evidence Level & Quality
8	Sales, J.M., Cwiak, C., Haddad, L.B., Phillips, A., Powell, L., Tamler, I., and Sheth, A.N. (2019)	Quasi experimental	28 providers/staff members working in safety net family planning (FP) clinics in Atlanta, GA Staff included physicians, NPs, health educator, clinic manager for the region's four clinics	Providers' knowledge and confidence for PrEP improved after a 1.5-hour education session	PrEP knowledge before training was M=3.26 vs post M=5.13 (SD = 1.1.8) Provider confidence in identifying patients at HIV risk was pre-M=8.11 vs post M=9.11, p =.007 Only 19% of staff members had previously heard of PrEP and only 7% were aware of USPHS guidelines prior to education intervention	A convenience sample of family planning clinic staff that included non-providers; did not train every staff member for each clinic	Level II & B Quality

Article #	Author & Date	Evidence Type	Sample, Sample Size, Setting	Findings that help answer the EBP Question	Observable Measures	Limitations	Evidence Level & Quality
9 (non-research)	United States Preventive Task Force (USPTF) (2019)	Scientific reviews of various evidence-based high-quality research that had been conducted Consensus; Position Statement of national expert committee appointed by AHRQ – based on high quality evidence	N/A	"A" grade for the position that clinicians should offer PrEP to persons at risk of HIV transmission	Effectiveness of risk assessment; PrEP efficacy; Potential risk assessment; Estimate magnitude of net benefit	Did not address regional differences in PrEP uptake; Does not discuss the providers' roles in addressing PrEP practice; does not discuss lack of provider knowledge	Level I & A Quality

Article #	Author & Date	Evidence Type	Sample, Sample Size, Setting	Findings that help answer the EBP Question	Observable Measures	Limitations	Evidence Level & Quality
10	Wilson, K., Beckett, C.G., Blaylock, J.M., Okulicz, J.F., Scott, P. T., Hakres, S. (2020)	Cross Sectional online survey (Descriptive Study)	432 Active U.S. Navy providers in various specialties (family medicine, infectious disease, internal medicine, occupational health, pediatrics)	PrEP Knowledge gap exists amongst Navy Providers despite military's provision of PrEP; Training to improve prescribing practice knowledge and sexual history taking may be useful	Number of patients seen monthly; comfort discussing sexual risk behaviors; frequency of querying patients about sexual activities; frequency of prescribing PrEP; Knowledge of CDC guideline on PrEP Poor knowledge (17.1%); Ever prescribed PrEP (19%) Provider knowledge about PrEP directly correlated with their likeliness to prescribe PrEP (29% vs 6%)	Participation bias – respondents more interested in HIV prevention; survey limited to military providers and not generalizable for non-military providers; 22-item lengthy survey leading to survey-fatigue	Level III & B Quality

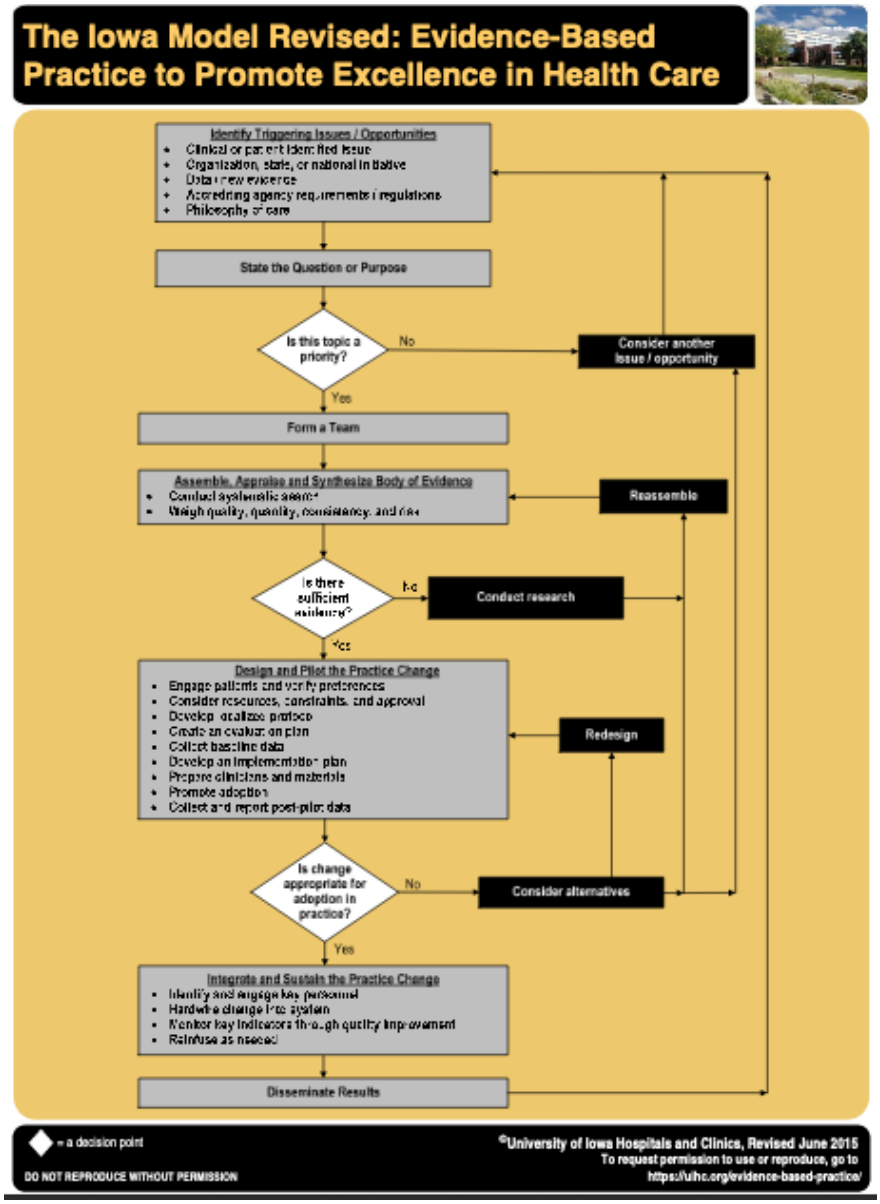
Article #	Author & Date	Evidence Type	Sample, Sample Size, Setting	Findings that help answer the EBP Question	Observable Measures	Limitations	Evidence Level & Quality
11	Wood, B.R., Mann, M.S., Martinez-Paz, N., Unruh, K.T., Annese, M., Spach, D.H., Scott, J.D. & Stekler, J.D. (2018)	Quasi experimental (Pilot tele-mentoring program)	Medical providers on the HIV ECHO email list (Extension for Community Healthcare Outcomes); Program was out of Seattle, WA and supported HIV practitioners in NW region of country n=24 pre-test n=45 post-test	Continuous education and support improved providers ability to stay current on PrEP guidelines and improved prescribing confidence	Adding PrEP distance curriculum into existing Project ECHO improved medical provider knowledge and comfort with PrEP 64% responded “extremely” and 12 % “moderately” that PrEP Echo increased their likelihood to prescribe PrEP	Pre and post intervention surveys were not matched; insufficient sample size; no measure of statistical significance; low overall response rate; qualified for post survey criteria was based on at least one session; possible responder bias; study was limited to one region of the country	Level II & C Quality

Article #	Author & Date	Evidence Type	Sample, Sample Size, Setting	Findings that help answer the EBP Question	Observable Measures	Limitations	Evidence Level & Quality
12	Zhang, C., McMahon, J., Fiscella, K., Przbyla, S., Braksmajer, A., LeBlanc, N. & Liu, Yu (2019)	Systematic review	18,265 health care professionals (HCP) in various settings from 36 studies were assessed	Discrepancy exist between HCPs awareness/ willingness to prescribe PrEP vs low prevalence of PrEP consultations and actual prescribing frequencies; PrEP provision lowest among HCP's of South; Barriers and and facilitators for PrEP implement-ation exist	Pooled prevalence of PrEP awareness among HCP (68%; 95% CI 55-80%); willingness to prescribe (66%; 95% CI 54-77%); PrEP consultation (37%l 95% CI 25-52%); PrEP prescription (24%; 95% CI 17-32%)	Publication biases – type 1 errors; high heterogeneity of studies due to diverse design, populations and settings; scarce data of PrEP implementation in certain specialists; compromised precision and validity of estimates due to arbitrarily categorizing participants (i.e. NPs & PAs into one grp)	Level II & A quality

Appendix C

Iowa Model Revised

Figure 1. *Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care*



(Iowa Model Collaborative, 2017)

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Appendix D

Project Team Members

Table 1. *PrEP Education Intervention Team Members*

Dr. Karen Whitt	Primary Advisor Principal Investigator
Dr. Laura Posey	Secondary Advisor
Kristina Jung, MSN	Student Principal Investigator
Linda Duquette-Petersen, MSN	Regional Quality Lead – Region 23
Carol Gibson, MSN	Region 23 Fellow, Preceptor
Hilary Summers-Royce, DNP	Regional Quality Lead – Region 22

Appendix E

GWU IRB Determination

From: **SON Research** sonresearch@email.gwu.edu
Subject: Re: Quality Improvement Project for Review
Date: July 15, 2020 at 5:07 PM
To: Kristina Jung kjung007@gwmail.gwu.edu
Cc: SON Research SON Research SONResearch@gwu.edu, Karen Whitt - kjwhitt@gwu.edu kjwhitt@gwu.edu

SR

Dear Kristina and Dr. Whitt,

Regarding the determination request for the proposal entitled, "The PrEP Education Intervention," a determination has been made that your project does not meet the definition of research. That is, a systematic investigation intended to contribute to generalizable knowledge.

This determination is being made after review of the project documents. The project nature as quality improvement intends to inform internal practice. The project does not aim to inform new theories or external standards of practice. Therefore, further review by the GW Nursing Office of Research or the GW Institutional Review Board is not required (per GW IRB Policy HRP-010, Human Research Protection Program).

Should your project change in any way that it would meet the definition of research, please contact the GW Nursing Office of Research at sonresearch@gwu.edu so we may assist you in proceeding. As a reminder, you are to conduct all projects in an ethical manner regardless of review requirements.

Please do not hesitate to contact me with any questions or concerns regarding this determination.

Kind regards,

Angela M. McNelis, PhD, RN, FAAN, ANEF, CNE
Professor and Associate Dean for Scholarship, Innovation, and Clinical Science
Governor-At-Large, National League for Nursing
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Appendix F

Intervention Syllabus

Dear colleagues,

As frontline providers to the communities we serve, we nurse practitioners (NP) must confront the current HIV epidemic. The national initiative endorsed by the Centers for Disease Control and Prevention (2019), "Ending the HIV Epidemic: A Plan for America," aims to reduce 75% of HIV infections in the next five years and 90% by the year 2030. Importantly, Washington DC had the highest incidence rate in the nation with 34.6% in 2018 (CDC, 2019)!

According to the Centers for Disease Control and Prevention's site, all MinuteClinic is identified under "PrEP Locator" listings. This means that our clinics should offer this service confidently as well as being confident to screen for those at-high HIV risk individuals. Although this education session is optional, I hope you can take the time to review the PrEP education session. I hope it may enhance your knowledge and confidence in providing PrEP encounters.

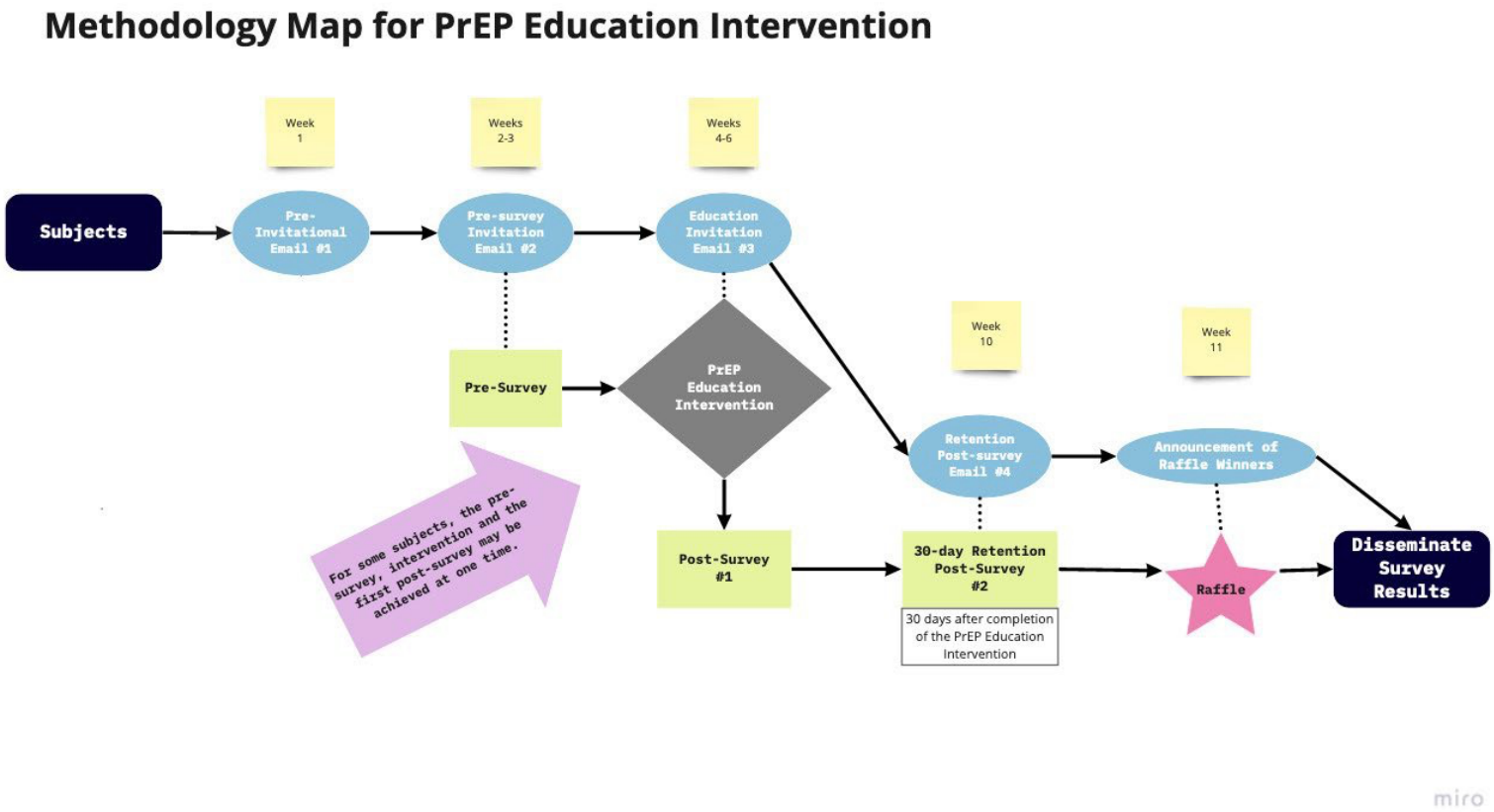
Length of Education Session Delivered online	25-30 minutes
Online Presurvey	5-10 minutes
Online Postsurvey	5-10 minutes
30-day Post intervention Retention Survey	5-10 minutes
Purpose of Learning Session	To gain knowledge, comfort, and confidence with PrEP clinical practice that includes screening candidacy and prescribing PrEP
Learning Objectives	1. Learn what PrEP is 2. Learn about the potential adverse effects of PrEP 3. Learn to assess patient's risk of contracting HIV to determine PrEP candidacy 4. Learn to evaluate patients' clinical eligibility for PrEP 5. Learn to prepare PrEP prescriptions with appropriate patient education and necessary follow-ups

Centers for Disease Control and Prevention. (2019). *HIV surveillance report* (Volume 30) [Report]. cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-2018-vol-30.pdf

Appendix G

Intervention Methodology Map

Figure 2. *PrEP Education Intervention's Methodology Map*



Appendix H

Intervention Timeline

Table 2. *PrEP Education Intervention Timeline*

Completion Date	Planning	Pre-Implementation	Implementation	Evaluation
5/08/2020	Finalize DNP Project Proposal			
5/25/2020	Begin developing PP PrEP session			
7/03/2020	Obtain approval from XYZ Clinic's DNP Project Committee			
7/15/2020		GWU IRB submission and approval		
7/20/2020	Complete PP PrEP teaching material			
7/27/2020 **Week 1**		Reconnect with SPMs to remind them about launching date	Launch the "Pre-Intervention Emails Email #1	
8/03/2020 **Week 2**			Launch the Invitational Emails- Pre-survey Email #2	Pre-survey
8/10/2020 **Week 3**			Pre-survey Email # 2	Pre-survey
8/17/2020 **Week 4**			Launch the Education intervention Emails – PrEP	Pre-survey & Post-survey

			Education w/ Post-survey Email #3 (embedded with pre-survey)	
8/24/2020 **Week 5**			PrEP Education w/ Post-survey Email # 3 (embedded with pre-survey)	Pre-survey & Post-survey
8/31/2020 **Week 6**			PrEP Education w/ Post-survey Email #3 (embedded with pre-survey)	Pre-survey & Post-survey
9/14/2020 **Week 8**			Re-launch the PrEP Education w/ Post-survey (embedded with pre-survey)	Pre-survey & Post-survey
9/21/2020 **Week 9**			Invitational Emails – PrEP Education w/ Post-survey (embedded with pre-survey)	Pre-survey & Post-survey
10/26/2020 **Week 14**			Launch the Retention Survey Invitation Email #4	Retention Survey
11/02/2020 **Week 15**			Retention Survey	Retention Survey
11/23/2020 **Week 16**			Announce Raffle winners	Send Thank You emails to everyone

Appendix I

Informed Consent

Title of Study**: The PrEP Education Intervention**
IRB #:
Principal Investigator Name**: Dr. Karen Whitt DNP Student Investigator: Kristina Jung**
Version Date: 1/4/2019

You are invited to participate in a quality improvement project under the direction of **Dr. Karen Whitt of the Department of Nursing, George Washington University** (GWU). Taking part in this research is entirely voluntary. Further information regarding this study may be obtained by contacting **Kristina Jung (DNP Student Investigator) at (703) 615-4300.**

The purpose of this project is to **evaluate clinic nurse practitioners in assessing and prescribing PrEP. Participants will receive an educational intervention aimed at increasing provider knowledge of PrEP to help improve screening and prophylaxis preexposure HIV in at-risk individuals.**

What are the reasons you might choose to volunteer for this project? **The PrEP education session will be provided online, at your convenience and will refresh your knowledge about PrEP practice that includes identifying those at-HIV risk and safe prescribing. Your participation also supports the national movement "Ending the HIV Epidemic: A Plan for America," which aims to reduce 75% of HIV infections in the next five years and 90% by the year 2030.**

What are the reasons you might not choose to volunteer for this project?
It does require some attention and time commitment to attend the education session and complete the surveys.

If you choose to take part in this project, **you will answer the presurvey, view the PowerPoint learning module and answer the postsurvey. One month later, you will be asked to answer the post survey again to test for knowledge retention.** The total amount of time you will spend in connection with this **project is 20-30 minutes**. The second postsurvey will take **additional 10-15 minutes.** You may refuse to answer any of the questions, and you may stop your participation in this project at any time.

Possible risks or discomforts you could experience during this project include: **The risks for participating in this project are minimal and no more than encountered in daily life. The main risk would be confidentiality of your answers on the surveys. All survey answers will only be accessible to the investigator, Kristina Jung, and**

individual names and answers will not be kept confidential. Results from the survey will only be reported in aggregated, anonymous form.

You will not benefit directly from your participation in the project. The benefits to science and humankind that might result from this study are: **It may further support the need for PrEP education for American frontline providers. PrEP education may improve knowledge, comfort and confidence for PrEP related practice, as well as, increasing the willingness to prescribe to those at-risk HIV patients. Frontline providers, equipped with improved knowledge and confidence, may improve the care delivered to the at-risk HIV patient population.**

Every effort will be made to keep your information confidential, however, this cannot be guaranteed. **You will be asked to include your name on the survey, but only the investigator, Kristina Jung, will have access to this information. After initial data is collected your name will be replaced with an anonymous number.** If results of this research study are reported in journals or at scientific meetings, the people who participated in this project will not be named or identified.

The Office of Human Research of George Washington University, at telephone number (202) 994-2715, can provide further information about your rights as a research participant.

To ensure anonymity your signature is not required. Your willingness to participate in this project is implied if you proceed with completing the surveys.
*Please keep a copy of this document in case you want to read it again.

Appendix J

PrEP Education Survey

Token ID: _____

Demographics

Age in years _____

How many years of experience do you have as a Nurse Practitioner? _____

What is your Race/ Ethnicity?
1 = White/ Non-Hispanic
2 = African American
3 = Asian
4 = Other

What is your highest degree of education?
1 = MSN or master's degree
2 = DNP/ Doctorate

What is your gender?
1 = Female
2 = Male

"Prior PrEP Experience"

1) Before today, had you heard of PrEP?1=Yes
   2=No

2) Have you ever been asked about PrEP by a patient?1=Yes
   2=No

3) Have you ever initiated a conversation about PrEP with a patient?1=Yes
   2=No

4) Have you ever prescribed PrEP to a patient?1=Yes
   2=No

5) Before today, how would you rate your knowledge of PrEP's potential side effects (e.g., renal dysfunction)?

a) Excellent
b) Very good
c) Good
d) Fair
e) Poor

Provider Knowledge – 10 questions

1) Which medication has been FDA-approved for PrEP use? (FDA)
   a) Maraviroc (Selzentry)
   b) Tenofovir
   c) **Tenofovir / Emtricitabine (Truvada)***
   d) Tenofovir / Emtricitabine / Efavirenz (Atripla)
   e) Raltegravir + Emtracitabine (Isentress + Emtriva)
   f) None has been approved
   g) Not Sure

PrEP Knowledge Survey item

2) How often should patients on PrEP be followed for medication side effects and lab toxicities after initial assessment? (PrEP Monitor)
   a) Every month
   b) Every 6 months
   c) **Every 3 months**
   d) Yearly
   e) Not necessary to monitor after the first year

3) You are discussing PrEP with a 30-year-old male who has multiple male sexual partners. He states he seldom wears a condom. Which clinical eligibility factors do not support the initiation of PrEP?

   a) HIV negative status, no active signs/symptoms of HIV infection, GFR > 60
   b) HIV negative status, negative Anti-HBs, Negative Hep C antibody, GFR<60
   c) HIV negative status, no active signs/symptoms of HIV infection, Positive HBsAg, GFR>60
   d) HIV negative status, Negative HBsAg, no fever, fatigue, pharyngitis, rash, night sweats and adenopathy

4) Can an individual be initiated on PrEP after becoming exposed to HIV?

   a) Yes. PrEP can be initiated within 72 hours of becoming exposed to HIV
   b) No. PrEP must be initiated for HIV negative individuals only
   c) Yes. PrEP can be taken for up to 7 days
   d) Only Descovy can be started under this circumstance

5) What are the serious side effects of PrEP?

   a) Increased bone mineral density
   b) Increased buildup of calcium deposits
   c) Mild nausea and diarrhea
   d) New or worsening renal impairment, including kidney failure

6) How effective do you think PrEP is in preventing acquisition of HIV among people who take it every day as prescribed?
   1=Not at all effective
   2=Slightly Effective
   3=Moderately Effective
   4=**Extremely Effective**

7) Based on your understanding of PrEP side effects, how safe is PrEP?
   1=Not at all safe
   2=Slightly safe
   3=Moderately safe
   4=Extremely safe

8) PrEP reaches maximum protection from HIV for **receptive anal sex** at about **how many days** of daily use?
   a) 3 days of daily use
   b) 4 days of daily use
   c) 6 days of daily use
   d) 7 days of daily use

9) For **receptive vaginal sex** and **injection drug use**, PrEP reaches maximum protection at about **how many days** of daily use.
   a) 7 days of daily use
   b) 14 days of daily use
   c) 21 days of daily use
   d) 28 days of daily use

10) If a patient says he/she is using condoms consistently and correctly, how important is it to offer PrEP in addition to condoms if you have identified the individual as possessing high at-risk HIV?
    1=Not at all important
    2=Slightly important
    3=Moderately important
    4=Extremely important

Provider Comfort Level - 4 questions

1) For each of the following risk behavior categories, how comfortable are you evaluatingeligibility for PrEP?

How comfortable are you evaluating PrEP eligibility for Women who have sex with men?

1= Not at all comfortable
2= Slightly comfortable
3= Moderately comfortable
4= Extremely comfortable

2) How comfortable are you evaluating PrEP eligibility for **Men who have sex with women**?
1= Not at all comfortable
2= Slightly comfortable
3= Moderately comfortable
4= Extremely comfortable

3) How comfortable are you evaluating PrEP eligibility for **Men who have sex with men?**
1= Not at all comfortable
2= Slightly comfortable
3= Moderately comfortable
4= Extremely comfortable

4) How comfortable are you evaluating PrEP eligibility for **People who inject drugs?**
1= Not at all comfortable
2= Slightly comfortable
3= Moderately comfortable
4= Extremely comfortable

Provider Confidence - 8 questions

Each of the following risk behavior categories, how **confident** are you to prescribe PrEP to an eligible individual, assuming a recent negative HIV test and equal access to medication.

1) Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to **a female with a current male partner known to be HIV-positive**?

1= Not at all confident
2= Slightly confident
3= Moderately confident
4= Extremely confident

2) Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to **a female who has unprotected sex with male partners with**

unknown HIV status who are at high risk of HIV infection (e.g. partners(s) who has sex with other males or uses injection drugs)?

1= Not at all confident
2= Slightly confident
3= Moderately confident
4= Extremely confident

3) Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a **male with a current female partner known to be HIV-positive**?

1= Not at all confident
2= Slightly confident
3= Moderately confident
4= Extremely confident

4) Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to A male who has unprotected sex with male partners with unknown HIV status who are at high risk of HIV infection (e.g., partner(s) who has sex with other males or uses injection drugs)?
1= Not at all confident
2= Slightly confident
3= Moderately confident
4= Extremely confident

5) Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a **male with a current male partner known to be HIV-positive**?
1= Not at all confident
2= Slightly confident
3= Moderately confident
4= Extremely confident

6) Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to **a male who has sex with multiple male partners and has had unprotected anal sex**?
1= Not at all confident
2= Slightly confident
3= Moderately confident
4= Extremely confident

7) Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a **person who has injected drugs in the past 6 months and shared injection equipment**?
1= Not at all confident
2= Slightly confident

3= Moderately confident
4= Extremely confident

8) Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a **person who has been on methadone maintenance for the past 6 months but has continued injection drug use**?
1= Not at all confident
2= Slightly confident
3= Moderately confident
4= Extremely confident

Provider likeliness to prescribe

1) How likely are you to prescribe PrEP in the next 6 months?
1= Not at all
2= Slightly
3= Moderately
4= Extremely

Appendix K

Variable Table

VARIABLES	TYPE OF VARIABLE	THEORETICAL DEFINITION	OPERATIONAL DEFINITION	LEVEL OF MEASUREMENT
NP Identifier	Alpha-numeric, discrete	Unique ID	System generated unique ID	Nominal/ Categorical
NP Age	Demographic	Self-reported Age in years	Age in actual years	Continuous
NP years of experience as a provider	Demographic	Self-reported Years of NP experience	Number of years of NP experience	Continuous
NP Race/ Ethnicity	Demographic	Self-reported ethnic identity	Categorical: 1 = White/ Non-Hispanic 2 = African American 3 = Asian 4 = Other	Categorical
NP Education level	Demographic	Self-reported highest degree of nursing education	Categorical: 1 = MSN 2 = DNP/ Doctorate	Nominal/ Categorical
NP Gender	Demographic	Self-reported gender	Categorical: 1 = Female 2 = Male 3=Other	Nominal/ Categorical
Before today, had you heard of PrEP?	Demographic	Prior PrEP Experience	Categorical: 1=Yes 2=NO	Nominal/ Categorical
Have been asked about PrEP by a Patient?	Demographic	Prior PrEP Experience	Categorical: 1=Yes 2=NO	Nominal/ Categorical
Have you ever initiated a conversation about PrEP with Patient?	Demographic	Prior PrEP Experience	Categorical: 1=Yes 2=NO	Nominal/ Categorical
Ever prescribed	Demographic	Prior PrEP Experience	Categorical: 1=Yes 2=NO	Nominal/ Categorical

PrEP to a Patient?				
Before today, how would you rate your knowledge of PrEP's potential side effects?	Demographic	Provider knowledge of PrEP's potential side effects	Likert scale" 1=Poor 2=Fair 3=Good 4=Very good 5=Excellent	Categorical
PrEP clinical practice knowledge composite measured at pre, post and 30-day follow-up	Dependent	Total score for all knowledge construct questions	Numerical scale & ratio The sum of the number of correct answers on 7 multiple choice items and 3 rating questions measuring knowledge Total possible score of 19.	Ratio (%) Continuous Scale (raw score)
Comfort identifying PrEP eligible patients composite score measured at pre, post and 30-day follow-up	Dependent	Total score for all comfort construct questions	The sum of the numeric self-rated answers on 4 question's rating comfort on a 4-point Likert scale. Total possible score of 16.	Ratio (%) Continuous Scale (raw score)
Confidence prescribing PrEP composite score measured at pre, post and 30-day follow-up	Dependent	Total score for all confidence construct questions.	The sum of the numeric self-rated answers on 8 questions rating confidence on a 4-point Likert scale. Total possible score of 32.	Ratio (%) Continuous Scale (raw score)
NP likelihood to prescribe PrEP in 6 months measured at pre & post Intervention and 30-day follow-up	Dependent	NP self-determined likelihood to prescribe	Likert Scale: 1= Not at all 2= Slightly 3= Moderately 4= Extremely	Ordinal

Appendix L

Data Dictionary

Data Element	Data Label	Data Type	Definition/Purpose	Data Values & Coding
Participant Identifier	Token	Alpha-numeric	Personal identifier – 6 digits in length	Alpha-numeric
Employment Status	Empstatus	Categorical	Descriptive Item: What is your employment status?	1, Full time; 2, Regular Part time; 3, Casual/ Committed Part time; 4, Management and/or education
Gender	gender	Categorical	Descriptive Item: What is your gender?	1, female; 2, male
Age	age	Numeric, continuous	Descriptive Item: What is your age?	Actual numeric value
NP Experience	NPexper	Numeric, continuous	Descriptive Item: How many years of experience do you have as a Nurse Practitioner?	Actual numeric value
Race/Ethnicity	race	Categorical	Descriptive Item: What is your Race/ Ethnicity?	1, African American or Black; 2, Asian; 3, Hispanic or Latino; 4, White/Non-Hispanic; 5, Other
nursing education lvl	nursingedlvl	Categorical	Descriptive Item: What is your highest degree of nursing education?	1, MSN or master's degree; 2, DNP/doctorate
Ever heard of PrEP	EverPrEP	Categorial	Descriptive Item: Before today, had you heard of PrEP?	1, Yes; 2, No

Ever been asked about PrEP by a patient	askedabtprep	Categorical	Descriptive Item: Have you ever been asked about PrEP by a patient?	1, Yes; 2, No
Ever initiated PrEP topic with a patient	initiateconv	Categorical	Descriptive Item: Haveyou ever initiated a conversation about PrEP with patient?	1, Yes; 2, No
Ever prescribed PrEPto a patient?	prescribePrEP	Categorical	Descriptive Item: Have you ever prescribed PrEP to a patient?	1. Yes; 2, No
PrEP side effect knowledge	SEknowl	Categorical	Descriptive Item: Before today, how would you rate your knowledge of PrEP's potential side effects (e.g. renal dysfunction)?	1, Excellent; 2, Very good; 3, Good; 4, Fair; 5, Poor
PreK1 FDA approved PrEP	preK1	Categorical Nominal	Presurvey Knowledge item #1: Which medication has been FDA-approved for PrEP use?	Maraviroc (Selzentry); Tenofovir; Tenofovir/ Emtricitabine (Truvada); Tenofovir/ Emtricitabine/ Efavirenz (Atripla); Raltegravir + Emtracitabine (Isentress + Emtriva); none approved; not sure
Correct preK1 answer	CorrectpreK1	Categorical Nominal	Answer: Tenofovir/ Emtricitabine (Truvada)	1, correct response; 0, incorrect response
PreK2 PrEP follow-up frequency	preK2	Categorical Nominal	Presurvey Knowledge item #2: How often should patients on PrEP be followed up for medication side effects	Every month; Every 6 months; Every 3 months; Yearly; Not necessary after first year

			and lab work-up after the initial assessment?	
Correct preK2 answer	CorrectpreK2	Categorical Nominal	Answer: Every 3 months	1, correct response; 0, incorrect response
PreK3 Clinical eligibilitydoes not support initiation of PrEP	preK3	Categorical Nominal	Presurvey Knowledge item #3: You are assessing recent lab results for a 30-year-old male patient with significant risk for HIV. Which set of clinical eligibility factors **does not** support the initiation of PrEP (Truvada) at this time?	1, HIV negative status, no active signs/ symptoms of HIV infection. Positive HBsAg, GFR>60 ; 2, HIV negative status, negative Anti-HBS, Negative Hep C antibody, GFR<60; 3,HIV negative status, no active signs/ symptoms of HIV infection, GFR>60; 4, HIV negative status, Negative HBsAg, no fever, fatigue, pharyngitis,rash, night sweats and adenopathy
Correct preK3 answer	CorrectpreK3	Categorical Nominal	Answer: HIV negative status,negative Anti-HBS, Negative Hep C antibody, GR<60	1, correct response; 0, incorrect response
PreK 4PrEP post HIVexposure	preK4	Categorical Nominal	Presurvey Knowledge item #4: Can an individual be initiated on PrEP after becoming exposed to HIV?	1, Yes. PrEP can be initiated within 72hours of becoming exposed to HIV; 2,No. PrEP must be initiated for HIV negative individuals only, 3, Yes. PrEPcan be taken for up to 7 days; 4, Only Descovy can be started under this circumstance
Correct preK4 answer	CorrectpreK4	Categorical Nominal	Answer: No. PrEP must beinitiated for HIV	1, correct response; 0, incorrect response

			negative individuals only	
PreK5 Serious SE ofPrEP	preK5	Categorical Nominal	Presurvey Knowledge item #5: What are the serious side effects of PrEP?	1, Increased bone mineral density; 2, Increased buildup of calcium deposits; 3, mild nausea and diarrhea; 4, New or worsening renal impairment, including kidney failure
Correct preK5 answer	CorrectpreK5	Categorical Nominal	Answer: New or worsening renal impairment, including kidney failure	1, correct response; 0, incorrect response
PreK6 Effectiveness ofPrEP	preK6	Categorical Ordinal	Presurvey Knowledge item #6: How effective do you think PrEP is in preventing acquisition of HIV among people who take it every day as prescribed?	1, Not at all effective; 2, Slightly effective; 3, Moderately effective; 4, Extremely effective
Correct preK6 answer	CorrectpreK6	Categorical Nominal	Answer: 4= Extremely Effective	1, correct response; 0, incorrect response
PreK7 PrEP safety	preK7	Categorical Ordinal	Presurvey Knowledge item #7: Based on your understanding of PrEP side effects, how safe is PrEP?	1, Not at all safe; 2, Slightly safe; 3,Moderately safe; 4, Extremely safe
Correct preK7 answer	CorrectpreK7	Categorical Nominal	Answer: 4=Extremely safe	1, correct response; 0, incorrect response
PreK8 Maximum protection from anal sex	preK8	Categorical Nominal	Presurvey Knowledge item #8:	1, 3 days of daily use; 2, 4 days of daily use; 3, 6 days of daily use; 4, 7days of daily use

			PrEP reaches maximum protection from HIV for receptive anal sex at about how many days of daily use?	
Correct preK8 answer	CorrectpreK8	Categorical Nominal	Answer: 7 days of daily use	1, correct response; 0, incorrect response
PreK9 Maximum protection from vaginal sex	preK9	Categorical Nominal	Presurvey Knowledge item #9: For receptive vaginal sex and injection drug use, PrEP reaches maximum protection at about how many days of daily use?	1, 7 days of daily use; 2, 14 days of daily use; 3, 21 days of daily use; 4, 28days of daily use
Correct preK9 answer	CorrectpreK9	Categorical Nominal	Answer: 21 days of daily use	1, correct response; 0, incorrect response
PreK10 Importance of condom use with PrEP	preK10	Categorical Ordinal	Presurvey Knowledge item #10: If a patient says he/she is using condoms consistently and correctly, how important is it to offer PrEP in addition to condoms if you have identified the individual as possessing high at-risk HIV?	1, Not at all important; 2, Slightly important; 3, Moderately important; 4, Extremely important
Correct PreK answer	CorrectpreK10	Categorical Nominal	Answer: 4=Extremely important	1, correct response; 0, incorrect response
Total PreK score	PreK score	Numerical Discrete	Total number of correct responses	Each point for each of the correct responses for total of 10 points

Pre Comfort with evaluation for women having sex with men	preComf1	Categorical Ordinal	Presurvey Comfort item #1: How comfortable are you evaluating PrEP eligibility for Women who have sex with men?	1, not at all comfortable; 2, slightly comfortable; 3, moderately comfortable; 4, extremely comfortable
Pre Comfort with evaluation for men having sex with women	preComf2	Categorical Ordinal	Presurvey Comfort item #2: How comfortable are you evaluating PrEP eligibility for Men who have sex with women	1, not at all comfortable; 2, slightly comfortable; 3, moderately comfortable; 4, extremely comfortable
Pre Comfort with evaluation for men having sex with men	preComf3	Categorical Ordinal	Presurvey Comfort item #3: How comfortable are you evaluating PrEP eligibility for Men who have sex with men?	1, not at all comfortable; 2, slightly comfortable; 3, moderately comfortable; 4, extremely comfortable
Pre Comfort with evaluation for people who inject drugs	preComf4	Categorical Ordinal	Presurvey Comfort item #4: How comfortable are you evaluating PrEP eligibility for People who inject drugs?	1, not at all comfortable; 2, slightly comfortable; 3, moderately comfortable; 4, extremely comfortable
Pre Comfort Score	PreComfscore	Numerical Discrete	Total cumulative score for Comfort related questions	Total possible points from 4 to 16 numeric points

Pre Confidence to prescribe PrEP to a female who has HIV positive male partner	preCon1	Categorical Ordinal	Presurvey Confidence item #1: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a female with a current male partner known to be HIV-positive?	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident
Pre Confidence to prescribe PrEP to a female who has sex with unknown HIV status male partners	preCon2	Categorical Ordinal	Presurvey Confidence item #2: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a female who has unprotected sex with male partners with unknown HIV status who are at high risk of HIV infection (e.g. partners(s) who has sex with other males or uses injection drugs)?	1, not at all; 2, slightly confident; 3, moderately confident; 4, extremely confident
Pre Confidence to prescribe PrEP to a male with a current	preCon3	Categorical Ordinal	Presurvey Confidence item #3:	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident

HIV positive femalepartner			Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a male with a current female partner known to be HIV-positive?	
Pre Confidence to prescribe PrEP to a male who has unprotected sex with male partners with unknown HIV status	preCon4	Categorical Ordinal	Presurvey Confidence item #4: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to A male who has unprotected sex with male partners with unknown HIV status who are at high risk of HIV infection (e.g., partner(s) who has sex with other males or uses injection drugs)?	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident
Pre Confidence to prescribe PrEP to a male with a current HIV positive malepartner	preCon5	Categorical Ordinal	Presurvey Confidence item #5: Assuming a recent negative HIV test and equal access to	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident

			medication, how confident are you to prescribe PrEP to a male with a current male partner known to be HIV-positive?	
Pre Confidence to prescribe PrEP to a male who has sex with multiple male partners and has had unprotected anal sex	preCon6	Categorical Ordinal	Presurvey Confidence item #6: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a male who has sex with multiple male partners and has had unprotected anal sex?	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident
Pre Confidence to prescribe PrEP to a person who has injected drugs in the past 6 months and shared injection equipment	preCon7	Categorical Ordinal	Presurvey Confidence item #7: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a person who has injected drugs in the past 6 months and shared injection equipment?	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident

Pre Confidence to prescribe PrEP to a person who has been on methadone maintenance for the past 6 months but has continued injection drug use	preCon8	Categorical Ordinal	Presurvey Confidence item #8: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a person who has been on methadone maintenance for the past 6 months but has continued injection drug use?	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident
Pre Confidence total score	PreConScore	Numerical Discrete	Total score of all pre Confidence related responses	Total possible points 8 to 32 numeric points
Pre-Likeliness to prescribe PrEP in next6 months	Pre_prescribe	Ordinal	Presurvey item: How likely are you to prescribe PrEP in the next 6 months?	1, not at all; 2, slightly; 3, moderately; 4, extremely
PostK1 FDA approved PrEP	postK1	Categorical Nominal	Postsurvey Knowledge item #1: Which medication has been FDA-approved for PrEP use?	1, Maraviroc (Selzentry); 2, Tenofovir; 3, Tenofovir/ Emtricitabine (Truvada); 4, Tenofovir/ Emtricitabine/ Efavirenz (Atripla); 5, Raltegravir + Emtracitabine (Isentress + Emtriva) 6, none approved; 7, not sure
Correct postK1 answer	CorrectpostK1	Categorical Nominal	Answer: Tenofovir/ Emtricitabine (Truvada)	1, correct response; 0, incorrect response

PostK2 PrEP follow-up frequency	postK2	Categorical Nominal	Postsurvey Knowledge item #2: How often should patients on PrEP be followed up for medication side effects and lab work-up after the initial assessment?	1, Every month; 2, Every 6 months, 3, Every 3 months, 4, Yearly, 5, Not necessary after first year
Correct postK2 answer	CorrectpostK2	Categorical Nominal	Answer: Every 3 months	1, correct response; 0, incorrect response
PostK3 Clinical eligibility does not supportinitiation of PrEP	postK3	Categorical Nominal	Postsurvey Knowledge item #3: You are assessing recent lab results for a 30-year-old male patient with significant risk for HIV. Which set of clinical eligibility factors **does not** support the initiation of PrEP (Truvada) at this time?	1, HIV negative status, no active signs/ symptoms of HIV infection. Positive HBsAg, GFR>60 ; 2, HIV negative status, negative Anti-HBS, Negative Hep C antibody, GFR<60; 3,HIV negative status, no active signs/ symptoms of HIV infection, GFR>60; 4, HIV negative status, Negative HBsAg, no fever, fatigue, pharyngitis,rash, night sweats and adenopathy
Correct postK3 answer	CorrectpostK3	Categorical Nominal	Answer: HIV negative status,negative Anti-HBS, Negative Hep C antibody, GR<60	1, correct response; 0, incorrect response
PostK4 PrEP post HIVexposure	postK4	Categorical Nominal	Postsurvey Knowledge item #4: Can an individual be initiated on PrEP after becoming exposed to HIV?	1, Yes. PrEP can be initiated within 72hours of becoming exposed to HIV; 2,No. PrEP must be initiated for HIV negative individuals only, 3, Yes. PrEPcan be taken for up to 7 days; 4, Only

				Descovy can be started under this circumstance
Correct postK4 answer	CorrectpostK4	Categorical Nominal	Answer: No. PrEP must be initiated for HIV negative individuals only	1, correct response; 0, incorrect response
PostK5 Serious SE ofPrEP	postK5	Categorical Nominal	Postsurvey Knowledge item #5: What are the serious side effects of PrEP?	1, Increased bone mineral density; 2, Increased buildup of calcium deposits; 3, mild nausea and diarrhea; 4, New or worsening renal impairment, including kidney failure
Correct postK5 answer	CorrectpostK5	Categorical Nominal	Answer: New or worsening renal impairment, including kidney failure	1, correct response; 0, incorrect response
PostK6Effectiveness ofPrEP	postK6	Categorical Ordinal	Postsurvey Knowledge item #6: How effective do you think PrEP is in preventing acquisition of HIV among people who take it every day as prescribed?	1, Not at all effective; 2, Slightly effective; 3, Moderately effective; 4, Extremely effective
Correct postK6 answer	CorrectpostK6	Categorical Nominal	Answer: 4= Extremely Effective	1, correct response; 0, incorrect response
PostK7PrEP safety	postK7	Categorical Ordinal	Postsurvey knowledge item #7: Based on your understanding of PrEP side effects, how safe is PrEP?	1, Not at all safe; 2, Slightly safe; 3,Moderately safe; 4, Extremely safe

Correct postK7 answer	CorrectpostK7	Categorical Nominal	Answer: 4=Extremely safe	1, correct response; 0, incorrect response
PostK8Maximum protection from anal sex	postK8	Categorical Nominal	Postsurvey Knowledge item #8: PrEP reaches maximum protection from HIV for **receptive anal sex** at about how many days of daily use?	1, 3 days of daily use; 2, 4 days of daily use; 3, 6 days of daily use; 4, 7days of daily use
Correct postK8 answer	CorrectpostK8	Categorical Nominal	Answer: 7 days of daily use	1, correct response; 0, incorrect response
PostK9Maximu mprotection from vaginal sex	postK9	Categorical Nominal	Postsurvey Knowledge item #9: For receptive vaginal sex and injection drug use, PrEP reaches maximum protection at about how many days of daily use?	1, 7 days of daily use; 2, 14 days of daily use; 3, 21 days of daily use; 4, 28days of daily use
Correct postK9 answer	CorrectpostK9	Categorical Nominal	Answer: 21 days of daily use	1, correct response; 0, incorrect response
PostK10Importance of condom use with PrEP	postK10	Categorical Ordinal	Postsurvey Knowledge item #10: If a patient says he/she is using condoms consistently and correctly, how important is it to offer PrEP in addition to condoms if you have identified the individual as possessing high at-risk HIV?	1, Not at all important; 2, Slightly important; 3, Moderately important; 4, Extremely important

Correct postK answer	CorrectpostK10	Categorical Nominal	Answer: 4=Extremely important	1, correct response; 0, incorrect response
Total post Kscore	PostKscore	Numerical Discrete	Total number of correct responses	Each point for each of the correct responses for total of 10 points
Post Comfort with evaluation for women having sex with men	postComf1	Categorical Ordinal	Postsurvey Comfort item #1: How comfortable are you evaluating PrEP eligibility for Women who have sex with men?	1, not at all comfortable; 2, slightly comfortable; 3, moderately comfortable; 4, extremely comfortable
Post Comfort with evaluation for men having sex with women	postComf2	Categorical Ordinal	Postsurvey Comfort item #2: How comfortable are you evaluating PrEP eligibility for Men who have sex with women?	1, not at all comfortable; 2, slightly comfortable; 3, moderately comfortable; 4, extremely comfortable
Post Comfort with evaluation for men having sex with men	postComf3	Categorical Ordinal	Postsurvey Comfort item #3: How comfortable are you evaluating PrEP eligibility for Men who have sex with men?	1, not at all comfortable; 2, slightly comfortable; 3, moderately comfortable; 4, extremely comfortable
Post Comfort with evaluation for people who inject drugs	postComf4	Categorical Ordinal	Postsurvey Comfort item #4: How comfortable are you evaluating PrEP eligibility for People who inject drugs?	1, not at all comfortable; 2, slightly comfortable; 3, moderately comfortable; 4, extremely comfortable

Post Comf Score	PostComfscore	Numerical Discrete	Total cumulative score for Comfort related questions	Total possible points from 4 to 16 numeric points
Post Confidence to prescribe PrEP to a female who has HIV positive male partner	postCon1	Categorical Ordinal	Postsurvey Confidence item #1: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a female with a current male partner known to be HIV-positive?	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident
Post Confidence to prescribe PrEP to a female who has sex with unknown HIV status male partners	postCon2	Categorical Ordinal	Postsurvey Confidence item #2: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a female who has unprotected sex with male partners with unknown HIV status who are at high risk of HIV infection (e.g. partners(s) who has sex with other males or uses injection drugs)?	1, not at all; 2, slightly confident; 3, moderately confident; 4, extremely confident

Post Confidence to prescribe PrEP to a male with a current HIV positive femalepartner	postCon3	Categorical Ordinal	Postsurvey Confidence item #3: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a male with a current female partner known to be HIV-positive?	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident
Post Confidence to prescribe PrEP to a male who has unprotected sex with male partners with unknown HIV status	postCon4	Categorical Ordinal	Postsurvey Confidence item #4: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to A male who has unprotected sex with male partners with unknown HIV status who are at high risk of HIV infection (e.g., partner(s) who has sex with other males or uses injection drugs)?	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident
Post Confidence to prescribe PrEP to a male with a current	postCon5	Categorical Ordinal	Postsurvey Confidence item #5:	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident

HIV positive malepartner			Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a male with a current male partner known to be HIV-positive?	
Post Confidence to prescribe PrEP to a male who has sex with multiple male partners and has had unprotected anal sex	postCon6	Categorical Ordinal	Postsurvey Confidence item #6: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a male who has sex with multiple male partners and has had unprotected anal sex?	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident
Post Confidence to prescribe PrEP to a person who has injected drugs in the past 6 months and shared injection equipment	postCon7	Categorical Ordinal	Postsurvey Confidence item #7: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a person who has injected drugs in the past 6	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident

			months and shared injection equipment?	
Post Confidence to prescribe PrEP to a person who has been on methadone maintenance for the past 6 months but has continued injection drug use	postCon8	Categorical Ordinal	Postsurvey Confidence item #8: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a person who has been on methadone maintenance for the past 6 months but has continued injection drug use?	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident
Post Confidence total score	PostConScore	Numerical Discrete	Total score of all post Confidence related responses	Total possible points 8 to 32 numeric points
Post-Likeliness to prescribe PrEP in next 6 months	Post prescribe	Ordinal	Postsurvey item: How likely are you to prescribe PrEP in the next 6 months?	1, not at all; 2, slightly; 3, moderately; 4, extremely
ReK1 FDA approved PrEP	ReK1	Categorical Nominal	Retention Knowledge item #1: Which medication has been FDA-approved for PrEP use?	1, Maraviroc (Selzentry); 2, Tenofovir; 3, Tenofovir/ Emtricitabine (Truvada); 4, Tenofovir/ Emtricitabine/ Efavirenz (Atripla); 5, Raltegravir + Emtracitabine (Isentress + Emtriva) 6, none approved; 7, not sure

Correct ReK1 answer	CorrectReK1	Categorical Nominal	Answer: Tenofovir/ Emtricitabine (Truvada)	1, correct response; 0, incorrect response
ReK2 PrEP follow-up frequency	ReK2	Categorical Nominal	Retention Knowledge item #2: How often should patients on PrEP be followed up for medication side effects and lab work-up after the initial assessment?	1, Every month; 2, Every 6 months, 3, Every 3 months, 4, Yearly, 5, Not necessary after first year
Correct ReK2 answer	CorrectReK2	Categorical Nominal	Answer: Every 3 months	1, correct response; 0, incorrect response
ReK3 Clinical eligibilitynot support initiation of PrEP	ReK3	Categorical Nominal	Retention Knowledge item #3: You are assessing recent lab results for a 30-year-old male patient with significant risk for HIV. Which set of clinical eligibility factors **does not** support the initiation of PrEP (Truvada) at this time?	1, HIV negative status, no active signs/ symptoms of HIV infection. Positive HBsAg, GFR>60 ; 2, HIV negative status, negative Anti-HBS, Negative Hep C antibody, GFR<60; 3,HIV negative status, no active signs/ symptoms of HIV infection, GFR>60; 4, HIV negative status, Negative HBsAg, no fever, fatigue, pharyngitis,rash, night sweats and adenopathy
Correct ReK3 answer	CorrectReK3	Categorical Nominal	Answer: HIV negative status,negative Anti-HBS, Negative Hep C antibody, GR<60	1, correct response; 0, incorrect response
ReK 4PrEP post HIV exposure	ReK4	Categorical Nominal	Retention Knowledge item #4:	1, Yes. PrEP can be initiated within 72 hours of becoming exposed to HIV; 2,

			Can an individual be initiated on PrEP after becoming exposed to HIV?	No. PrEP must be initiated for HIV negative individuals only, 3, Yes. PrEPcan be taken for up to 7 days; 4, OnlyDescovy can be started under this circumstance
Correct ReK4 answer	CorrectReK4	Categorical Nominal	Answer: No. PrEP must be initiated for HIV negative individuals only	1, correct response; 0, incorrect response
ReK5 Serious SE ofPrEP	ReK5	Categorical Nominal	Retention Knowledge item #5: What are the serious side effects of PrEP?	1, Increased bone mineral density; 2, Increased buildup of calcium deposits; 3, mild nausea and diarrhea; 4, New or worsening renal impairment, including kidney failure
Correct ReK5 answer	CorrectReK5	Categorical Nominal	Answer: New or worsening renal impairment, including kidney failure	1, correct response; 0, incorrect response
ReK6 Effectiveness ofPrEP	ReK6	Categorical Ordinal	Retention Knowledge item #6: How effective do you think PrEP is in preventing acquisition of HIV among people who take it every day as prescribed?	1, Not at all effective; 2, Slightly effective; 3, Moderately effective; 4, Extremely effective
Correct ReK6 answer	CorrectReK6	Categorical Nominal	Answer: 4= Extremely Effective	1, correct response; 0, incorrect response
ReK7 PrEP safety	ReK7	Categorical Ordinal	Retention Knowledge item #7:	1, Not at all safe; 2, Slightly safe; 3, Moderately safe; 4, Extremely safe

			Based on your understanding of PrEP side effects, how safe is PrEP?	
Correct ReK7 answer	CorrectReK7	Categorical Nominal	Answer: 4=Extremely safe	1, correct response; 0, incorrect response
ReK8 Maximum protection from anal sex	ReK8	Categorical Nominal	Retention Knowledge item #8: PrEP reaches maximum protection from HIV for **receptive anal sex** at about how many days of daily use?	1, 3 days of daily use; 2, 4 days of daily use; 3, 6 days of daily use; 4, 7days of daily use
Correct ReK8 answer	CorrectReK8	Categorical Nominal	Answer: 7 days of daily use	1, correct response; 0, incorrect response
ReK9 Maximum protection from vaginal sex	ReK9	Categorical Nominal	Retention Knowledge item #9: For receptive vaginal sex and injection drug use, PrEP reaches maximum protection at about how many days of daily use?	1, 7 days of daily use; 2, 14 days of daily use; 3, 21 days of daily use; 4, 28days of daily use
Correct ReK9 answer	CorrectReK9	Categorical Nominal	Answer: 21 days of daily use	1, correct response; 0, incorrect response
ReK10 Importance of condom use with PrEP	ReK10	Categorical Ordinal	Retention Knowledge item #10: If a patient says he/she is using condoms consistently and correctly, how important is it to offer PrEP in	1, Not at all important; 2, Slightly important; 3, Moderately important; 4, Extremely important

			addition to condoms if you have identified the individual as possessing high at-risk HIV?	
Correct ReK answer	CorrectReK10	Categorical Nominal	Answer: 4=Extremely important	1, correct response; 0, incorrect response
Total Retention Kscore	ReKscore	Numerical Discrete	Total number of correct responses	Each point for each of the correct responses for total of 10 points
Retention Comfort with evaluation for women having sex with men	reComf1	Categorical Ordinal	Retention Comfort item #1: How comfortable are you evaluating PrEP eligibility for Women who have sex with men?	1, not at all comfortable; 2, slightly comfortable; 3, moderately comfortable; 4, extremely comfortable
Retention Comfort with evaluation for men having sex with women	reComf2	Categorical Ordinal	Retention Comfort item #2: How comfortable are you evaluating PrEP eligibility for Men who have sex with women	1, not at all comfortable; 2, slightly comfortable; 3, moderately comfortable; 4, extremely comfortable
Retention Comfort with evaluation for men having sex with men	reComf3	Categorical Ordinal	Retention Comfort item #3: How comfortable are you evaluating PrEP eligibility for Men who have sex with men?	1, not at all comfortable; 2, slightly comfortable; 3, moderately comfortable; 4, extremely comfortable
Retention Comfort with evaluation for people who inject drugs	reComf4	Categorical Ordinal	Retention Comfort item #4: How comfortable are you evaluating PrEP	1, not at all comfortable; 2, slightly comfortable; 3, moderately comfortable; 4, extremely comfortable

			eligibility for People who inject drugs:	
Retention Comf Score	ReComfscore	Numerical Discrete	Total cumulative score for Comfort related questions	Total possible points from 4 to 16 numeric points
Retention Confidence to prescribe PrEP to a female who has HIV positive male partner	reCon1	Categorical Ordinal	Retention Confidence item #1: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a female with a current male partner known to be HIV-positive?	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident
Retention Confidence to prescribe PrEP to a female who has sex with unknown HIV status male partners	reCon2	Categorical Ordinal	Retention Confidence item #2: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a female who has unprotected sex with male partners with unknown HIV status who are at high risk of HIV infection (e.g. partners(s) who has sex	1, not at all; 2, slightly confident; 3, moderately confident; 4, extremely confident

			with other males or uses injection drugs)?	
Retention Confidence to prescribe PrEP to a male with a current HIV positive female partner	reCon3	Categorical Ordinal	Retention Confidence item #3: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a male with a current female partner known to be HIV-positive?	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident
Retention Confidence to prescribe PrEP to a male who has unprotected sex with male partners with unknown HIV status	reCon4	Categorical Ordinal	Retention Confidence item #4: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to A male who has unprotected sex with male partners with unknown HIV status who are at high risk of HIV infection (e.g., partner(s) who has sex with other males or uses injection drugs)?	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident

Retention Confidence to prescribe PrEP to a male with a current HIV positive male partner	reCon5	Categorical Ordinal	Retention Confidence item #5: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a male with a current male partner known to be HIV-positive?	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident
Retention Confidence to prescribe PrEP to a male who has sex with multiple male partners and has had unprotected anal sex	reCon6	Categorical Ordinal	Retention Confidence item #6: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a male who has sex with multiple male partners and has had unprotected anal sex?	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident
Retention Confidence to prescribe PrEP to a person who has injected drugs in the past 6 months and shared injection equipment	reCon7	Categorical Ordinal	Posttest Confidence item #7: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident

			person who has injected drugs in the past 6 months and shared injection equipment?	
Retention Confidence to prescribe PrEP to a person who has been on methadone maintenance for the past 6 months but has continued injection drug use	reCon8	Categorical Ordinal	Posttest Confidence item #8: Assuming a recent negative HIV test and equal access to medication, how confident are you to prescribe PrEP to a person who has been on methadone maintenance for the past 6 months but has continued injection drug use?	1, not at all confident; 2, slightly confident; 3, moderately confident; 4, extremely confident
Retention Confidence total score	ReConScore	Numerical Discrete	Total score of all post Confidence related responses	Total possible points 8 to 32 numeric points
Retention survey-Likeliness to prescribe PrEP in next 6 months	Re_prescribe	Ordinal	Retention survey item: How likely are you to prescribe PrEP in the next 6 months?	1, not at all; 2, slightly; 3, moderately; 4, extremely

Appendix M

Budget Table

Table 3. *PrEP Education Intervention's Budget*

Necessary Items	Item Cost	Total Cost $
Survey Collection Platform	$276 – annual subscription	$276
Subject Incentive (Target)	$20 – each gift card X 5	$100
Articulate 360 subscription (e-learning platform)	$500	$500
SPSS 27 subscription	$99	$ 99
		$975

Appendix N

Participant Characteristics and Prior Experiences

Table 4. *Sociodemographic Characteristics of Participants at Baseline*

	n (%)
Participants	39 (100)
Employment status	
Full Time	34 (87.2)
Regular Part Time	1 (2.6)
Casual/Committed Part	3 (7.7)
Time	1 (2.6)
Gender	
Male	1 (2.6)
Female	38 (97.4)
Race	
African American or Black	11 (28.2)
Asian	10 (25.6)
Hispanic or Latino	1 (2.6)
White/ Non-Hispanic	14 (35.9)
Other	3 (7.7)
Nursing Education Level	
MSN or master's degree	30 (76.9)
DNP/ Doctorate	9 (23.7)
	M (SD)
Age	38.79 (8.89) [1]
Years' Experience	6.35 (8.98)

[1] *Five subjects missing data*

Note. This table depicts demographics for all 39 participants of the PrEP education intervention.

Table 5. *Prior Experiences with PrEP*

Items	n (%)
Heard about PrEP?	
Yes	38 (97.4)
No	1 (2.6)
Ever asked a Patient about PrEP?	
Yes	25 (65.8)
No	14 (35.9)
Ever initiated a patient conversation about PrEP?	
Yes	19 (48.7)
No	20 (51.3)
Ever prescribed PrEP?[1]	
Yes	20 (51.3)
No	18 (46.2)
Before today, how would you rate your knowledge of PrEP's potential side effects?	
Excellent	0 (0%)
Very Good	3 (7.9)
Good	14 (36.8)
Fair	14 (36.8)
Poor	7 (18.4)

[1] *Does not equal 100% due to missing data*

Note. Participants' prior experiences with PrEP are being described in percentages. The knowledge rating question regarding his or her knowledge of PrEP was based on a 5-point Likert Scale. Percentage breakdowns highlight that less than 50% of participants had baseline rating of "Good" or "Very Good" prior to the education tutorial.

Appendix O

Paired *t*-Test

Table 6. *Paired t-Tests for Pre and Post Survey Results*

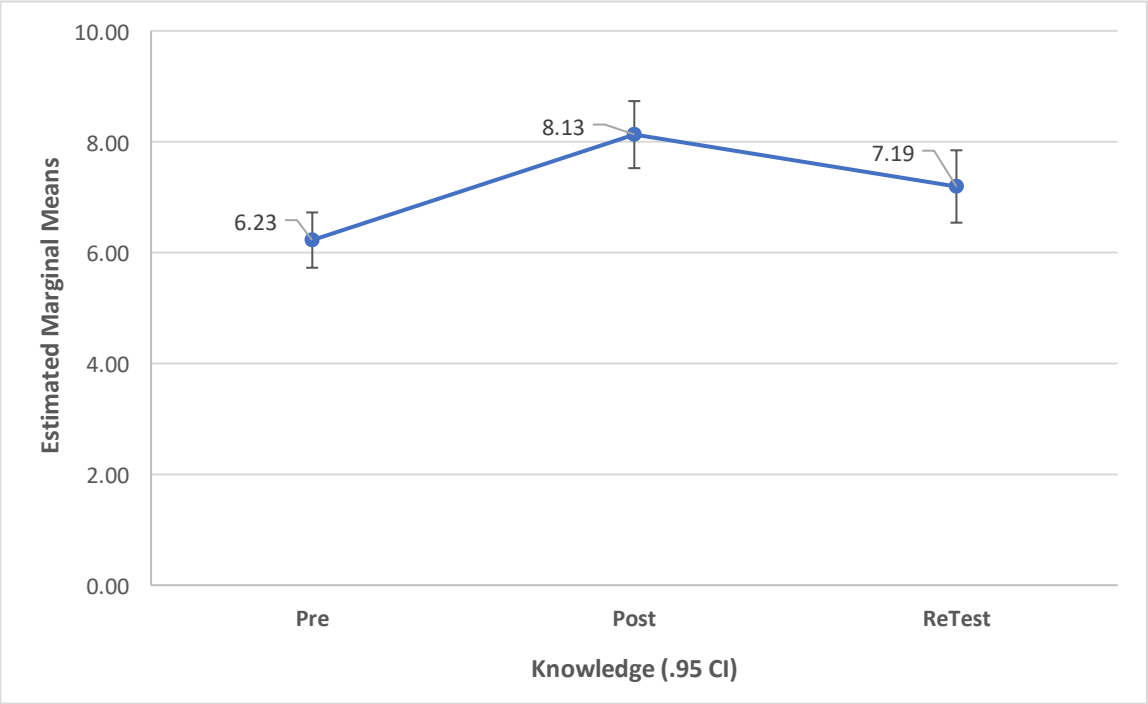
	Post			Pre							
	M	*SD*	*n*	*M*	*SD*	*N*	*t*	df	*p*	95% CI	
										Lower	Upper
Knowledge	8.10	1.651	39	6.44	1.373	39	5.159	38	<.001	1.013	2.321
Comfort	11.74	3.142	38	9.97	3.412	38	2.827	37	.008	.500	3.027
Confidence	24.18	5.703	39	19.54	6.786	39	4.516	38	<.001	2.561	6.721

Note. This table demonstrates the mean scores for all constructs for the pre- and post-survey items. There were significant mean differences between pre-survey scores compared with post-survey scores for all constructs. The mean scores for the construct that explored comfort identifying “at-risk HIV individuals” was also found to be significant.

Appendix P

Knowledge Mean Scores

Figure 3. *Mean Scores for Knowledge about PrEP's Clinical Practice*



Note. This figure depicts the mean score differences across the three survey phases for the knowledge about PrEP clinical practice. Each survey's total possible knowledge score was 10 points for the ten PrEP related knowledge questions.

Appendix Q

Knowledge Mean, SD, and ANOVA

Table 7. *Mean and SD for Knowledge of PrEP Clinical Practice*

Knowledge of PrEP clinical practice			
	M	*SD*	*N*
PreKscore	6.23	1.359	31
PostKscore	8.13	1.648	31
ReKscore	7.19	1.778	31

Table 8. *Repeated measures ANOVA – Knowledge of PrEP Clinical Practice*

	Sum Squares	Df	Mean Square	p	F	P Eta^2
Overall	56.151	2	28.075	<.001	13.825	.315
Knowledge	Mean Difference	Std. Error	Sig.[a]	95% Confidence Interval for Difference [a]		
				Lower	Upper	
Pre vs Post	-1.903*	.366	<.001	-2.83	-.975	
Pre vs Retention	-.968*	.333	.020	-1.81	-.124	
Post vs Retention	.939*	.385	.064	-.041	1.912	

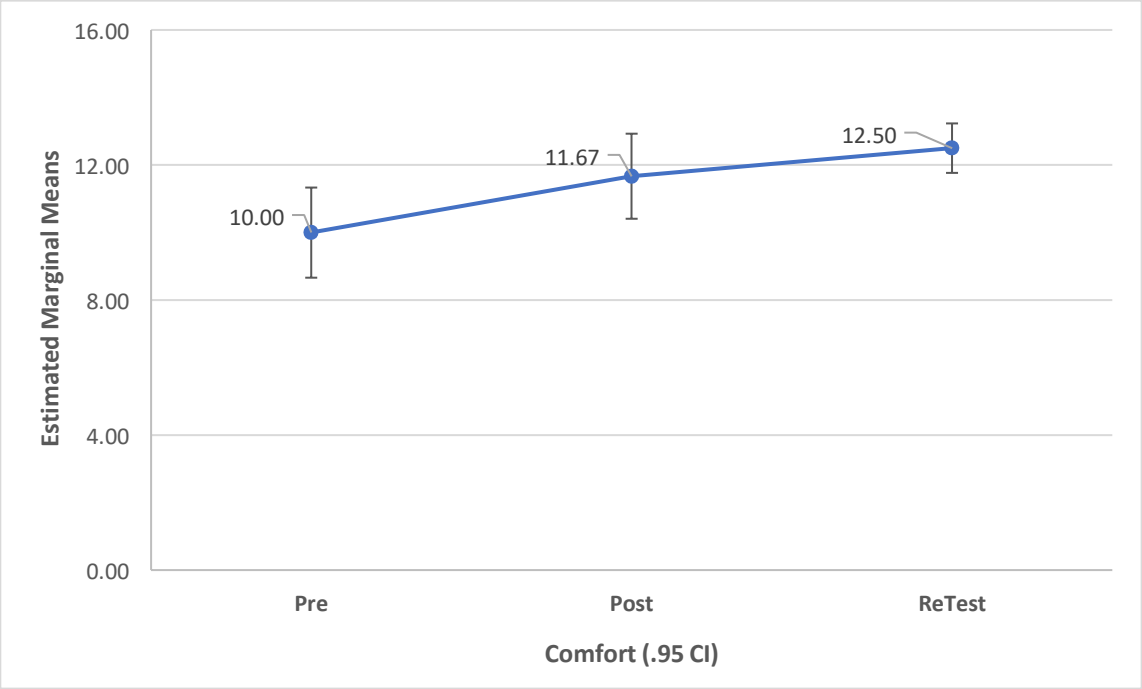
*$p \leq 0.05$, [a] Bonferroni post-hoc

Note. This table demonstrates the pairwise mean differences for the repeated measures of the knowledge construct's total composite scores. The average mean score for 31 participants for each survey was analyzed. The postKscore and preKscore mean differences were significantly different. The ReKscore was also significantly different from the PreKscore. There was no significant difference between the ReKscore and PostKscore.

Appendix R

Comfort Mean Scores

Figure 4. *Mean Scores for Comfort Identifying "At-Risk HIV Patients"*



Note. This figure depicts the difference in mean rating scores across the three survey points for the comfort construct which measured the comfort level associated with identifying "at-risk HIV" individuals. The survey consisted of 16 possible points for the four items related to comfort identifying "at-risk HIV patients."

Appendix S

Comfort Mean, SD, and ANOVA

Table 9. *Mean and SD for Comfort Identifying "At-Risk HIV Patients"*

Comfort Screening "At-risk HIV Patients"			
	M	*SD*	*N*
PreComfscore	10.00	3.572	30
PostComfscore	11.67	3.377	30
ReComfscore	12.50	1.961	30

Table 10. *Repeated measures ANOVA – Comfort Identifying "At-Risk HIV Patients"*

	Sum Squares	*df*	Mean Square	p	*F*	P Eta^2
Overall	97.222	2	48.611	.001	8.257	222
Comfort	Mean Difference	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]		
				Lower	Upper	
Pre vs Post	-1.667	.715	.081	-3.483	.150	
Pre vs Retention	-2.500*	.612	.001	-4.054	-.946	
Post vs Retention	-.833	.541	.402	-2.207	.540	

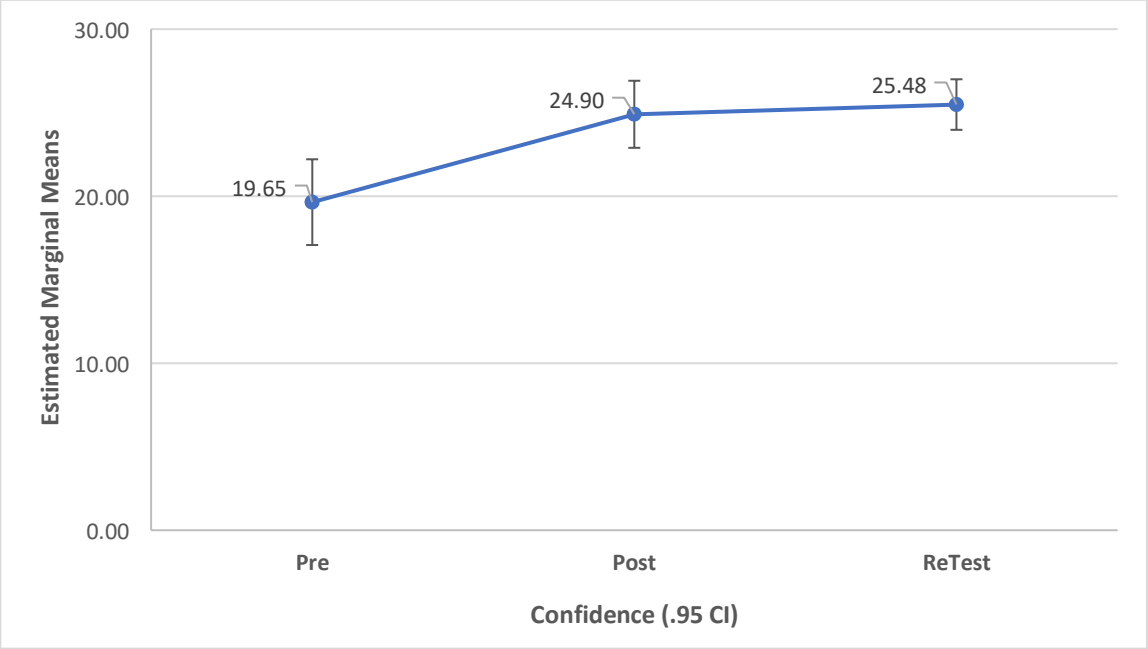
*$p \leq 0.05$, [a] Bonferroni post-hoc

Note. This table demonstrates the pairwise mean differences for the repeated measures of the comfort construct's total composite scores. The average score for the 30 participants were analyzed for the three surveys. The means for PreComfscore and PostComfscore were not significantly different. However, the mean score was significant when ReComfscore was compared to the PreComfscore, PostComfscore, and ReComfscore were not significantly different.

Appendix T

Confidence Mean Scores

Figure 5. *Mean Scores for Confidence to Prescribe PrEP*



Note. This figure depicts the difference in mean rating scores across the three survey points for the confidence with PrEP prescribing practices. This construct consisted of eight questions with a 4-point Likert Scale answers. There were 32 possible points for the eight items related to confidence prescribing PrEP.

Appendix U

Confidence Mean, SD, and ANOVA

Table 11. *Mean and SD for Confidence to Prescribe PrEP*

Confidence Prescribing PrEP			
	Mean	Std. Deviation	n
PreConScore	19.65	6.993	31
PostConScore	24.90	5.473	31
ReConScore	25.48	4.122	31

Table 12. *Repeated measures ANOVA – Confidence to Prescribe PrEP*

	Sum Squares	Df	Mean Square	p	F	P Eta^2
Overall	641.441	2	320.720	<.001	21.149	.413
Confidence	Mean Difference	Std. Error	Sig.[a]	95% Confidence Interval for Difference [a]		
				Lower	Upper	
Pre vs Post	-5.258*	.986	.001	-7.758	-2.758	
Pre vs Retention	-5.839*	1.53	.001	-8.762	-2915	
Post vs Retention	-.581	.796	.999	-2.600	1.438	

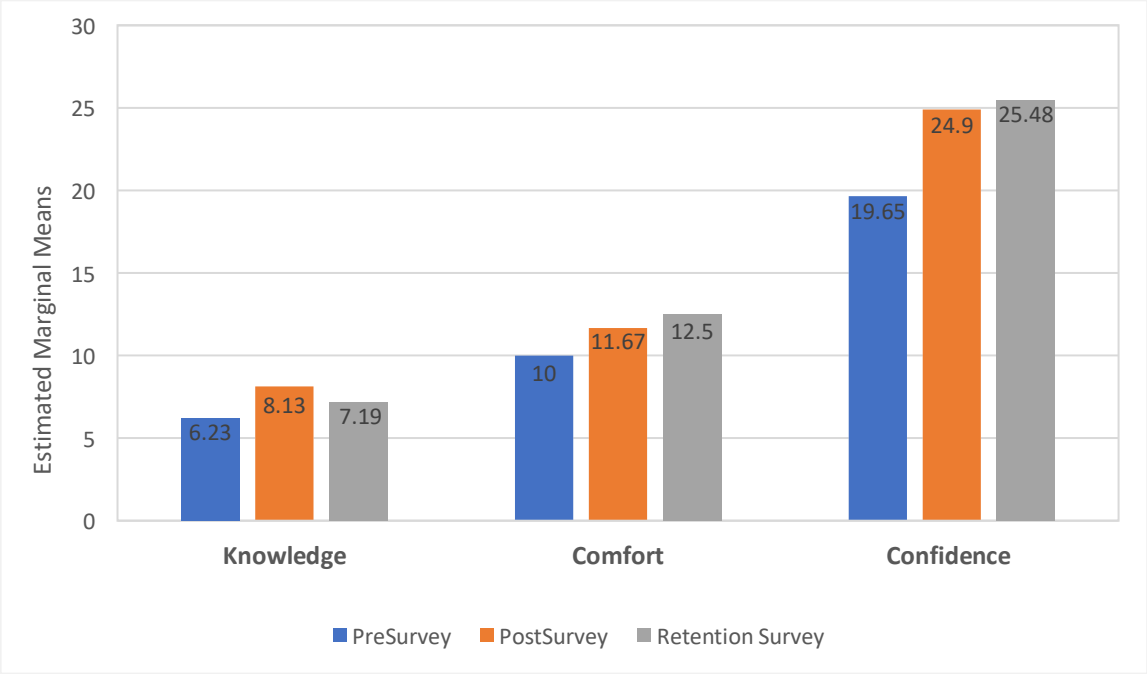
*$p \leq 0.05$, [a] Bonferroni post-hoc

Note. This table demonstrates the pairwise mean differences for the repeated measures of the confidence construct's total composite scores. Significant mean differences with p<.05 are notable between PreConScore and PostConScore as well PreConScore and ReConScore. There was no significant mean difference between PostConScore and ReConScore.

Appendix V

All Constructs Mean Scores

Figure 6. *Mean Scores Across All Constructs*

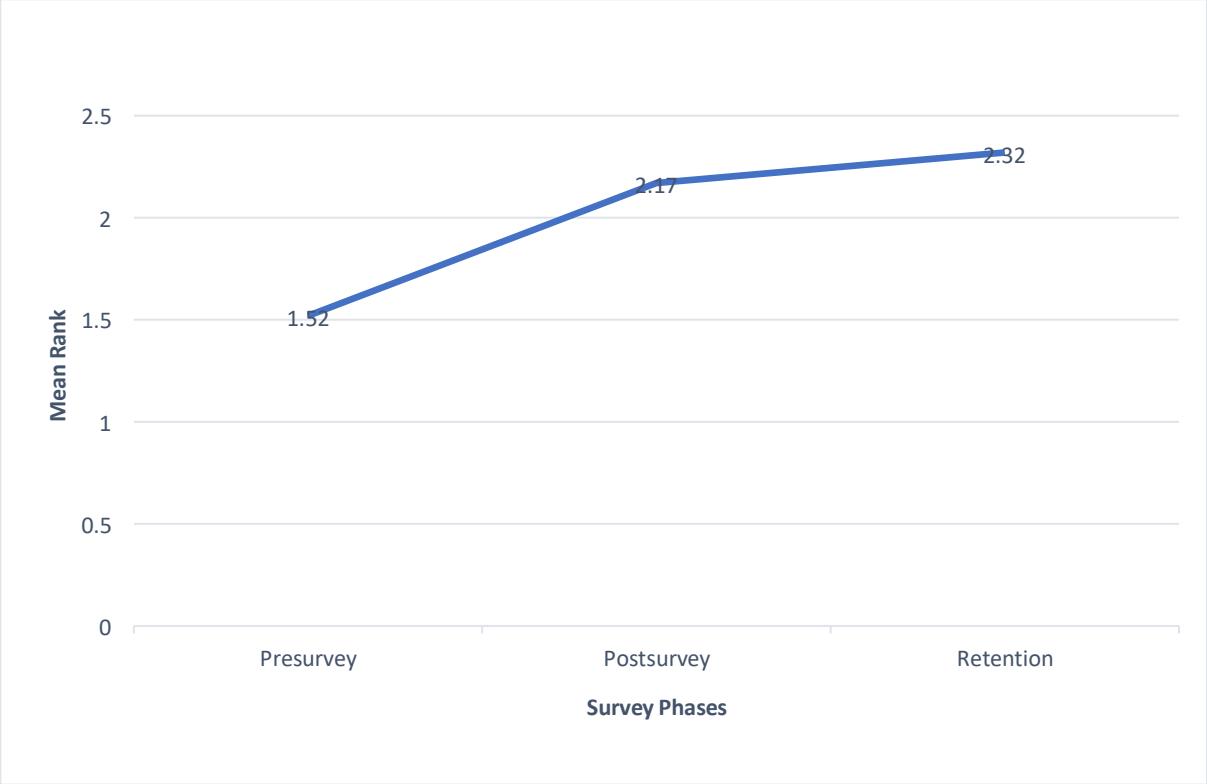


Note. This figure represents the mean ratings that was notable for the presurvey, postsurvey and retention survey results. The mean scores for PrEP clinical practice knowledge, comfort identifying at-risk HIV patients, and confidence with PrEP prescribing practices are depicted at a glance. These estimated marginal mean ratings were collected at .95 confidence interval.

Appendix W

Likeliness to Prescribe

Figure 7. *Likeliness to Prescribe PrEP in the Next Six Months*



Note. This figure demonstrates the mean rank for the question, "How likely are you to prescribe PrEP in the next 6 months?" The mean ranking increased throughout the three phases.

Appendix X

Friedman's ANOVA

Table 13. *Pairwise Comparison for Friedman's ANOVA*

		N	X^2	df	Asymptotic Sig. (2-sided test)	
Friedman's		30	22.448	2	<.0001	
Likeliness to Prescribe in next six months	Difference	Std. Error	Std. Test Statistic		Sig.	Adj. Sig[a]
Pre vs Post	.650*	.258	2.517		.012	.035
Pre vs Retention	.800*	.258	3.098		.002	.006
Post vs Retention	-.150	.258	-.581		.561	.999

*$p \leq 0.05$, [a] Bonferroni post-hoc

Note. This table demonstrates the changed likeliness to prescribe ratings for the three surveys administered. The result indicated that likeliness to prescribe in next six months at baseline pre-survey was significantly different from post-survey and pre-survey from retention survey. However, likeliness to prescribe for retention survey was not significantly different from post-survey.