

IDENTIFYING RISK FOR HIV AND IMPLEMENTATION OF PREP AMONGST PRIMARY
CARE PROVIDERS

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DOCTOR OF NURSING PRACTICE

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ABSTRACT

The purpose of this project was to improve primary care provider knowledge, attitude and behaviors related to the current HIV-screening and PrEP implementation guidelines. Surveys were conducted among five primary care providers at a Midwest VA Healthcare System before and after an HIV and PrEP-related education. The surveys were anonymous, and participation was voluntary. Each participant received a survey by pen and paper to self-assess their HIV-screening and PrEP prescribing intention, comfort-level with HIV prevention practices, and knowledge before and after the presentation by using Likert scales, true/false, and correct answer recall questions.

Of the eligible 11 providers in attendance of the presentation, six of the 11 (54.5%) participated in the surveys. One participant was excluded as he/she did not submit his/her completed presurvey, which rendered the survey incomplete for data analysis. The included participants (n=5) worked in General/Primary Care, were either a MD (2 of 5) or NP (3 of 5), who have practiced as their current clinical title for less than 5 years to greater than 25 years.

Responses were measured based on the FREQ procedure as the sample size was small. Following the intervention, there was no overall increase in intent to follow the current CDC HIV screening guidelines however intention prior to the intervention was already high. Following education, the providers' ability to identify those at risk for HIV increased by 60% (3 of 5), and comfort-level in identifying those at risk for HIV whom are PrEP eligible increased by 80% (4 of 5). Of these providers, there was an 80% (4 of 5) increase in provider self-rated comfort-level in discussing PrEP with high risk patients post-education. Each provider rated their intention to prescribe PrEP after the intervention on a Likert scale, as "*Probably*" or "*Very Probable*," which was a 60% (3 of 5) provider improvement.

Overall, responses indicated an improvement of provider knowledge, attitudes, and behavior after receiving HIV screening and PrEP education. Findings of this project are comparable with previous research, this project, however, did not evaluate actual provider change in practice following education.

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LIST OF ABBREVIATIONS

HIV	Human Immunodeficiency Virus.
PrEP	Pre-exposure Prophylaxis.
AIDS	Acquired Immunodeficiency Syndrome.
CD-4	Cluster of Differentiation.
ART	Anti-retroviral therapy.
CDC	Centers for Disease Control and Prevention.
TDF	Tenofovir disoproxil fumarate.
FTC	Emtricitabine.
FDA	Food and Drug Administration.
VHA	Veterans Health Administration.
USPSTF	United States Preventive Service Task Force.
DHAP	CDC's Division of HIV/AIDS Prevention.
STD	Sexually transmitted disease.
TB	Tuberculosis.
PCPs	Primary care providers.
HIVP	Human immunodeficiency virus providers.
KFF	Kaiser Family Foundation.
MSM	Men who have sex with men.
DHRS	Denver HIV Risk Score.
PWID	People who inject drugs.
CrCl	Creatinine clearance.
TDM	Therapeutic drug monitoring.
QALY	Quality adjusted life years.
ACA	Affordable Care Act.

NDDoH.....North Dakota Department of Health.
VA.....Department of Veterans Affairs.
IRB.....Institutional Review Board.
NDSU.....North Dakota State University.
MD.....Doctor of Medicine.
DO.....Doctor of Osteopathy.
NP.....Nurse Practitioner.
PA.....Physician Assistant.
RN.....Registered Nurse.
VAHCS.....Department of Veterans Affairs Health Care
System.
LGBTQ.....Lesbian, gay, bisexual, transgender, queer

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CHAPTER 1: INTRODUCTION

HIV/AIDS Background

Human Immunodeficiency Virus (HIV) is a virus that spreads through contact of certain bodily fluids of a HIV-infected person to a non-HIV infected person. Once infected, the virus attacks the cells of the immune system that fight off infection. These cells are called the CD-4 cells, which become damaged and significantly depleted with progressing and untreated HIV. The depletion of CD-4 cells create opportunity for a person to be more susceptible to disease, infections, and cancers. Once infected with the HIV, a person is infected for life. There is no cure for HIV, however anti-retroviral therapy (ART) is available for treatment to create HIV dormancy/inactivity in HIV positive individuals (Centers For Disease Control and Prevention, 2019).

The term “diagnosed with HIV” infection includes all persons infected with HIV, regardless of which of the four stages they are classified (0, 1, 2, 3 (AIDS), or unknown) (Centers for Disease Control and Prevention, 2019b). If left untreated, HIV can develop into acquired immunodeficiency syndrome (AIDS), termed stage 3, which is determined by a CD-4 count less than 200, with an estimated survival rate of three years (Centers For Disease Control and Prevention, 2019; U.S. Department of Veterans Affairs, 2018). Prevalence of HIV was last estimated in 2016, where there was 1.1 million persons infected in the United States. By the end of that year, 534,805 persons had been classified with AIDS at some point and nearly 16 thousand people diagnosed with HIV had died (Centers for Disease Control and Prevention (CDC), 2019b). Not only is HIV impacting the United States, in 2017, 940,000 people have died worldwide from AIDS and there were 36.9 million persons living with HIV (Centers for Disease Control and Prevention, 2019a).

The significant problem of the HIV epidemic lies within the 15% of the infected population who are unaware of their positive HIV status. Individuals who are unaware of their positive HIV status are responsible for 40% of newly transmitted HIV infections (Centers for Disease Control and Prevention, 2018b). The momentous spread of HIV by unaware, infected individuals is a major cause for concern in controlling the HIV epidemic. Making persons aware of their HIV-infection status and potential risk is a critical step in order to control the epidemic. The CDC (2017) has appointed healthcare providers to test all people aged 13-64 years for HIV at least once in a lifetime and all high-risk people at least once a year. Although these recommendations are in place, there are continued missed opportunities of risk identification and HIV detection, as screening is not being initiated at health care provider visits. In 2017, the CDC identified that 75% of persons, categorized as high risk, had seen their health care provider in the past year and were not offered an HIV test (Centers for Disease Control and Prevention, 2017b).

Fortunately, the identification of HIV-negative patients who are high risk provides a valuable opportunity to initiate pre-exposure prophylaxis medication, known as PrEP. The PrEP drug, tenofovir disoproxil fumarate with emtricitabine (TDF/FTC, Truvada®), was approved by the United States Food and Drug Administration (FDA) in 2012, to be used by HIV-negative persons who are at considerable risk in contracting HIV. The correct use of this medication reduced the risk of HIV infection from sex by more than 90% and by more than 70% for those who inject drugs (Centers for Disease Control and Prevention, 2017a; Veteran's Health Administration, 2017). Whether the individual is HIV positive or negative, there are treatments that are available for providers to offer in order to decrease the transmission of HIV.

The United States Preventive Service Task Force (USPSTF) makes recommendations about current preventative practice effectiveness by using a grading system. The grading system

is ranked “A, B, C, D, or I.” An “A” or “B” ranking is a suggestion to offer or provide the service. A “C” ranking is a suggestion to offer or provide the service for selected patients depending on the individual circumstance. The “D” rank is a suggestion to discourage the use of the service. And lastly, the “I” rank is the suggestion to read the clinical consideration section, that the patient should understand the uncertainty of the benefit to harm balance, if the service is offered.

As of 2019, the USPSTF Grade “A” recommendation of HIV screening is to screen all adolescents and adults aged 15 to 65 years and all pregnant persons whose status is unknown (U.S. Preventive Services Task Force, 2019a). For HIV prevention, the USPSTF Grade “A” recommendation is to have providers offer PrEP with effective antiretroviral therapy to persons at substantial risk for acquiring HIV (U.S. Preventive Services Task Force, 2019b). The USPSTF (2019) identified minimal harms of this drug (kidney and gastrointestinal effects) and conclude that PrEP, when used correctly, has substantial net benefit to reduce the risk of HIV acquisition in high risk individuals.

The USPSTF recommendations are in alignment with the CDC’s Division of HIV/AIDS Preventions’ (DHAP) Strategic Plan 2017-2020 to achieve a future without HIV. The DHAP plan addresses political, local, state, and national opportunities for HIV prevention that are cost effective with high potential to benefit populations of need. The goals are:

“Goal One: Prevent new HIV infections

Goal Two: Improve health outcomes for persons living with HIV

Goal Three: Reduce HIV related disparities and health inequities

Goal Four: Continually improve effectiveness and efficiency of operations” (Centers for Disease Control and Prevention & Division of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB prevention, 2019)

Every decade, the National Health Promotion and Disease Prevention objectives are developed, which are science-based goals, created to improve the health of Americans. This decade, Healthy People 2020, includes the goal: “Prevent human immunodeficiency virus (HIV) infection and related illness and death” (Office of Disease Prevention and Health Promotion, 2019). As HIV is a preventable disease, the Office of Disease Prevention and Health Promotion, USPSTF, and CDC all stress the need for identification of HIV status to appropriately preserve the health of those living with HIV by using antiretroviral therapy or protect those against HIV acquisition by using PrEP (Office of Disease Prevention and Health Promotion, 2019).

To take initiative to end the HIV epidemic, the CDC launched a \$120 million program toward HIV prevention efforts. Seventeen organizations are included into this program, one of which included the Midwest Capacity Building Assistance Network. This network was chosen to provide expertise, technology, and resources to improve HIV prevention and PrEP services in Midwestern organizations (Bhandari, 2019). This group will be used to assist communities in need including Missouri, Illinois, North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa, Wisconsin, Michigan, Indiana and Ohio.

Continuing prevention efforts, in the 2019 State of the Union Address, President Trump proposed a multi-year budget increase of \$291 million for the fiscal year of 2020. This budget increase will be used to initiate a plan of action to end the HIV epidemic by the year 2030. The plan *Ending the HIV Epidemic: Plan for America* is guided by the four actions: diagnose, treat, protect, and respond. This new initiative aims to decrease HIV infections by 90% and could

prevent more than 250,000 new infections by 2030 (U.S. Department of Health & Human Services, 2019). As the Department of Veterans Affairs (VA) is the single largest provider of HIV care in the United States, its role is vital to the prevention plan for America. The VA states they will “do its part to end HIV in the U.S. ” by offering HIV tests per guidelines, linking newly HIV diagnosed to treatment, giving high-quality access to HIV care, and offering PrEP when appropriate (U.S. Department of Veterans Affairs, 2019)

Significance of Proposed Project

Even with current recommendations, HIV/AIDS continues to be a worldwide, national, and local concern as infection status and risk potential are not being identified. Multiple studies show that missed opportunities for identification, linked to a variety of barriers, reveal that there is continued lack of success with the routine HIV screening recommendations (Hudson, Heilemann, & Rodriguez, 2012; Traynor, Rosen-Metsch, & Feaster, 2018). In 2018, 3,998,600 veterans in U.S. Department of Veterans Affairs (VA) care were eligible for HIV screening who did not already have an HIV diagnosis. By the end of the 2018 year, the VA had tested 44% of Veterans in care. A goal of the VA is to improve this outcome by following the CDC and USPSTF recommendations to rapidly detect HIV and prevent new infections (U.S Department of Veterans Affairs, 2019).

The VA is in full support of national HIV prevention efforts as it is the single largest provider of HIV infected patients. To increase prevention efforts, the Veterans Health Administration (VHA) created the National PrEP Working Group to increase PrEP use in primary care clinics and in high risk areas. This working group was developed to identify barriers that are preventing the uptake of PrEP. To complete this task, human immunodeficiency virus clinicians implemented a survey to identify barriers to HIV prevention. Barriers discovered

were that non-specialists (non-HIV providers) had knowledge gaps and lacked awareness of VA PrEP access, training, and education for PrEP prescribing (Zigrand, 2019).

Similarly, studies reveal that there are gaps in knowledge and comfort related to provider-initiated discussion of HIV with high risk patients. Researchers recommend that providers be given guides and resources to improve HIV screening rates and comfort-level in discussing HIV. Providers should be encouraged to screen for HIV and require additional training that includes information and resources that addresses perceived and experienced barriers to PrEP implementation. (Arya, Phillips, Street, Giordano, & Giordano, 2016; Drainoni, Dekker, Lee-Hood, Boehmer, & Relf, 2009; Parrish, Johnson, & Williams, 2018). These barriers, including lack of PrEP trained providers, have slowed the incorporation of PrEP into practice (Silapaswan, Krakower, & Mayer, 2017). As a result, providers requested to have more training and education so they would increase PrEP prescribing (Scott, Brar, Kole, & Sangha, 2019).

By incorporating educational related efforts to improve awareness among patients and providers, PrEP's popularity began to rise. From 2012 to 2016, there was a 73% increase of PrEP use (AIDSVu, 2019). In 2017, there was an estimated 100,000 users of PrEP in the nation and as of February 2019, 3,562 Veterans within the VA have received PrEP (Calabrese, Krakower, & Mayer, 2017; U.S Department of Veterans Affairs, 2019). Although PrEP use has increased, there is a projected 1.2 million persons who are PrEP candidates and not currently taking the medication (Calabrese, Krakower, & Mayer, 2017). Compared to HIV-providers (HIVP), fewer primary care providers (PCPs) have heard of PrEP, were familiar with prescribing PrEP, or had prescribed PrEP (Petroll et al., 2017). Primary care providers have continued to relay a lack of knowledge and comfort with PrEP, which directly impacts prescribing practices, rendering the need for further education within primary care to promote HIV prevention efforts.

Problem Statement and Purpose

Human immunodeficiency virus screening rates and PrEP prescribing by providers remains insufficient to slow the epidemic of HIV due to many provider-identified barriers including lack of knowledge and comfort-level with HIV prevention practice. Therefore, the purpose of this practice improvement project was to identify and increase primary care provider knowledge, comfort, and intentions to follow current national HIV prevention guidelines to improve HIV screening and PrEP for HIV prevention.

Project Objectives

- 1) Increase primary care provider intention to screen for HIV status after completion of the education module.
- 2) Increase primary care provider knowledge regarding PrEP after completion of the education module
- 3) Increase primary care provider awareness of individuals that would qualify for preexposure prophylaxis use after completion of the education module.
- 4) Increase primary care provider intention to prescribe PrEP after completion of the educational module.

CHAPTER 2: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

A literature review was conducted to identify HIV incidence, screening, barriers to screening, PrEP use, and provider role in HIV prevention. Search terms used: *HIV prevalence/epidemiology, HIV barriers to screening, barriers, facilitators, HIV test, PrEP use/implementation, provider + HIV prevention, HIV awareness/acceptability, HIV screening methods/tool, HIV + risk assessment, PrEP+barriers/perception, preexposure prophylaxis+prescribing*. Databases used: CINHAL, Springer, EBSCO, JAMA, PubMed, PLOS ONE, Centers for Disease Control and Prevention, BioMed Central, Ovid, ProQuest, Sage Journals.

Definition by the CDC HIV Surveillance Report (2017): “The term diagnosis of HIV infection is defined as a diagnosis of HIV infection regardless of the stage of disease (stage 0, 1, 2, 3 (AIDS), or unknown) and refers to all persons with a diagnosis of HIV infection.”

HIV Identification and Prevention

Each year an estimate of 40,000 persons become infected with HIV. In order to hinder the spread of HIV, the CDC and the USPSTF recommend routine screening in clinical settings. Although these recommendations are in place, 55% of individuals in the United States have never been tested for HIV (Rizza, MacGowan, Purcell, Branson, & Temesgen, 2012). In order to stop the spread of HIV, infection status needs to be identified. HIV status identification is crucial as one in six people in the United States does not know they are infected and are responsible for nearly 40% newly transmitted infections (Centers for Disease Control and Prevention, 2017b; Skarbinski et al., 2015). Delay in identification of HIV postpones treatment and contributes to increased transmission of the disease (Traynor et al., 2018). The CDC

estimated the median time of HIV infection to diagnosis is 3 years, but longer for those such as heterosexual males with a median of 5 years (NCHHSTP Newsroom, 2017).

Primary care providers have a vital role in with HIV prevention and transmission via identification, education, and with the use of pre-exposure prophylaxis medications. A cascade of steps have prevented the utilization of the successful pre-exposure medications. Lack of HIV testing has a direct impact on those who can benefit from the drug, an estimated 1.2 million U.S. adults at risk for HIV who are HIV negative (Silapaswan et al., 2017). Challenges and barriers to the identification of these individuals and the hinderance of PrEP initiation have been exposed throughout the literature review.

HIV Screening

With recommendations of the USPSTF and the CDC there has been a modest improvement of HIV screening, however, testing is inconsistent and suboptimal (Traynor et al., 2018; Zheng, Suneja, Chou, & Arya, 2014). Since the 2006 CDC HIV guideline implementation, routine screening by providers have rates as low as 20-60% (Berkenblit et al., 2011; Shirreffs, Lee, Henry, Golden, & Stekler, 2012). New HIV infections did decline post recommendations by 8% in 2010 to 2015, however in 2015 there was nearly 40,000 new HIV diagnosis and continue to be an estimated 40,000-50,000 new infections each year (Centers for Disease Control and Prevention, 2017b; Henry J Kaiser Family Foundation (KFF), 2018).

Unrelenting HIV infections are caused by the 15% of persons who do not know that they have HIV who are in-turn responsible for 40% of new infections (Centers for Disease Control and Prevention, 2017b). Health care providers have a significant role to initiating HIV testing, but nearly 75% patients are not being offered the test regardless of the recommended guidelines (Centers for Disease Control and Prevention, 2017b; Traynor et al., 2018). A study completed

by Traynor et al. (2018), identified missed opportunities of testing for HIV had occurred at all types of health care clinics including STD clinics, hospital, primary care visits, emergency centers, correctional facilities, and public health clinics (Traynor et al., 2018). A missed opportunity is described as an opportunity for HIV testing at a healthcare visit within the last 12 months.

Due to the inconsistency of testing, a review of data had been collected from providers about frequency of HIV testing after the release of the CDC's HIV testing recommendations. Respondents have reported multiple inconsistencies with implementation of routine screening based on the CDC and USPSTF recommendations. Findings amongst numerous articles were that clinics did not formally implement the recommendations (Schein & Travers, 2017) and many of the physicians are testing for HIV based on risk factors (Jain, Wyatt, Burke, Sepkowitz, & Begier, 2009). Other barriers noted were a lack of knowledge of the recommendations, assumed low prevalence of HIV, lack of comfort with knowledge of HIV testing, doubts of recommendations, concerns of cost-benefit analysis, and patient discomfort (Hudson et al., 2012; Shirreffs et al., 2012; Zheng et al., 2014). Furthermore, absence of routine testing was attributed to lack of time, patient reluctance/refusal, testing was not medically indicated for patient, testing is not a high priority, and concerns for reimbursement (Hudson et al., 2012; Mohajer, Lyons, King, Pratt, & Fichtenbaum, 2012).

Primary Care Provider's Role

A provider's recommendation to the patient for testing has a major impact on the patient's reason for testing. One of the strongest predictors of intention to test for HIV, is if a provider recommended HIV testing (Arya et al., 2016; Fernández et al., 2003). Primary care providers have a great opportunity to recommend HIV testing, as the most common healthcare

visit occurs at the family doctor. Surveys conducted by Stefan et al., of 9 internal medicine clinics, and by Petroll et al., of African American patients in Wisconsin, found that 92.4-96.5% of patients who tested for HIV was because of the doctor's recommendation (Petroll et al., 2009; Stefan et al., 2010). Primary care provider/family doctor healthcare sites should be a targeted area for promoting HIV testing as these sites had the most missed HIV testing opportunities (Traynor et al., 2018). As the provider clearly influences a patient's willingness to screen for HIV, the revealed barriers, knowledge deficits and attitudes of providers need to be addressed to successfully impact the HIV epidemic.

Potential Solutions

The main solution to overcome HIV testing barriers is education. Studies have revealed that providers want additional training regarding HIV testing and how to approach the testing subject with their patients. Providers requested to be updated on the latest HIV recommendations, given educational materials, desire leadership involvement to promote testing and structural protocols for eliciting more accurate sexual health histories. Providing educational tools and resources of how to approach the topic of HIV and encouragement for HIV testing could be a solution to increase HIV screening (Arya et al., 2016; Drainoni et al., 2009).

To address public concerns and decrease stigma, providers believe there should be HIV testing campaigns, promotional and educational posters that can serve as "cues" in the office and to initiate conversation and education for the patient (Arya et al., 2016). Another stigma to be addressed to encourage testing is to relay that HIV isn't a "gay disease," that risks don't depend solely on intravenous drug use and gay, bisexual, or men who have sex with men (MSM) behavior. In 2017, 17% of the people newly diagnosed with HIV were females, 7% were heterosexual males, and only 6% of the 2017 HIV diagnoses were people who injected drugs

(Centers for Disease Control and Prevention, 2019a). Risk behavior cannot be assumed, risk behavior needs to be elicited and measured as 10-25% of people that had tested positive for HIV denied any risky behaviors prior to diagnosis (Zheng et al., 2014).

Rizza et al. (2012) created a continuing education opportunity regarding status, barriers, and potential solutions for HIV screening in the health care setting which reviewed reasons for delayed testing in people who were found to be HIV positive. Sixty-nine percent of the HIV positive persons reported the testing delay was because they did not feel they were at risk for the infection. A qualitative study by Drainoni et al. (2009), identified providers commonly requested assistance to develop comfort-level with HIV discussion and how to appropriately assess and recognize high-risk patients. As assumed risk by patients and providers serves as a continued barrier to HIV testing, tools for measuring risk should be readily available for providers to comfortably and confidently evaluate HIV risk, in addition to their clinical judgement, in a clear and succinct manor.

HIV Risk Prediction Tool

The principle strategy of the CDC and the USPSTF is to reduce HIV infection by maximizing screening efforts to decrease the transmission of HIV and identify those with undiagnosed HIV infection. The guidelines were created to encourage screening in clinical practice, regardless of risk, in population prevalence of undiagnosed HIV infection of 0.1% or greater. The CDC also recommends that those who are at “high-risk” should be screened more frequently. HIV infections have declined by 18% since 2008, though one in seven are still unaware of their status (Centers for Disease Control and Prevention, 2018b; “National HIV testing day,” 2019). The routine and “one size fits all” approach can be seen as costly,

unwarranted, intrusive or even inefficient, which can be attributed for the slow implementation into practice (Haukoos et al., 2015; Rizza et al., 2012).

Haukoos et al. (2015) completed a quantitative study to validate a HIV Risk Prediction Tool using a National HIV testing cohort from the CDC using the Denver HIV Risk Score (DHRS). The DHRS is an instrument that is used to quantify the probability of a patient being infected by HIV. A score greater than or equal to 30 identifies individuals at significant risk for HIV. A DHRS score of 30-39 is defined moderate risk, 40-49 is high risk and those with a score of greater than or equal to 50, defined very high risk, had the highest risk for HIV. The study categorized 4,830,941 HIV tests over a three-year period of patients ≥ 13 years (per CDC recommendations). Sixty-three percent of the cohort were categorized into the top three risk groups (score of greater than 30), of which included 90% of the newly diagnosed HIV infections (Haukoos et al., 2015). The DHRS was able to successfully quantify a patient's probability of being infected with HIV.

Sexual health histories are commonly deferred amongst providers of primary care (Wimberly, Hogben, Moore-Ruffin, Moore, & Fry-Johnson, 2006). The DHRS can be a valuable tool within the sexual health history for providers to decrease discomfort for the provider/patient, for clinical support, and to clarify who qualifies for the CDC recommended high risk annual screening recommendations. Per Krakower et al., (2014), the use of prediction tools, with a greater sensitivity than specificity, may result in more accurate assessments than clinical judgment. Owens et al., identified that continued research is needed to develop and validate risk tools in order to give providers the ability to accurately identify high risk for HIV patients (Owens et al., 2019). Prediction tools, such as DHRS, could optimize prescribing of pre-exposure prophylaxis medications. It is recommended that providers be given guides and

resources to improve HIV screening rates and to improve their comfort-level in HIV related discussions. In addition to supplemental aids, providers need to be encouraged to test for HIV and that training should include information/resources that address providers' perceived and experienced barriers to PrEP implementation (Arya et al., 2016; Drainoni et al., 2009; Parrish et al., 2018). The optimization of PrEP however relies upon the training and education for providers on prediction tools and its importance of identifying those who will benefit from PrEP.

Pre-exposure Prophylaxis

The goal of determining HIV status is to initiate treatment. For a HIV-positive person, the goal is to initiate daily anti-retroviral therapy to decrease viral load, protect health, prevent drug resistance and to prevent the transmission of HIV to others (Centers for Disease Control and Prevention, 2018c). HIV-negative persons who are determined to be at significant risk should be counseled on risk reduction behavior and could be eligible for PrEP. The U.S. FDA approved a PrEP drug in 2012, the prescription: tenofovir disoproxil fumarate with emtricitabine. Tenofovir disoproxil fumarate with emtricitabine is a highly effective prevention method that protects HIV-negative persons from acquiring HIV (Calabrese, Krakower, & Mayer, 2017). The correct use of this medication taken by at-risk individuals reduced the risk of HIV infection from sex (MSM or HIV-discordant) by more than 90% and by more than 70% for those who inject drugs (Centers for Disease Control and Prevention, 2017a) (Veteran's Health Administration, 2017). PrEP use with high adherence provides encouraging results and education of PrEP needs to be provided in the primary care setting in order to have a major impact in decreasing HIV (Calabrese, Krakower, et al., 2017; D. S. Krakower & Mayer, 2016).

Pre-exposure Prophylaxis Candidates

The use of TDF/FTC in combination with risk reduction behavior is the recommendation for HIV prevention. Pre-exposure prophylaxis should be considered for those at substantial risk for HIV including: sexually active men who have sex with men (MSM), heterosexually active women and men, transgender women and men, adult persons who inject drugs (PWID), and heterosexually active woman and men whose partners are HIV positive (Veteran's Health Administration, 2017). The Veteran Health Administration (VHA, 2017) describes substantial risk can be defined as those who: use condoms inconsistently, have a high number of sex partners, having an HIV-positive sex partner, recently acquiring a sexually transmitted infection (STI), having an HIV-positive sex partner, having an HIV-infected injecting partner, sharing injection or drug preparation equipment, or engaging in commercial sex work.

Per the VHA (2017), during the screening for PrEP candidacy the provider should perform a thorough history, evaluate sexual health, drug use behavior, and intention for pregnancy. Human immunodeficiency virus testing should be performed with a fourth generation Ag/Ab test, oral tests are not recommended. This test needs to be performed one week prior to PrEP initiation. Hepatitis B status and renal screening should be performed. Tenofovir disoproxil fumarate (TDF) and emtricitabine (FTC) are active against hepatitis B and the medication should not be prescribed to a person with a creatinine clearance (CrCl) less than 60 mg/min.

Tenofovir disoproxil fumarate/emtricitabine should be prescribed as one pill by mouth daily. The VHA (2017) recommends a 90-day supply with no refills as it is important to reassess HIV status, history, lab, and to provide education and counselling every three months. Currently alternatives to oral PrEP include long acting injectable antiretroviral drugs, subcutaneous implant with controlled-sustained release of tenofovir alafenamide. These options may be considered if

there are adherence problems identified to daily oral PrEP, however few studies have yet addressed the potential of these additional PrEP delivery routes (Greene et al., 2017). In addition to screening for adherence at the three-month assessment, assessments should include side effects, drug and alcohol use risk, sexual health and evaluation of symptoms of acute HIV infection. Testing for HIV is done every three months as well as for STDs, pregnancy, and for renal function (Centers for Disease Control and Prevention, 2017a; Veteran's Health Administration, 2017). Each visit, the provider should continue to educate and counsel the patient on HIV risk reduction techniques and consistent condom use to further reduce risk of HIV acquisition by 80% and to prevent STDs as PrEP does not reduce risk of STDs (U.S. Preventive Services Task Force, 2019b). The provider should continue to evaluate if PrEP should be continued based on HIV tests, side effects, adherence, and ongoing HIV risk. Preexposure prophylaxis can be utilized by the patient as long as they are at high risk for HIV acquisition and are HIV negative.

The USPSTF Final Recommendation Statement (2019) reviews randomized control trials that investigated harms and effectiveness of PrEP at four months to four years. Some studies associated risk of renal adverse events with PrEP vs placebo however renal events were rare. Normal serum creatinine levels were achieved after cessation of PrEP in three studies and in return to normal creatinine without cessation of PrEP in two studies. Gastrointestinal adverse events, mostly nausea, was associated with PrEP use, although rare, and were found to diminish over time in 3 trials.

Therapeutic drug monitoring (TDM) is not required for this medication however if done per provider discretion, will only reflect the serum plasma of the very recent doses. Pharmacokinetic data suggests that the maximum levels of tenofovir (active form of tenofovir

diphosphate) is achieved 20 days in blood and vaginal tissue and by seven days in rectal tissue (U.S. Preventive Services Task Force, 2019b). A patient who plans on getting pregnant or is pregnant and exposed to an HIV positive person with an unknown viral load can take PrEP to reduce acquisition of HIV infection. The FDA and perinatal antiretroviral treatment guidelines authorize off label use of PrEP during pregnancy for uninfected woman however, fetal risk data is limited. Data of the Antiretroviral Pregnancy Registry found no evidence of adverse effects among fetuses exposed to the medication. As data is limited with adverse effects among pregnant individuals and fetuses, risk and benefit information along with other options must be clarified to serodiscordant couples and all persons taking PrEP (Centers for Disease Control and Prevention, 2018d) . Common side effects are nausea, vomiting, diarrhea, mild headache, and fatigue (Centers for Disease Control and Prevention, n.d., 2017a). Further monitoring and guidelines are identified in the US Public Health Services (2017), “Preexposure prophylaxis for the prevention of HIV infection in the United States: A clinical practice guideline”.

Current Recommendations from Literature

With consistent use, PrEP is the most successful biomedical intervention to prevent HIV to date when used in combination of risk reduction behaviors. Due to PrEP successes, the USPSTF (2019) Grade “A” recommendation and the CDC (2017) both recommend that clinicians offer PrEP with effective antiretroviral therapy to persons at high risk (Centers for Disease Control and Prevention, 2018d; Owens et al., 2019). Although current guidelines are recommending PrEP, providers may not be offering PrEP to the population of need due to lack of familiarity of the drug or guideline. Information such as the risk benefit ratio, accurate data on the efficacy and safety of PrEP needs to be addressed with providers to increase prescriptive practices (D. S. Krakower & Mayer, 2016). Blumenthal et al. linked increased correct knowledge

of PrEP amongst providers to higher likelihood of prescribing PrEP (Blumenthal et al., 2015a). Therefore, providers need an education intervention to increase knowledge, enhance comfort-level, and provide skills for the identification of PrEP candidates and PrEP prescribing (Newman et al., 2019).

Although the CDC has recommended PrEP since 2014, many providers have not heard of PrEP or haven't prescribed to patients due to lack of knowledge, training, or experience (Gunn et al., 2019). Provider perceived barriers to PrEP prescribing are discomfort of discussing PrEP with patients, the unknown of which type of provider is most responsible for prescribing, and questions about the drug's efficacy and effect on patients. Other concerns of providers are the drug cost, future drug resistance, and how having drug availability may increase risky behavior (Karris, Beekmann, Mehta, Anderson, & Polgreen, 2014; D. Krakower, Ware, Mitty, Maloney, & Mayer, 2014; Turner, Roepke, Wardell, & Teitelman, 2018). Continued education for primary care providers is needed to address concerns to diminish perceived barriers of PrEP and to reinforce that the benefit of PrEP to reduce HIV acquisition is significant (Hakre et al., 2016; Owens et al., 2019).

Recommendations for PrEP in the Midwest

Throughout the review there was a noted gap in research correlating HIV screening and PrEP prescribing among primary care providers, particularly in the Midwest. Dr Patel, head of a CDC funded Midwest Organization for HIV/PrEP prevention efforts, explains that HIV is a rural and urban epidemic in the Midwest. Patel describes that models used for HIV prevention, like in San Francisco or New York, can't be used in the same way in the Midwest. Efforts are needed to identify Midwest specific challenges to best address HIV prevention practices to end the

epidemic (Bhandari, 2019). Research gaps addressed are the Midwest providers' familiarity with HIV prevalence, and their knowledge, attitudes, and beliefs/practice regarding HIV prevention.

As primary care providers have the major role in preventative care, they have the ability and essential position to identify risk for HIV and prescribe PrEP. Provider's self-identified reasons to not prescribe PrEP are causally related to lack of knowledge and comfort-level with PrEP use. Willingness to prescribe PrEP was not a commonly an identified reason for lack of prescribing (Blumenthal et al., 2015a; Clement et al., 2018; Smith, Mendoza, Stryker, & Rose, 2016). In alignment with studies done by Clement et al. (2018) and Smith et al. (2016), providers felt that prescribing practices would increase with additional training and encouragement to do so. Prior researchers concurred with these statements, as Blumenthal et al, (2015), found that PrEP prescribing by providers was largely dependent on knowledge, that education needs to be a key component for HIV prevention using PrEP. Within following years, researchers concluded that HIV related training efforts increases awareness and knowledge resulting in primary care providers increased likeliness to supply patients with condoms and HIV preventions tools, and likeliness to prescribe PrEP (Clement et al., 2018; Henny et al., 2019).

Barriers Addressed by Literature

The updated 2019 USPSTF final recommendations of PrEP address concerns and barriers regarding HIV resistance and behavior. A meta-analysis reviewed by the USPSTF found there was no differences between use of PrEP to no PrEP in risk to syphilis, gonorrhea, chlamydia, or combination of sexually transmitted infections. In regard to resistance, eight trials of patients taking tenofovir disoproxil fumarate monotherapy or tenofovir disoproxil fumarate/emtricitabine, three of 282 patients were newly diagnosed with HIV infection with tenofovir resistant mutations. In another six trials, 14 of 174 patients were newly diagnosed with HIV infection with

emtricitabine resistant mutations. Sixty-three percent of these patients were found to be already infected with HIV upon enrollment but were not recognized (U.S. Preventive Services Task Force, 2019b). With this data, the significance of testing and identification of acute and chronic HIV infection is paramount to prevent HIV resistance with PrEP use.

Cost and cost effectiveness is another area of concern of providers in which needs to be addressed through education as a month supply of PrEP can cost nearly \$2,000 per month in the United States. Based on a South African quality adjusted life years (QALY) study addressing incidence of infection and cost effectiveness over 20 years, PrEP is highly cost effective in those at substantial risk to acquire HIV (Yap et al., 2019). Studies performed in Canada and the Netherlands also concur that PrEP for HIV prevention is the most cost effective (Nichols, Boucher, van der Valk, Rijnders, & van de Vijver, 2016; Ouellet, Durand, Guertin, LeLorier, & Tremblay, 2015).

To assist PrEP coverage in the United States, a Californian Senator released a bill following the 2019 USPSTF PrEP recommendations called the PrEP Access Coverage Act. The PrEP Access Coverage Act would require all private and public insurance plans to cover PrEP for HIV prevention including related services (Rosenberg, 2019). Under Section 2713 of the Affordable Care Act (ACA), insurers must cover all evidence-based services for adults rated Grade “A” or “B” in the current USPSTF recommendations. All non-grandfathered private health plans (including individual, small group, large group, and self-insured plans) must cover PrEP without cost-sharing (such as a copay or coinsurance) beginning no later than the 2021 plan year (Henry J. Kaiser Family Foundation, 2015; Rosenberg, 2019). For those without insurance, Gilead Sciences (creator of tenofovir disoproxil fumarate with emtricitabine (TDF/FTC) Truvada®) has established medication assistance programs in which provides co-pay assistance, free

condoms, and access to free HIV testing (Centers for Disease Control and Prevention, 2018d). In addition, to support the U.S. initiative to end HIV, Gilead Sciences, made an agreement to provide the CDC 2.4 million bottles of tenofovir disoproxil fumarate with emtricitabine annually to those who are uninsured until the year of 2030 (Gilead Sciences, 2019).

Conclusion

As nearly 1.9 million adults become infected with HIV each year in the world, health care practices need to adapt and streamline the focus to primary HIV prevention. The most effective method of biomedical HIV prevention to date is PrEP. Since the FDA approval of PrEP, provider awareness has increased slowly, yet prescribing practices and PrEP use has only reached 5% of the target population (Zablotska & O'Connor, 2017). The lag of PrEP prescribing has stemmed from inconsistent and improper risk assessment screenings and lack of training required for the provider to appropriately identify PrEP individuals. The Centers for Disease Control and Prevention released a Division of HIV/AIDS Strategic Plan (DHAP) 2017-2020, which is considered the “blueprint” to a future without HIV. Within the DHAP Strategic Plan, the focus is to refine strategies to maximize PrEP and antiretroviral therapy along with HIV prevention tools. Prioritizing the support of knowledge of, support for, and use of PrEP is a goal of the 2017-2020 primary prevention efforts. The first goal in the Strategic Plan is to “Increase the number of persons who are using PrEP by 500%” by increasing the number of providers who are aware of and prescribe PrEP (Centers for Disease Control and Prevention, 2018a). In order to maximize effectiveness of HIV prevention methods, efforts need to first be focused on provider education, addressing all barriers perceived in identifying patients at risk for HIV and perceived barriers of PrEP use.

Theoretical Framework

The Cabana et al. Model: Framework for Improvement

Cabana et al. (1999), created a framework for guideline improvement based on a comprehensive review of physician guideline adherence. The framework incorporates self-efficacy and outcome expectancy which is different than other guideline adherence frameworks. The investigational analysis of this framework is to identify different types of barriers that are hindering adherence to preventative health guidelines. By identifying the areas that are preventing providers from following guidelines, interventions can then be made in order to dissolve the recognized barriers and improve guideline adherence. The model was developed based on three mechanisms affecting guideline adherence: knowledge, attitudes, and behavior (Cabana et al., 1999). These mechanisms are all a part of the sequence of behavior change that first influences the provider before the guideline can affect patient outcomes. See Figure 1 for Cabana et al. model.

Cabana et al. Framework (1999): Sequence of Behavior Change
Identifying Risk for HIV and Implementation of PrEP Amongst
Primary Care Providers

Barriers to
Guideline
Adherence

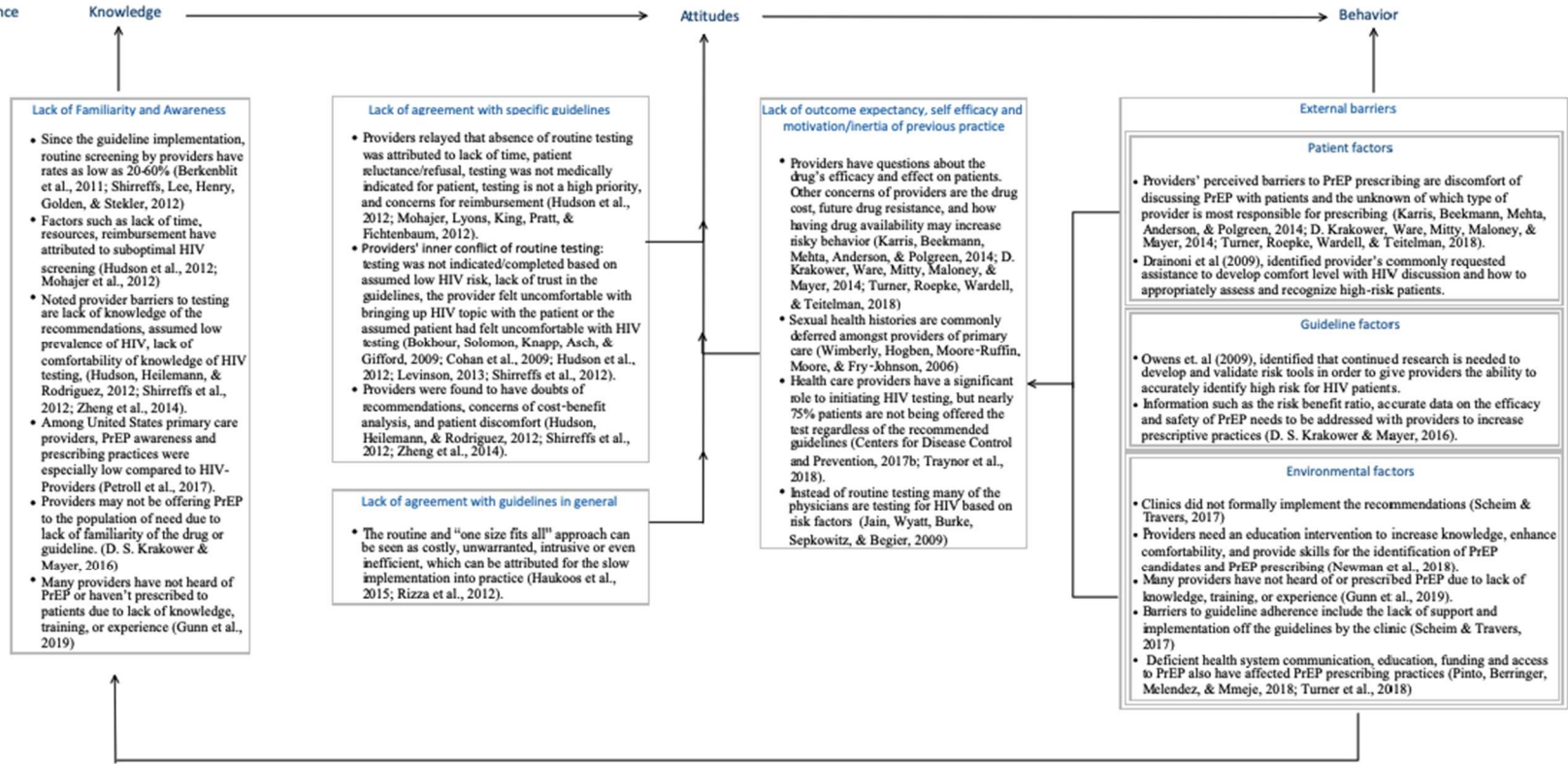


Figure 1. Cabana et al. Framework: Sequence of Behavior Change: Identifying Risk for HIV and Implementation of PrEP Amongst Primary Care Providers. Adapted with permission from Cabana MD, Rand CS, Powe NR, et al. Why Don't Physicians Follow Clinical Practice Guidelines? A Framework for Improvement. JAMA. 1999;282(15):1458–1465. doi:10.1001/jama.282.15.1458. Copyright 1999 American Medical Association. All rights reserved.

CHAPTER 3: METHODS

Project Design

This evidence-based practice improvement project was created following a literature review needs assessment exposing a need for provider HIV-prevention education. Throughout the review there was a noted gap in research correlating HIV screening and PrEP prescribing among primary care providers, particularly in the Midwest. (Bhandari, 2019). Therefore, an educational module was developed, guided by the Cabana et al. (1999) Framework, to address gaps in research and HIV prevention guideline adherence for Midwest primary care providers. The purpose of this practice improvement was to identify and increase provider knowledge, comfort-level, and intentions to screen for HIV and prescribe PrEP following education. The target population for this project was primary care providers at a Midwest VA facility. The education was presented face-to-face to the providers in PowerPoint format. Pre and post education surveys were utilized to evaluate an expected correlation of increased knowledge, comfort, and intentions to apply HIV prevention practices with the given education.

Implementation Plan

Setting

The VA is the single largest provider of HIV care in the United States, therefore this setting seemed the most appropriate for continued HIV prevention efforts (Maguire, 2018). The VA facility that was the setting for this project is located in the Midwest, serves more than 33,000 veterans, and has approximately 300,000 outpatient visits per year. There are currently 140 providers that work within this VA HealthCare System (VAHCS), 33 of these providers are identified within the Primary Care service line. This HealthCare System is a Joint Commission medical/surgical hospital with more than 30 acute-care beds, a 38-bed Community Living

Center, Primary Care and Specialty Clinics, and 10 Community Based Outpatient Clinics (U.S. Department of Veterans Affairs, 2020).

Approval for DNP Project

This practice improvement project was proposed to key stakeholders, the research and infectious disease departments at the Midwest VA facility. The key stakeholders assessed the need for this education for providers and the congruence of the project with the facility's goals. The key stakeholders of this project within the VAHCS included the Associate Chief of Staff- Research & Development, Administrative Officer of Research Development, Education Director, Educational Program Assistant, TMS/Accreditation Specialist, Training Technician, and two Medical Doctors of Infections Disease, both of which oversee education with primary care providers and of VA staff . With an identified need, the proposed “HIV risk identification and prevention using PrEP” education was accepted as a topic for presentation at a weekly educational meeting for primary care providers.

The next steps completed prior to IRB submission included the completion of “Research Service Standard Operating Procedure for Submission of Human Subjects Research.” Submitted forms and trainings included: CITI training, TMS training, a secondary University IRB submission for survey research (University of South Dakota), Research Protocol, Conflict of Interest Form, Curriculum Vita, Scope of Practice, and Research and Development application. Following acceptance of these applications, this project was approved by the Midwest VAHCS via the Institutional Review Board (IRB) of the University of South Dakota (See Appendix E). This project was also approved via completion of the “IRB Protocol Application for Exemption for Primary Research”, submitted to the North Dakota State University IRB (See Appendix F).

There were no vulnerable populations included in this project. There was also no associated risk to participate in this project.

Population

The key stakeholders, Associate Chief of Staff-Research & Development, Administrative Officer of Research Development, and the two medical doctors were instrumental in identifying a population for focus and setting for the project implementation. The population for focus of this DNP project included health care professionals that are employees at the Midwest VAHCS who were in attendance one of two potential meetings in October or December of 2019.

The October 2019 meeting comprised of multiple clinical disciplines employed by the VAHCS. This type of meeting occurred monthly which normally has 50-60 attendees. The December 2019 meeting comprised of primary care providers, this type of meeting occurs every Friday and normally comprises of 10-20 providers. The term provider is inclusive of the following clinical titles: Doctor of Medicine (MD), Doctor of Osteopathy (DO), Nurse Practitioner (NP), and Physician's Assistant (PA). This DNP project was implemented at the primary care provider meeting in December 2019, as the potential participants were more appropriate for the purposes of this project. No recruitment was needed as the key stakeholders had chosen the setting and form of education that is a standard for primary care providers employed at the Midwest VAHCS. Research inclusion criteria comprised of participants that are employees of the VAHCS of any demographic who is a clinical provider and attended the educational presentation. Each participant needed to complete and return both the pre and postsurvey to be included in this project.

Intervention

The co-investigator developed the educational module, which was presented in person, via PowerPoint format per request of the VAHCS PCP liaison (key stakeholder and Infectious Disease MD) who coordinates the weekly meetings. Parallel to the purpose of this project, the intervention was created to address perceived barriers and improve adherence to the USPSTF and CDC HIV screening and PrEP guidelines by providing the necessary education.

Therefore, the education included national and local HIV incidence and prevalence, literature review, VAHCS congruence to the project, CDC and USPSTF HIV screening and PrEP guidelines, HIV risk identification, Denver HIV Risk Score Tool, PrEP: uses, screening, initiation, dosing, pharmacology, side effects, monitoring/associated testing, discontinuation and PEP (post-exposure prophylaxis). Continued education for primary care providers is necessary to address concerns and diminish perceived barriers, to reinforce that the benefit of PrEP to reduce HIV acquisition is significant (Calabrese et al., 2017; Hakre et al., 2016; D. S. Krakower & Mayer, 2016; Owens et al., 2019). Barriers/concerns addressed throughout the education were: PrEP and condom use, associated risky behavior, potential for resistance, costs, alternative medications, and future medications undergoing research for PrEP. A resource supplement for providers was also incorporated into the presentation for future reference in practice.

Evaluation and Data Analysis

Survey Evaluation

Prior to initiating the educational module, participants were given a paper packet including a Statement of Implied Consent (see Appendix A), presurvey (see Appendix B), and postsurvey (see Appendix C). The statement of consent and surveys were stapled together, the presurvey and postsurvey were numbered to prevent loss of comparative information and to keep

anonymity. Each presurvey number matched the attached postsurvey number for data interpretation purposes and to not identify the participant. After reading the Statement of Implied Consent, the person was then able to voluntarily continue or not participate in the project. Each voluntary participant was directed to complete the presurvey (see appendix B) prior to the educational module. The presurvey consisted thirteen questions, in which the first four were for identifying demographics without the identification of personal information.

Following the presentation, participants were able to ask questions and were directed to complete the postsurvey. The postsurvey comprised of nine of the thirteen questions from the presurvey, questions not included were questions one through four of the presurvey (demographic questions). The participants were informed that they were able to keep the statement of consent if desired and could use that document for the point of contact as well as to obtain the presentation and resources provided in the presentation. The hard copy of each participant's surveys were collected and placed in a lock box immediately following the presentation.

The survey questions were constructed following the Cabana et al. (1999) Framework: Sequence of Behavior Change. The questions (excluding demographic) were each associated with the framework by category: knowledge, attitudes, and behaviors. The purpose of the presurvey was to identify pre-education knowledge, attitude, or behavior of the participants. The purpose of the postsurvey was to identify change in knowledge, attitudes, and behavior following intervention. Presurvey to postsurvey evaluation was completed for identification of change to contribute to the overall evaluation of the DNP project success. Evaluation, for purposes of this project, is completed for each objective and is described as "objective met" or "objective not met."

Data Collection

Data collection for this project was completed by the co-investigator with the assistance of the NDSU Statistics Center team. Information submitted by the co-investigator did not include personal identifiers for strict participant confidentiality. Demographic data was submitted to NDSU Qualtrics for analysis. Qualtrics is a data collection and analysis software approved by the North Dakota University System. In addition, Excel software was used for data entry of presurvey to postsurvey by the co-investigator for comparative analysis. The presurvey answers (questions 5 to 13) were compared to the corresponding postsurvey answers (questions 1 to 9) per participant to identify trends through descriptive statistical analysis. The Excel data table created was then sent to the NDSU Statistics Center for analysis. Data analysis was completed using the FREQ procedure, a frequency data evaluation model. As the sample size was small ($n=5$), an inferential data test was not applicable. For each question, a FREQ procedure evaluation was completed per pre-question, post-questions, for a FREQ table percent comparing pre- and post-questions. (Refer to Appendix G for frequency tables).

CHAPTER 4: RESULTS

Demographic and Practice Characteristics of Respondents

For the December 2019 intervention of the eligible 11 providers in attendance, six of the 11 (54.5%) participated in the surveys. The participants had approximately 10 minutes to finish the presurvey and 20 minutes to finish the post survey. The intervention was nearly 60 minutes in length. Five out of six (83.3%) participants returned the presurvey in completion. Six out of six (100%) participants returned the post survey. The postsurvey completed by the participant that did not return a presurvey was excluded from the project, leaving a total participant number of five. Of the five participating providers who completed and submitted the demographic portion, 100% worked in general/primary care, two providers were MDs (40%) and three providers were NPs (60%). Age of the providers ranged from 26 years to 65 years. Years in practice ranged from less than five years to over 25 years. (For demographic results, refer to Table 1).

Table 1

Demographics

Survey Response	%	Count
Age in years		
26-35 years	20%	1
36-45 years	20%	1
46-55 years	40%	2
56-65 years	20%	1
Total	100%	5
Years in Practice		
Less than 5	20%	1
5 to 9	20%	1
15 to 19	40%	2
25+	20%	1
Total	100%	5
Clinical Practice		
General/Primary Care	100%	5
Total	100%	5
Clinical Title		
MD	40%	2
NP	60%	3
Total	100%	5

Following the demographic section, the questionnaire surveyed provider knowledge of North Dakota, the VA's role and impact of HIV, and knowledge, attitude, and behaviors associated to one of four project objectives. Each project objective was evaluated as "met or not met" after response data was analyzed by pre-to-postsurvey answer comparison. The evaluation of objective "met or not met" was by measured by frequency of correctness and/or improvement on a Likert Scale rating system. (See Appendix G for Survey Tables: Presurvey by postsurvey, using FREQ procedure. See Appendix H for Provider responses: Tables of presurvey to postsurvey comparison.)

VA and North Dakota Knowledge

Two of the survey questions (presurvey questions 5 & 6) were associated with the Sequence of Behavior Change: knowledge, to identify provider knowledge of the VA's role in HIV care and the impact of HIV in North Dakota. Prior to the education, two of five (40%) of VAHCS providers were aware that the Department of Veterans Affairs is the single largest provider of HIV care in America (See Figure 2/Appendix G. Table G1). One provider, pre-intervention, was aware that North Dakota has had an increase by 73% of newly diagnosed HIV/AIDS cases over the past five years (See Figure 3/Appendix G. Table G2). Following the education five out of five participants were able to identify the Department of Veterans Affairs' role in HIV as well as North Dakota's increase in HIV rates.

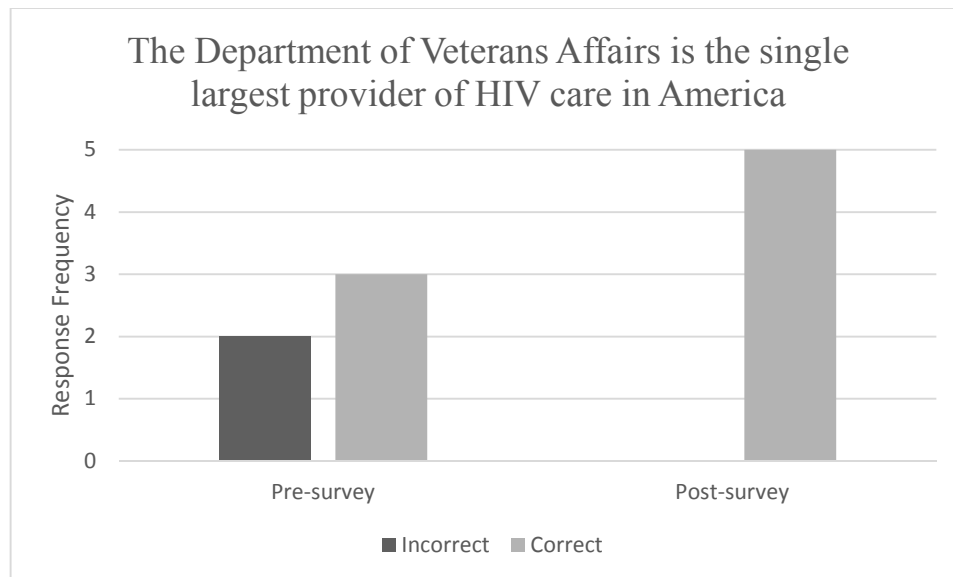


Figure 2. Pre Q5, Post Q1. Provider knowledge of the VA role with HIV. Answer: True.

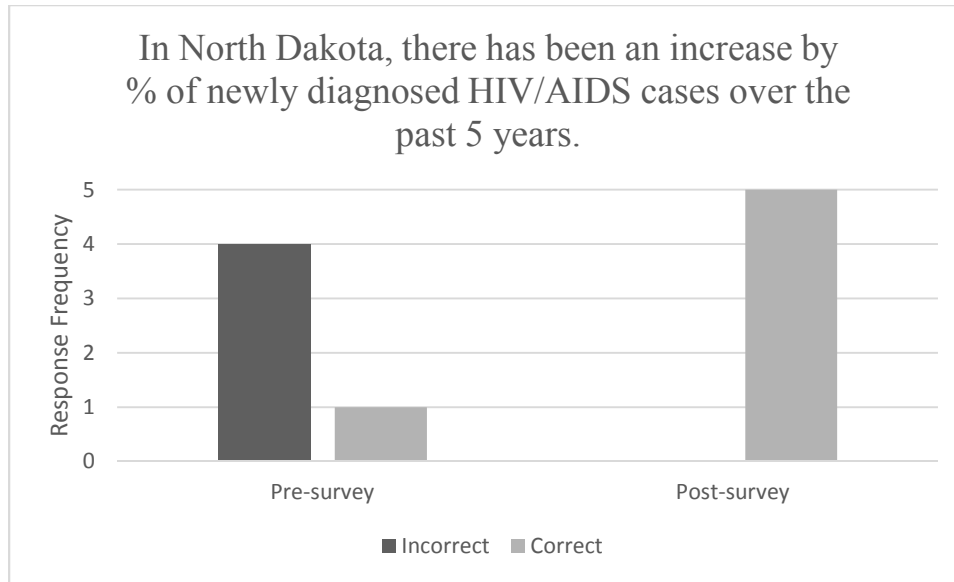


Figure 3. Pre Q6, Post Q1. Provider knowledge of ND's HIV prevalence. Answer: 73%.

Objective One

The first objective was to increase primary care provider intention to screen for HIV status after completion of the education module. The following questions were created to measure behavior related to the current CDC's HIV screening guidelines by using the Likert scale: *Definitely*=5, *Very Probable*=4, *Probably*=3, *Probably Not*=2, *Definitely Not*=1. This Likert scale is used to measure likelihood of behavior, as *Definitely Not*=1 as the least likely and *Definitely*=5 as the most likely. The first question was used to rate the intention to screen all persons aged 13-64 years for HIV at least once. Postsurvey, three of the five participants answers remained unchanged. Another participant's intention to screen all persons declined from *Definitely* (5) to *Very Probable* (4). There was a single participant improvement of intent to screen all persons, with rating increase from *Probably* (3) to *Very Probable* (4). (See Figure 4/Appendix G. Table G7).

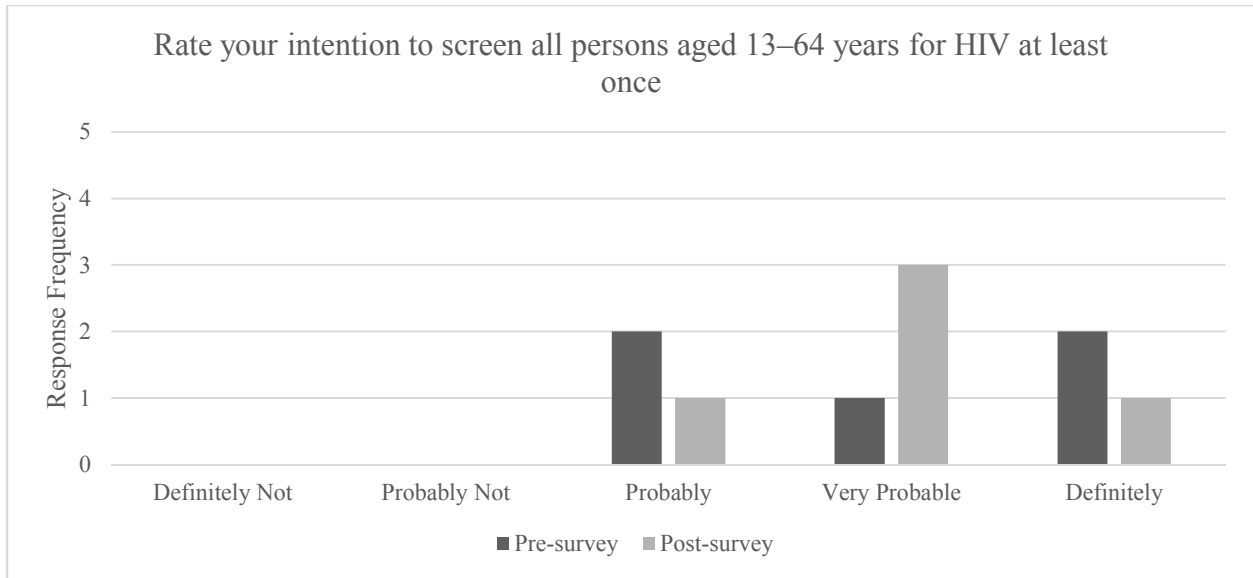


Figure 4. Pre Q11, Post Q7. Provider ratings of intentions to screen all persons age 13-64 years for HIV at least once.

The second question was measured with the same Likert Scale to evaluate intention to annually screen persons at high risk for HIV. Following intervention, three of the five participants answers remained unchanged. A single participant’s intention to screen persons at high risk annually declined from *Definitely (5)* to *Very Probable (4)* following intervention. There was a single participant improvement of intent to annually screen high-risk persons, with rating increase from *Probably (3)* to *Very Probable (4)*. (See Figure 5/Appendix G. Table G8)

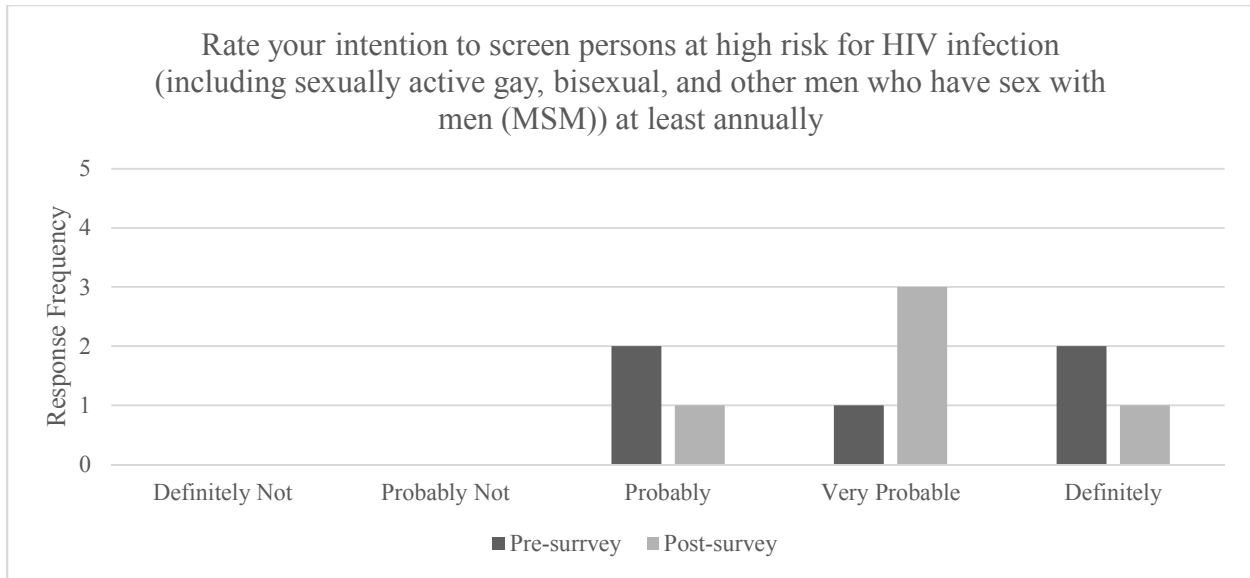


Figure 5. Pre Q12, Post Q8. Provider ratings of intention to screen persons at high risk for HIV infection.

Overall, net intention to screen all persons aged 13-64 years for HIV at least once and intention to screen persons at high risk for HIV at least annually remains unchanged following the intervention. The objective to increase primary care provider intention to screen for HIV status after completion of the education module, was not met.

Table 2

Objective 1 Questions

Cabana Framework	#Presurvey, #Postsurvey	Question	Objective met if (on postsurvey):
Behavior	11, 7	Rate your intention to screen all persons aged 13–64 years for HIV at least once:	Improvement on Likert scale rating
Behavior	12, 8	Rate your intention to screen persons at high risk for HIV infection (including sexually active gay, bisexual, and other men who have sex with men (MSM)) at least annually:	Improvement on Likert scale rating

Likert scale: *Definitely*=5, *Very Probable*=4, *Probably*=3, *Probably Not*=2, *Definitely Not*=1.

Objective Two

The second objective was to increase the primary care provider knowledge regarding PrEP after completion of the education module. The associated questions were used to address knowledge of PrEP and attitude in regard to comfort-level in discussing PrEP with high-risk patients. To measure an increase of knowledge regarding PrEP, the frequency of correctness was evaluated using the question: What is pre-exposure prophylaxis (PrEP). Before the education module, four of five (80%) selected the correct definition of PrEP, “*a preventative medication, for HIV negative adults who are at substantial risk for HIV acquisition*”. In the presurvey, one of the participants did not select the correct answer although had selected “*I have not heard of/do not have knowledge about PrEP*”. Following intervention, four of five participants (80%) selected the correct answer. One participant of the post survey selected the incorrect answer from a previously correct answer in the presurvey. (See Figure 6/Appendix G. Table G4).

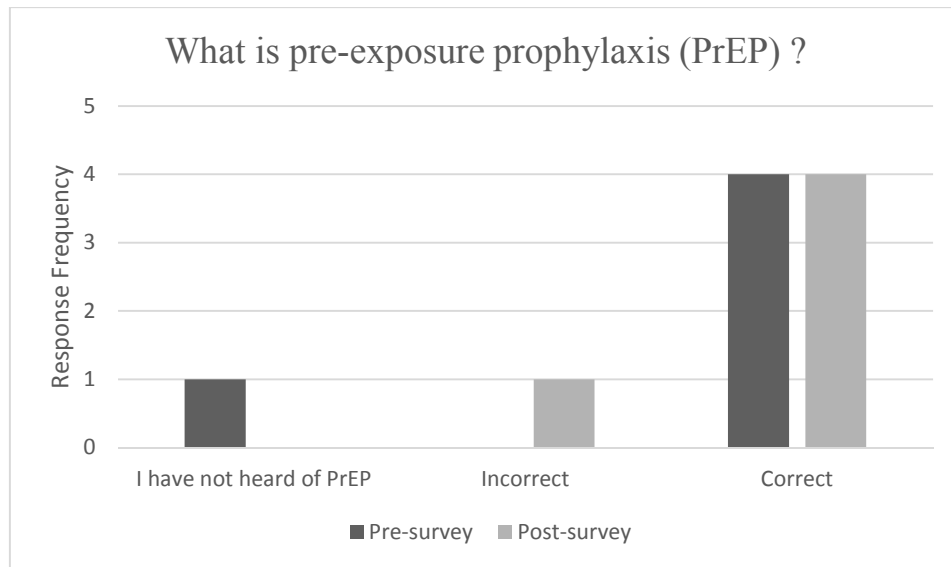


Figure 6. Pre Q8, Post Q4. Provider knowledge of the definition of PrEP. Answer: A preventative medication, for HIV negative adults who are substantial risk for HIV acquisition.

Provider agreement with the statement “I am comfortable in discussing PrEP with high-risk patients” was rated on a Likert scale from increasing order of agreeability to decreasing:

Strongly agree=5, Agree=4, Undecided=3, Disagree=2, Strongly disagree=1. Presurvey results were two of five (40%) *Strongly disagree (1)*, one of five (20%) *Disagree (2)*, one of five (20%) *Undecided (3)*, one of five (20%) *Agree (4)*. There was an increase in comfort-level following education with response frequency of 20% *Disagree (1)* , 20% *Undecided (3)*, and 60% *Agree (4)* Of those respondents who selected *Disagree* or *Undecided*, both individually increased comfort-level rating from pre to postsurvey respectively. (See Figure 7/Appendix G. Table G6).

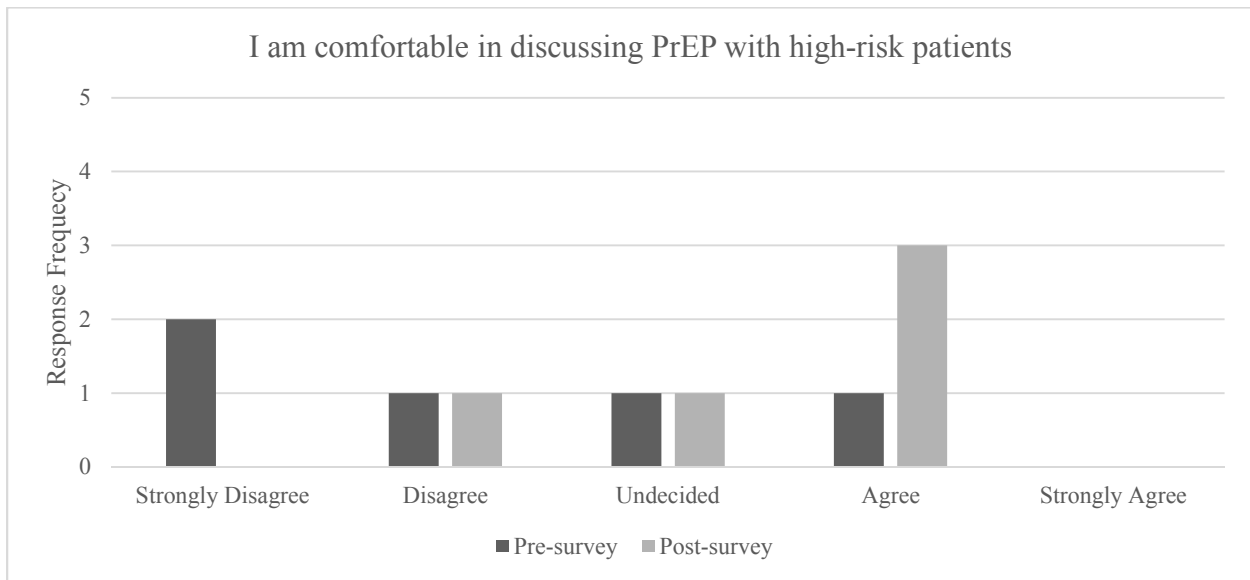


Figure 7. Pre Q10, Post Q6. Provider rating of comfort level with discussing PrEP with high risk patients.

Overall the net knowledge of PrEP remained unchanged with response frequency of 80%. However, provider agreement with comfort-level of discussing PrEP increased by 80% following intervention. The second objective: to increase the primary care provider knowledge regarding PrEP after completion of the education module, was partially met. Objective evaluation is related to there not being a change in knowledge of the definition of PrEP but an increase in comfort-level with discussing PrEP with high-risk patients.

Table 3

Objective 2 Questions

Cabana Framework	#Presurvey, #Postsurvey	Question	Objective met if (on postsurvey):
Knowledge	8, 4	What is pre-exposure prophylaxis (PrEP) :	Correct
Attitude	10, 6	I am comfortable in discussing PrEP with high-risk patients:	Improvement in Likert scale rating

Likert scale: Strongly agree=5, Agree=4, Undecided=3, Disagree=2, Strongly disagree=1.

Objective Three

The third objective was to increase primary care provider awareness of individuals that would qualify for preexposure prophylaxis use after completion of the education module. Questions about knowledge and attitude were used to evaluate awareness of individuals who qualify for PrEP. To evaluate knowledge, a “select all that apply” question was used for providers to identify persons who are at substantial risk for HIV. Of the eight available answers, all eight of the answers were correct. To evaluate knowledge gained, an increase in selected answers was expected (maximum of 8). On the presurvey, one provider (20%) selected four correct answers, two providers (40%) selected five correct answers, and two providers (40%) selected all eight correct answers. Following intervention, all of the providers (five of five), selected the eight correct answers. There was an overall improvement net improvement of 40% to 100% in provider ability to identify those at substantial risk for HIV. (See Figure 8/Appendix G. G3).

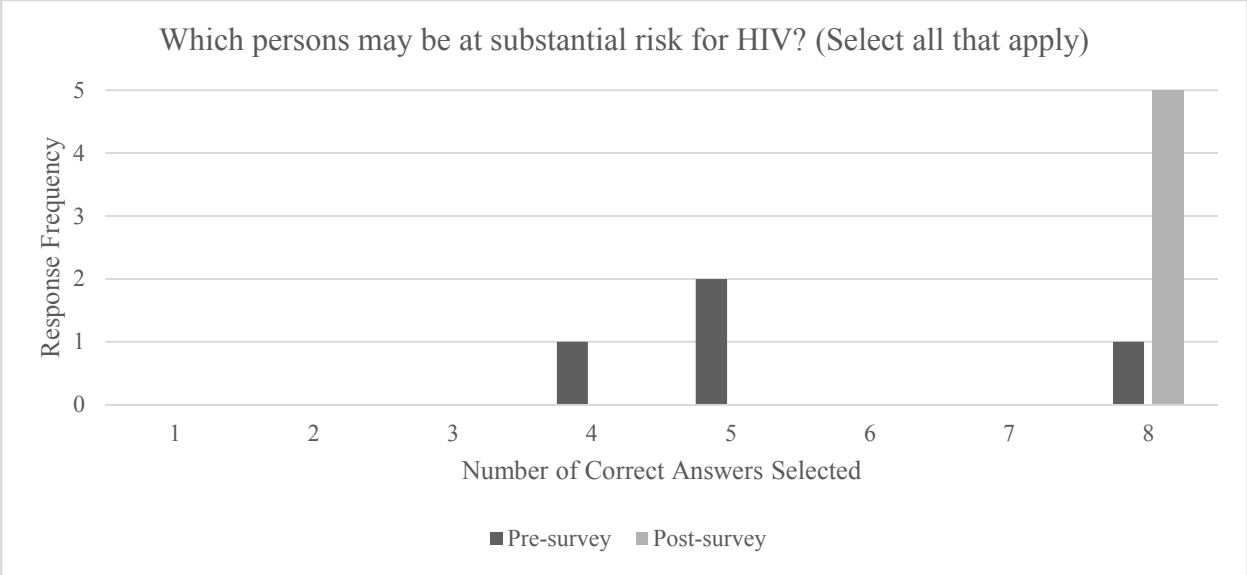


Figure 8. Pre Q7, Post Q3. Provider knowledge of persons at substantial risk for HIV. Answers (8 total): sexually active men who have sex with men (MSM), heterosexually active women, heterosexually active men, sexually active transgender women and men, adult persons who inject drugs (PWID), heterosexually active woman and men whose partners are HIV positive, infrequently use condoms during sex with 1 or more partners with unknown HIV status, diagnosed with or reported bacterial STI within 6 months.

Confidence was the measurement for attitude/comfort-level in regard to provider ability to identify persons at substantial risk for HIV who are PrEP eligible. Confidence was measured using a Likert scale from increasing order of agreeability to decreasing: *Strongly agree*=5, *Agree*=4, *Undecided*=3, *Disagree*=2, *Strongly disagree*=1. There was an 80% increase in confidence to identify those who are eligible for PrEP with response frequencies of four of five (80%) *Agree* (4) and one of five (20%) *Disagree* (2). (See Figure 9/Appendix G. Table G5).

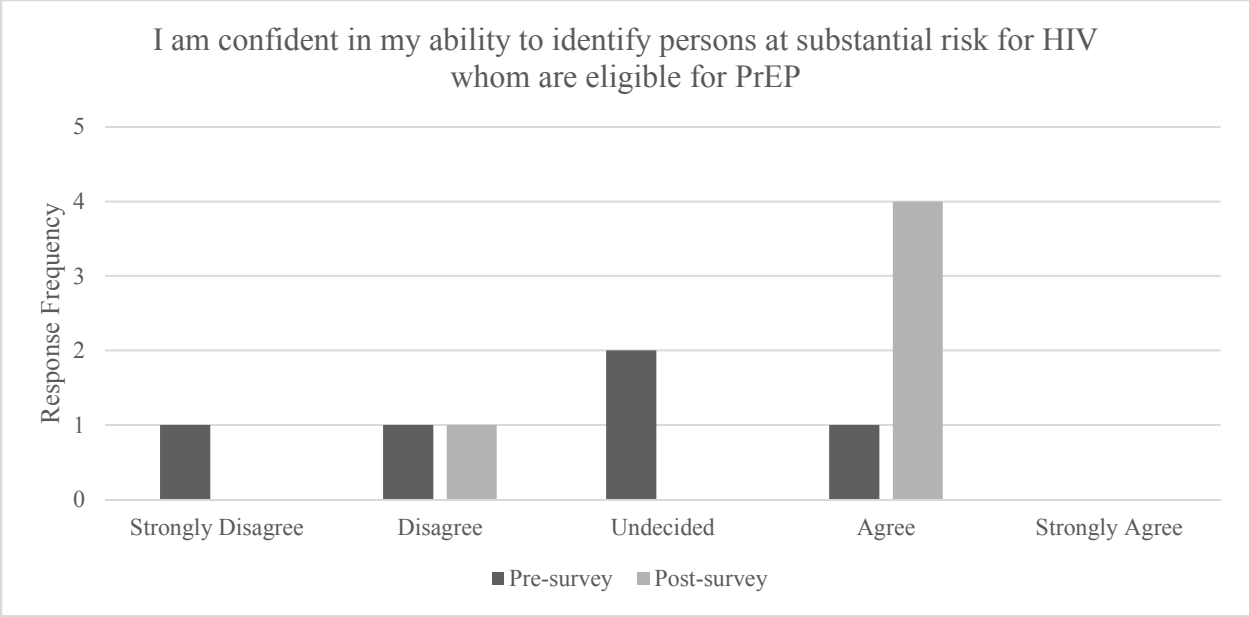


Figure 9. Pre Q9, Post Q5. Provider ratings of confidence in ability to identify persons at substantial risk for HIV whom are eligible for PrEP.

The third objective, to increase primary care provider awareness of individuals that would qualify for preexposure prophylaxis use after completion of the education module, was met. Overall, this objective was met as provider confidence (comfort-level/attitude) and ability (knowledge) in the identification of those at substantial risk for HIV increased.

Table 4

Objective 3 Questions

Cabana Framework	#Presurvey, #Postsurvey	Question	Objective met if (on postsurvey):
Knowledge	7, 3	Which persons may be at substantial risk for HIV: (select all that apply)	Increased # of answers selected (max 8)
Attitude	9, 5	I am confident in my ability to identify persons at substantial risk for HIV whom are eligible for PrEP:	Improvement in Likert scale rating

Likert scale : *Strongly agree=5, Agree=4, Undecided=3, Disagree=2, Strongly disagree=1.*

Objective Four

The fourth objective was to increase primary care providers' intention to prescribe PrEP after completion of the educational module. A question evaluating provider behavior was used to evaluate intention to prescribe PrEP using the Likert scale measuring from the highest probability (5) to the lowest (1): *Definitely*=5, *Very Probable*=4, *Probably*=3, *Probably Not*=2, *Definitely Not*=1. The option *I do not prescribe medications* was available for those who are students or do not have current prescriptive practices.

Following the intervention, there was an increase in intention to prescribe PrEP, three of five (60%) providers selected *Probably* (3), two of five (40%) selected *Very Probable* (4). The respondent that had selected *I do not prescribe medications* in the presurvey, selected *Very Probable*, potentially suggesting future for prescribing practices.

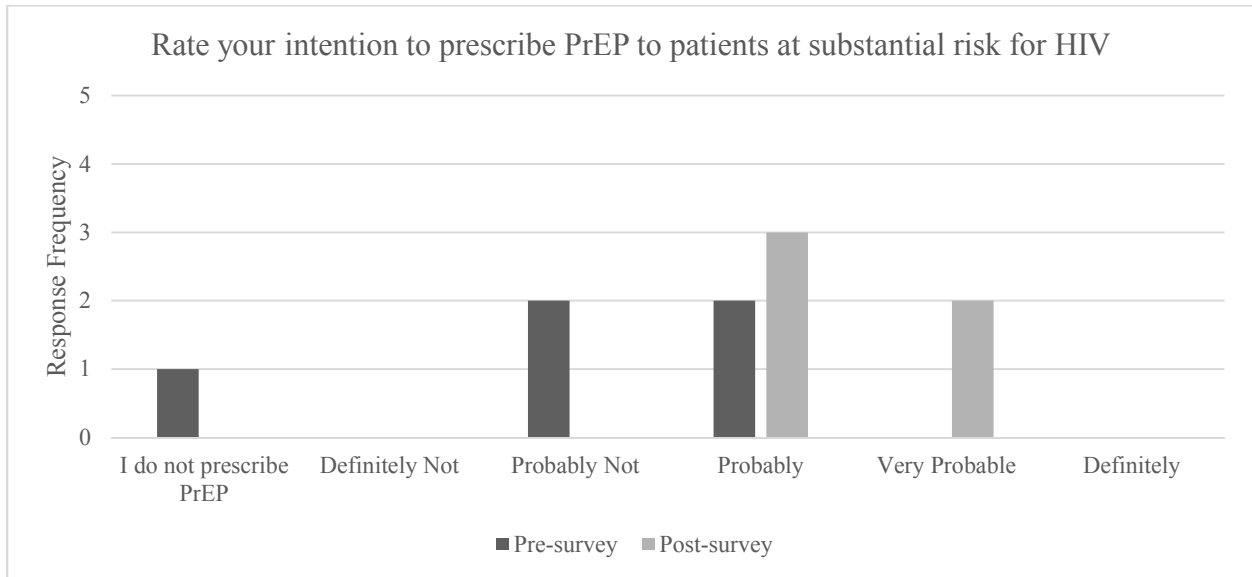


Figure 10. Pre Q13, Post Q9. Provider ratings of intention to prescribe PrEP to patients at substantial risk for HIV.

The fourth objective, to increase primary care providers' intention to prescribe PrEP after completion of the educational module, was met as there was a 60% (three of five) net increase of provider intention to prescribe PrEP. (See Figure 10/Appendix G. Table G9).

Table 5

Objective 4 Question

Cabana Framework	#Presurvey, #Postsurvey	Question	Objective met if (on postsurvey):
Behavior	13, 9	Rate your intention to prescribe PrEP to patients at substantial risk for HIV:	Improvement in Likert scale rating

Likert scale: *Definitely=5, Very Probable=4, Probably=3, Probably Not=2, Definitely Not=1.*
Available option *I do not prescribe medications.*

CHAPTER 5: DISCUSSION AND RECOMMENDATIONS

Summary

According to the U.S. Department of Health and Human Services, approximately 1.1 million people in the U.S. are living with HIV today. Since 2015, there has been a decline of new HIV diagnosis, which the CDC contributes to efforts made in prevention and treatment of HIV. There were approximately 37,832 new HIV infections in 2018 and an estimated 14% of Americans that have a non-diagnosed positive HIV status. Due to trends of new HIV diagnoses each year, the CDC concluded that prevention and treatment efforts have plateaued and are not adequate for infection prevention (U.S. Department of Health and Human Services, 2020).

To reduce the number of HIV infections in the United States, providers should be following the current CDC and USPSTF grade “A” recommendations for HIV screening and PrEP implementation. This DNP project was implemented with intentions to improve HIV screening and PrEP prescribing practices per national guidelines in the primary care setting as HIV is a preventative disease. The Cabana et al. (1999) Model “Why Don’t Physicians Follow Clinical Practice Guidelines?” was the framework used as an evidence-based guide for this practice improvement project (See Figure 1).

Through application of the framework and literature review needs assessment, provider knowledge, attitude, and behavior barriers revealed a need for Midwest primary care providers to have further HIV-related education. With the assistance of key stakeholders, an educational presentation was created as an intervention for a practice improvement project to engage primary care providers at a Midwest VA Health Care System (VAHCS). This intervention included evidence-based education on HIV screening and PrEP implementation guidelines, tools for HIV risk identification, PrEP overview, and prescribing process/resources. Of the included

participants (n=5), three were nurse practitioners, two were medical doctors, who all practiced in general/primary care and had five to 25+ years in practice.

This DNP project had four objectives proposed and evaluated following implementation. The first objective was to increase primary care provider intention to screen for HIV status after the intervention. The expected result of this objective was to have an increase of intention to screen for HIV status, similar to improved HIV screening outcomes in previous studies (Sanz et al., 2019). Unexpectedly, this outcome had no net change in intent of screening behavior for all persons or persons at high risk following education. Although there was not an increase on intent following education, each provider had already rated themselves as having a high probability (3,4, or 5 out of 5 rank) to follow HIV screening recommendations.

The second objective was to increase primary care provider knowledge regarding PrEP. This objective was measured by the frequency of correctness of the definition of PrEP and the providers' confidence/ comfort-level in discussing PrEP with patients. Knowledge of PrEP (definition only) did not improve, which could be attributed to simple error, as the respondent who selected the incorrect response in the postsurvey did indeed have the question correct previously.

Following intervention, there was an increase (80%) in provider confidence/ comfort-level with discussing PrEP following education. Post-intervention, this objective was partially met, as there was not a net increase in knowledge of the PrEP definition however there was an increase in confidence/comfort-level. An increase in provider comfort-level was expected as previous studies have had either similar results after an educational intervention or had predicted an increase in comfort-level with education (Blackstock et al., 2017; Blumenthal et al., 2015b; Castel et al., 2015; Henny et al., 2019; Scott et al., 2019). Having a high comfort-level with

PrEP use among providers is critical as it supports the provider to initiate/facilitate PrEP discussions with patients. By supplementing a primary care provider's knowledge of HIV and PrEP, a PCP is well positioned to identify patient risk factors and initiated crucial discussions with the patient to prevent HIV acquisition.

Having an increased knowledge of PrEP is of significant importance to close the gap between generalists (non-HIVP) and HIV-providers to facilitate the PrEP prescribing cascade. The PrEP cascade is a series of steps that identifies the provider's evaluation of a patient's PrEP eligibility, initiating PrEP therapy, and retaining a patient in PrEP services (Hojilla et al., 2018). Therefore, the third objective was to increase primary care provider awareness of individuals that would qualify for preexposure prophylaxis. To evaluate knowledge gained, providers were to select all correct responses that were examples of persons at substantial risk for HIV. After the intervention, all providers selected each correct response. On this question, three of five (60%) providers improved their ability to identify those at substantial risk for HIV. Relatedly, four of five (80%) providers felt their comfort-level in identifying persons at risk for HIV that are eligible for PrEP had improved. Similar to previous research, this project successfully correlated an increase in knowledge to improvement of provider comfort-level with identifying those who are PrEP eligible (Elion, Fransua, Stringer, & Sierra, 2019; D. Krakower & Mayer, 2012).

By improving the ability and comfort-level in identifying persons at risk for HIV, a provider has the opportunity to take the next step in the PrEP cascade, to initiate PrEP therapy. The purpose of the last objective was to evaluate whether or not providing additional education will support the provider as a bridge between steps of the PrEP cascade: "identifying a patient's PrEP eligibility" and "initiating PrEP" therapy. Hence, the fourth objective was to measure the providers intent to prescribe PrEP, to trigger the last step in the cascade. Responses were

measured by a probability Likert Scale. An increase of intention to prescribe PrEP was expected as previous studies found intentions had increased following education that informs providers how to deliver this HIV prevention method (Newman et al., 2019; Smith et al., 2016).

As anticipated, there was a 60% (three of five) increase in intention to prescribe PrEP following the intervention which could be correlated with an increase in knowledge and comfort-level of HIV screening and PrEP prescribing. Among this group, every provider rated their intention to prescribe PrEP as “*probably* (3) or *very probable* (4)”. This project did not evaluate occurrences of PrEP prescribing by primary care providers, however, an increase in prescribing following intervention is expected as there was a high intent to prescribe following education. This hypothesis is supported by previous research, in which there is an increase in prescribing of primary care providers who have attended PrEP related training (Clement et al., 2018; Silapaswan et al., 2017)

Findings within Context of Literature

The key findings from this DNP project were that with HIV and PrEP-related training, primary care providers did not change their likelihood of HIV screening, however their knowledge, comfort-level, candidate identification ability, and intent to prescribe PrEP increased. Though the sample size was small, findings from this project are similar to other studies, that HIV-related education is needed among providers in order to have success in HIV-prevention efforts (Elion et al., 2019).

Equivalent to other studies, this project identified that having an increase in a provider’s PrEP comfort-level promotes the provider to initiate/facilitate a discussion of PrEP with patients. Providers that are more likely to initiate the discussion of PrEP are linked to having increased prescribing of PrEP (Scott et al., 2019). As seen in this project, training interventions will

increase a provider's knowledge of PrEP, comfort-level in discussing PrEP, intent of prescribing PrEP, and likelihood of prescribing PrEP following HIV-related trainings (Blackstock et al., 2017; Blumenthal et al., 2015b; Castel et al., 2015; Henny et al., 2019; Scott et al., 2019). The data from this project supports other research outcomes, that HIV-related provider education is crucial to enhance HIV screening and PrEP prescribing. Education should be individually tailored following needs assessment of providers in order to identify which barriers to address through education to optimize effectiveness.

Recommendations

This project was completed to evaluate providers' self-rating of knowledge, confidence, comfort-level, and intentions associated to HIV screening and PrEP prescribing practices and did not evaluate practice change following intervention. Subsequent research within the VAHCS following educational intervention could be beneficial to evaluate an improvement in HIV prevention efforts in congruence with the VA and national initiatives. From the data collected thus far, it would be expected to see an increase in HIV screening and PrEP discussions or prescribing among the primary care providers who participated in this project. Per previous research, PCPs who have received educational interventions had either prescribed PrEP for the first time after intervention or had more prescribing occurrences (Silapaswan et al., 2017).

Recommendations for future research would be to integrate HIV-related education into health care facilities within the region, especially rural, and evaluate if there is a change in practice related to HIV screening guideline adherence and prescribing of PrEP. For additional evaluation of knowledge, attitude, and behavior change, future research focusing on change of behavior following education intervention is recommended and supported by numerous studies.

The Midwest tends to be a more conservative region where patient and provider views of HIV and high-risk sexual behavior are understudied.

Local health departments can address these research gaps by assessing providers knowledge, attitudes, practice, guideline adherence, and readiness for practice change. By identifying local needs, educational interventions can be tailored, as there is not a one-size-fits-all solution. Other considerations for future research that were not addressed in this project are barriers related to the facility, policy, cost, Midwest ideation and stigma related to HIV risk and screening, and stigma related to PrEP and PrEP prescribing in the Midwest.

In addition, further research should address the understudied impact of Veterans Affairs, provider, and the veteran patients' views of lesbian, gay, bisexual, transgender, queer (LGBTQ) healthcare services. Specifically, the impact on healthcare service before and after the 1993 policy of "don't ask, don't tell", where statements of homosexual activity would lead to the member's military discharge (Burrelli, 2010). In 2011, the 1993 policy of "don't ask, don't tell" was ruled as unconstitutional. An analysis in 2017 found that 4.23% of men aged 18 to 44 years that served in the military had self-reported as gay, bisexual, or other MSM activities. This percentage does not represent women or other self-identified orientation. Military persons may be less likely to self-report gay, bisexual, or other MSM activities due to concerns of potential discharge of the military or loss of VA healthcare benefits after leaving the service (Hoover, Tao, & Peters, 2017). Research should evaluate how under-reporting and a provider's attitude, comfort-level, and behavior toward high-risk activity impacts HIV prevention and treatment services.

Dissemination

The key findings of this project will be disseminated to the Associate Chief of Staff of Research and Development and key stakeholders at the VAHCS. The Primary Care Provider liaison of the VAHCS will be informed directly of results and interpretation of this project. For further dissemination, there is plan to present the findings of this project at a poster presentation at North Dakota State University in the Spring of 2020. To disseminate the findings of this project to other health care communities and public, this disquisition will potentially be available pending publishing.

Strengths and Limitations

A limitation of this project was the small sample size as there was not a measure for statistical significance and cross tabulation was not performed. Data results of this project should be interpreted with caution due to size. Prior to implementation of the project, the initial setting/proposed population was estimated to be 50-60 persons, planned in October 2019. Project implementation on this date was canceled due to a VAHCS event conflict. Although the final sample size was not large once implemented in December 2019, the included participants were all primary care providers, which was the population of interest for this project. Other limitations were that a needs assessment was not done directly with the participants of the project. Nor was there an evaluation of practice change following intervention. Of literature comparison, this project measured intention to perform HIV screening and intention to utilize PrEP in practice and did not measure occurrences of screening or PrEP prescribing before and after intervention.

Testing rates and PrEP prescribing may also vary upon region and HIV incidence, which should also be factored into evaluation of change in practice, attitudes, and behaviors.

Geographical regions that have higher-risk populations may be more aware of PrEP, which

should be considered for future research. Other regional factors include: PrEP stigma, HIV-stigma, homophobia, transphobia, patient/community attitudes, gender, racial, and ethnic disparities.

The “purview paradox” was not evaluated within this research project. The “purview paradox” was termed by Krakower and colleagues, which explains the theory that providers who are viewed as the most knowledgeable and experienced in PrEP prescribing (HIV-providers) should be responsible for PrEP prescribing. Yet, HIV-providers do not often see patients who are PrEP eligible (HIV-negative). (D. Krakower et al., 2014). Furthermore, HIVPs believe that the prescribers who have contact with the most PrEP eligible (primary care providers) who have the capability and position to prevent HIV should be most responsible for PrEP prescribing. However, many PCPs do not feel they have sufficient knowledge, training, comfort, or experience with prescribing the drug. The “purview paradox” is used to explain the gap of PrEP prescribing responsibilities. Examining the primary care providers’ assumed role with PrEP prescribing pre and post-intervention could be beneficial to see if education eliminates the purview paradox.

A strength of this project, despite the size, was the quality of the population studied, evaluating primary care providers specifically. Presenting this education to small group of primary care providers facilitated discussion and participant to project-lead collaboration. After the presentation, the providers in attendance reported the education was “very helpful”, “interesting”, and some inquired about how they could contact the project-lead for questions.

This project was a successful attempt to improve HIV-prevention efforts among primary care providers in the Midwest region. By incorporating HIV/PrEP education recommended by previous studies, the providers had an increased knowledge, ability, and comfort-level in

identifying those at risk for HIV whom are PrEP eligible. By providing educational support to the providers, comfort-levels with PrEP discussion and intent to prescribe PrEP had increased as expected. The net benefit to supporting Midwest providers in their role of HIV-prevention is that there will be an increase of PrEP trained, competent, and confident providers which will in turn increase patient access to PrEP.

Significance of the Project and Application of Project Findings to the DNP Role

Throughout the process of this DNP project and clinical experience, providers had inquired about this project and findings. The resulting discussions exposed that many providers within the area (upper Midwest) are unaware of PrEP, stating “they have never heard of it” and “I have a few patients that would benefit from this, I wish I knew of it [PrEP] sooner.” Or questioned “how long has this medication been out for?” Within context of a clinical rotation of this co-investigator, a patient requested PrEP from a non-VA primary care provider. This primary care provider expressed they had heard of PrEP but did not feel “comfortable prescribing” due to lack of knowledge. Following the “purview paradox”, a referral to infectious disease was offered to the patient as the provider was unaware of how to identify candidates for PrEP and the process of prescribing PrEP. This specific patient reported they had heard of PrEP while visiting California and expressed a lack of access, information, and resources to obtain PrEP in the Midwest region.

Access to PrEP does vary per region, research performed assessing PrEP prescribing reveals that local health departments in the Midwest and Northeast regions of the United States are less likely to report intention to initiate PrEP implementation versus the West and South (Weiss et al., 2018). Compared to the Midwest, California has made significant bounds for PrEP availability for HIV prevention efforts. With the recent passage of Senate Bill No. 159,

California is to be the first state to allow pharmacists to dispense PrEP without a prescription (California Legislative Information, 2019).

This “purview paradox” situation presented a significant “PrEP gap” between the regions and providers. The provider from the situation above was briefed of this project and that their response to a PrEP prescription request was consistent with the project findings. With additional discussion of PrEP, the provider advocated for supplementary education within their primary care department. This discussion was not facilitated to be included into this research project, however this situation and inquiry made by the provider exposed the significance of this project firsthand.

The significance of this project was a DNP contribution of evidence-based practice improvement/research that identified the need for HIV and PrEP related training among primary care providers in the Midwest region. This project represents role advancement in which each member of the DNP profession is responsible for. Contributing to evidence-based research and application in the DNP role fosters improvement in patient healthcare quality. This project’s significance and application within this community has the potential to increase patient access to PrEP providers who are competent and confident in their ability to provide HIV prevention, guided by national guidelines.

REFERENCES

- AIDSVu. (2019). *Mapping PrEP: First ever data on PrEP users across the U.S.* Retrieved from <https://aidsvu.org/prep/>
- Arya, M., Phillips, A. L., Street, R. L., Giordano, T. P., & Giordano, T. P. (2016). Physician Preferences for Physician-Targeted HIV Testing Campaigns. *Journal of the International Association of Providers of AIDS Care*, 15(6), 470–476.
<https://doi.org/10.1177/2325957416636475>
- Berkenblit, G. V., Bass, M., Bashook, P. G., Edison, M., Todd Korthuis, P., Sullivan, L. E., ... Sosman, J. M. (2011). General internists' beliefs, behaviors, and perceived barriers to routine HIV screening in primary care. *AIDS Education and Prevention* (Vol. 23). Retrieved from <https://search-proquest-com.ezproxy.lib.ndsu.nodak.edu/docview/872823018/fulltextPDF/4CB131A7AD304644P/Q/1?accountid=6766>
- Bhandari, T. (2019). *Halting spread of HIV in Midwest is aim of new network*. St. Louis. Retrieved from <https://medicine.wustl.edu/news/halting-spread-of-hiv-in-midwest-is-aim-of-new-network/>
- Blackstock, O. J., Moore, B. A., Berkenblit, G. V., Calabrese, S. K., Cunningham, C. O., Fiellin, D. A., Edelman, E. J. (2017). A cross-sectional online survey of HIV pre-exposure prophylaxis adoption among primary care physicians. *Journal of General Internal Medicine*, 32(1), 62–70. <https://doi.org/10.1007/s11606-016-3903-z>
- Blumenthal, J., Jain, S., Krakower, D., Sun, X., Young, J., Mayer, K., & Haubrich, R. (2015a). Knowledge is Power! Increased provider knowledge scores regarding pre-exposure

- prophylaxis (PrEP) are associated with higher rates of PrEP prescription and future intent to prescribe PrEP. *AIDS and Behavior*, 19(5). <https://doi.org/10.1007/s10461-015-0996-z>
- Blumenthal, J., Jain, S., Krakower, D., Sun, X., Young, J., Mayer, K., & Haubrich, R. (2015b). Knowledge is Power! Increased provider knowledge scores regarding pre-exposure prophylaxis (PrEP) are associated with higher rates of PrEP prescription and future intent to prescribe PrEP. *AIDS and Behavior*, 19(5), 802–810. <https://doi.org/10.1007/s10461-015-0996-z>
- Burrelli, D. F. (2010). *Don't ask, don't tell": The law and military policy on same-sex behavior*. Retrieved from www.crs.gov
- Cabana, M. D., Rand, C. S., Powe, N. R., Wu, A. W., Wilson, M. H., Abboud, P.-A. C., & Rubin, H. R. (1999). Why don't physicians follow clinical practice guidelines? *JAMA*, 282(15), 1458. <https://doi.org/10.1001/jama.282.15.1458>
- Calabrese, S. K., Krakower, D. S., & Mayer, K. H. (2017). Integrating HIV preexposure prophylaxis (PrEP) into routine preventive health care to avoid exacerbating disparities. *American Journal of Public Health*, 107(12), 1883–1889. <https://doi.org/10.2105/AJPH.2017.304061>
- California Legislative Information. (2019). Senate Bill No. 159: Chapter 532. Retrieved January 26, 2020, from http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200SB159
- Castel, A. D., Feaster, D. J., Tang, W., Willis, S., Jordan, H., Villamizar, K., ... Metsch, L. R. (2015). Understanding HIV care provider attitudes regarding intentions to prescribe PrEP. *Journal of Acquired Immune Deficiency Syndromes*, 70(5). <https://doi.org/10.1097/QAI.0000000000000780>

Centers for Disease Control and Prevention. (n.d.). *Prescribe PrEP pre-exposure prophylaxis FAQs for the health care professional*. Retrieved from http://www.gilead.com/pdf/truvada_pi.pdf

Centers for Disease Control and Prevention. (2017a). *Preexposure prophylaxis for the prevention of HIV infection in the United States: Clinical providers' supplement*. Retrieved from <https://www.cdc.gov/hiv/pdf/guidelines/cdc-hiv-prep-provider-supplement-2017.pdf>

Centers for Disease Control and Prevention. (2017b). Vital signs: HIV testing. Retrieved October 9, 2018, from <https://www.cdc.gov/vitalsigns/hiv-testing/index.html>

Centers for Disease Control and Prevention. (2018a). Division of HIV/AIDS prevention strategic plan 2017-2020. Retrieved March 15, 2019, from <https://www.cdc.gov/hiv/dhap/strategicplan/index.html>

Centers for Disease Control and Prevention. (2018b). HIV/AIDS: Basic statistics. Retrieved February 3, 2019, from <https://www.cdc.gov/hiv/basics/statistics.html>

Centers for Disease Control and Prevention. (2018c). HIV Treatment. Retrieved March 17, 2019, from <https://www.cdc.gov/hiv/basics/livingwithhiv/treatment.html>

Centers for Disease Control and Prevention. (2018d). *Preexpoure prophylaxi for the prevention of HIV infection in the United States – 2017 Update clinical practice guideline*. Retrieved from <https://www.cdc.gov/std/tg2015/tg-2015->

Centers for Disease Control and Prevention. (2019a). *HIV in the United States and dependent areas*. Retrieved from <https://www.cdc.gov/hiv/statistics/overview/ataglace.html>

Centers for Disease Control and Prevention. (2019b). Statistics overview. Retrieved July 9, 2019, from <https://www.cdc.gov/hiv/statistics/overview/index.html>

Centers For Disease Control and Prevention. (2019). About HIV/AIDS. Retrieved July 9, 2019, from <https://www.cdc.gov/hiv/basics/whatishiv.html>

Centers for Disease Control and Prevention, & Division of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and T. prevention. (2019). About DHAP: DHAP strategic plan. Retrieved August 15, 2019, from <https://www.cdc.gov/hiv/dhap/strategicplan/index.html>

Clement, M. E., Seidelman, J., Wu, J., Alexis, K., McGee, K., Okeke, N. L., ... McKellar, M. (2018). An educational initiative in response to identified PrEP prescribing needs among PCPs in the Southern U.S. *AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV*, 30(5), 650–655. <https://doi.org/10.1080/09540121.2017.1384534>

Drainoni, M.-L., Dekker, D., Lee-Hood, E., Boehmer, U., & Relf, M. (2009). HIV medical care provider practices for reducing high-risk sexual behavior: Results of a qualitative study. *AIDS Patient Care and STDs*, 23(5), 347–356. <https://doi.org/10.1089/apc.2008.0063>

Elion, R., Fransua, M., Stringer, G. J., & Sierra, K. (2019). Improving HIV prevention for underserved, at-risk populations: The IMPACT of an educational curriculum for primary care clinicians.

Fernández, M. I., Bowen, G. S., Perrino, T., Royal, S., Mattson, T., Arheart, K. L., & Cohn, S. (2003). Promoting HIV testing among never-tested Hispanic men: A doctor's recommendation may suffice. *AIDS and Behavior*, 7(3), 253–262. <https://doi.org/10.1023/A:1025491602652>

Gilead Sciences, I. (2019). Gilead sciences to provide free Truvada for PrEP® to support U.S. initiative to end the HIV epidemic. Retrieved September 29, 2019, from

<https://www.gilead.com/news-and-press/press-room/press-releases/2019/5/gilead-sciences-to-provide-free-truvada-for-prep-to-support-us-initiative-to-end-the-hiv-epidemic>

Greene, G. J., Swann, G., Fought, A. J., Carballo-Diéguez, A., Hope, T. J., Kiser, P. F., ...

D'Aquila, R. T. (2017). Preferences for long-acting pre-exposure prophylaxis (PrEP), Daily oral PrEP, or Condoms for HIV prevention among U.S. men who have sex with men. *AIDS and Behavior*, 21(5), 1336–1349. <https://doi.org/10.1007/s10461-016-1565-9>

Gunn, L. H., Janson, B., Lorjuste, I., Summers, L., Burns, P., & Bryant, T. (2019). Healthcare providers' knowledge, readiness, prescribing behaviors, and perceived barriers regarding routine HIV testing and pre-exposure prophylaxis in DeLand, Florida. *SAGE Open Medicine*, 7, 205031211983603. <https://doi.org/10.1177/2050312119836030>

Hakre, S., Blaylock, J. M., Dawson, P., Beckett, C., Garges, E. C., Michael, N. L., Okulicz, J. F. (2016). Knowledge, attitudes, and beliefs about HIV pre-exposure prophylaxis among US Air Force Health Care Providers. *Medicine*, 95(32), e4511. <https://doi.org/10.1097/MD.0000000000004511>

Haukoos, J., Hopkins, E., Bucossi, M., Lyons, M., Rothman, R., White, D., Thrun, M. (2015). *Validation of the refined Denver HIV risk score using a national HIV testing cohort*. Retrieved from <http://www.croiconference.org/sites/default/files/posters/946.pdf>

Henny, K. D., Duke, C. C., Geter, A., Gaul, Z., Frazier, C., Peterson, J., Sutton, M. Y. (2019). HIV-Related training and correlates of knowledge, HIV screening and prescribing of nPEP and PrEP among primary care providers in Southeast United States, 2017. *AIDS and Behavior*, 23(11), 2926–2935. <https://doi.org/10.1007/s10461-019-02545-1>

Henry J. Kaiser Family Foundation. (2015). Preventive services covered by private health plans under the Affordable Care Act. Retrieved August 12, 2019, from

<https://www.kff.org/health-reform/fact-sheet/preventive-services-covered-by-private-health-plans/>

Henry J Kaiser Family Foundation (KFF). (2018). The HIV/AIDS epidemic in the United States: The basics. Retrieved December 23, 2018, from <https://www.kff.org/hiv/aids/fact-sheet/the-hiv-aids-epidemic-in-the-united-states-the-basics/>

Hojilla, J. C., Vlahov, D., Crouch, P. C., Dawson-Rose, C., Freeborn, K., & Carrico, A. (2018). HIV pre-exposure prophylaxis (PrEP) uptake and retention among men who have sex with men in a community-based sexual health clinic. *AIDS and Behavior*, 22(4), 1096–1099. <https://doi.org/10.1007/s10461-017-2009-x>

Hoover, K. W., Tao, K. L., & Peters, P. J. (2017). Nationally representative prevalence estimates of gay, bisexual, and other men who have sex with men who have served in the U.S. military. *PLoS ONE*, 12(8). <https://doi.org/10.1371/journal.pone.0182222>

Hudson, A. L., Heilemann, M. V., & Rodriguez, M. (2012). Missed opportunities for universal HIV screening in primary care clinics. *Journal of Clinical Medicine Research*, 4(4), 242–250. <https://doi.org/10.4021/jocmr1014w>

Jain, C. L., Wyatt, C. M., Burke, R., Sepkowitz, K., & Begier, E. M. (2009). Knowledge of the Centers for Disease Control and Prevention's 2006 routine HIV testing recommendations among New York City internal medicine residents. *AIDS Patient Care and STDs*, 23(3), 167–176. <https://doi.org/10.1089/apc.2008.0130>

Karris, M. Y., Beekmann, S. E., Mehta, S. R., Anderson, C. M., & Polgreen, P. M. (2014). Are we prepped for preexposure prophylaxis (PrEP)? Provider opinions on the real-world use of PrEP in the United States and Canada. *Clinical Infectious Diseases*, 58(5). <https://doi.org/10.1093/cid/cit796>

- Krakower, D., & Mayer, K. H. (2012). Engaging healthcare providers to implement HIV pre-exposure prophylaxis. *Current Opinion in HIV and AIDS*, 7(6), 593–599.
<https://doi.org/10.1097/COH.0b013e3283590446>
- Krakower, D. S., & Mayer, K. H. (2016). The role of healthcare providers in the roll out of preexposure prophylaxis. *Current Opinion in HIV and AIDS*, 11(1), 41–48.
<https://doi.org/10.1097/COH.0000000000000206>
- Krakower, D., Ware, N., Mitty, J. A., Maloney, K., & Mayer, K. H. (2014). HIV providers' perceived barriers and facilitators to implementing pre-exposure prophylaxis in care settings: A qualitative study. *AIDS and Behavior*, 18(9). <https://doi.org/10.1007/s10461-014-0839-3>
- Maguire, E. (2018). Caring for veterans with HIV. Retrieved September 29, 2019, from <https://www.blogs.va.gov/VAntage/54578/caring-for-veterans-with-hiv/>
- Mohajer, M. Al, Lyons, M., King, E., Pratt, J., & Fichtenbaum, C. J. (2012). Internal medicine and emergency medicine physicians lack accurate knowledge of current CDC HIV testing recommendations and infrequently offer HIV testing. *Journal of the International Association of Physicians in AIDS Care*, 11(2), 101–108.
<https://doi.org/10.1177/1545109711430165>
- National HIV testing day. (2019). Retrieved March 17, 2019, from <https://aidsvu.org/hiv-testing-day-2018/>
- NCHHSTP Newsroom. (2017). *HIV Testing and Diagnosis Delays*. Centers for Disease Control and Prevention. Retrieved from <https://www.cdc.gov/nchhstp/newsroom/2017/HIV-testing-and-diagnosis-delays.html>

- Newman, R., Katchi, T., Karass, M., Gennarelli, M., Goutis, J., Kifayat, A., Nabors, C. (2019). Enhancing HIV pre-exposure prophylaxis practices via an educational ntervention. *American Journal of Therapeutics*, 26(4), e462–e468. <https://doi.org/10.1097/MJT.0000000000000773>
- Nichols, B. E., Boucher, C. A. B., van der Valk, M., Rijnders, B. J. A., & van de Vijver, D. A. M. C. (2016). Cost-effectiveness analysis of pre-exposure prophylaxis for HIV-1 prevention in the Netherlands: a mathematical modelling study. *The Lancet Infectious Diseases*, 16(12), 1423–1429. [https://doi.org/10.1016/S1473-3099\(16\)30311-5](https://doi.org/10.1016/S1473-3099(16)30311-5)
- Office of Disease Prevention and Health Promotion. (2019). *2020 Topics & objectives: HIV*. Retrieved from <https://www.healthypeople.gov/2020/topics-objectives/topic/hiv>
- Ouellet, E., Durand, M., Guertin, J. R., LeLorier, J., & Tremblay, C. L. (2015). Cost effectiveness of “on demand” HIV pre-exposure prophylaxis for non-injection drug-using men who have sex with men in Canada. *Canadian Journal of Infectious Diseases and Medical Microbiology*, 26(1), 23–29. <https://doi.org/10.1155/2015/964512>
- Owens, D. K., Davidson, K. W., Krist, A. H., Barry, M. J., Cabana, M., Caughey, A. B., ... Wong, J. B. (2019). Preexposure prophylaxis for the prevention of HIV infection. *JAMA*, 321(22), 2203. <https://doi.org/10.1001/jama.2019.6390>
- Parrish, K., Johnson, H., & Williams, S. (2018). *Prepping providers for pre-exposure prophylaxis (PrEP) implementation: Findings from California office of AIDS’ (OA) Local site evaluation of project PrIDE PrEP training activities*.
- Petroll, A. E., DiFranceisco, W., McAuliffe, T. L., Seal, D. W., Kelly, J. A., & Pinkerton, S. D. (2009). HIV testing rates, testing locations, and healthcare utilization among urban african-

- american men. *Journal of Urban Health*, 86(1), 119–131. <https://doi.org/10.1007/s11524-008-9339-y>
- Petroll, A. E., Walsh, J. L., Owczarzak, J. L., McAuliffe, T. L., Bogart, L. M., & Kelly, J. A. (2017). PrEP awareness, familiarity, comfort, and prescribing experience among US primary care providers and HIV specialists. *AIDS and Behavior*, 21(5), 1256–1267. <https://doi.org/10.1007/s10461-016-1625-1>
- Rizza, S. A., MacGowan, R. J., Purcell, D. W., Branson, B. M., & Temesgen, Z. (2012). HIV screening in the health care setting: status, barriers, and potential solutions. *Mayo Clinic Proceedings*, 87(9), 915–924. <https://doi.org/10.1016/j.mayocp.2012.06.021>
- Rosenberg, J. (2019). Harris introduces bill that would require all insurance plans to cover PrEP and related services. *American Journal of Managed Care*. Retrieved from <https://www.ajmc.com/newsroom/harris-introduces-bill-that-would-require-all-insurance-plans-to-cover-prep-and-related-services>
- Sanz, J. M., Elías, M. J. P., Muriel, A., Ayerbe, C. G., Gallego, M. J. V., Conde, M. S., ... Moreno, S. (2019). Outcome of an HIV education program for primary care providers: Screening and late diagnosis rates. *PLoS ONE*, 14(7). <https://doi.org/10.1371/journal.pone.0218380>
- Schein, A. I., & Travers, R. (2017). Barriers and facilitators to HIV and sexually transmitted infections testing for gay, bisexual, and other transgender men who have sex with men. *AIDS Care*, 29(8), 990–995. <https://doi.org/10.1080/09540121.2016.1271937>
- Scott, M., Brar, I., Kole, M., & Sangha, R. (2019). Provider knowledge and comfort with the use of HIV pre-exposure prophylaxis (PrEP) therapy in high-risk patient populations. *Quality Improvement*. Retrieved from <https://scholarlycommons.henryford.com/merf2019qi/11>

- Shirreffs, A., Lee, D. P., Henry, J., Golden, M. R., & Stekler, J. D. (2012). Understanding barriers to routine HIV screening: Knowledge, attitudes, and practices of healthcare providers in King County, Washington. *PLoS ONE*, 7(9), e44417. <https://doi.org/10.1371/journal.pone.0044417>
- Silapaswan, A., Krakower, D., & Mayer, K. H. (2017). Pre-exposure prophylaxis: A narrative review of provider behavior and interventions to increase PrEP implementation in primary care. *Journal of General Internal Medicine*, 32(2), 192–198. <https://doi.org/10.1007/s11606-016-3899-4>
- Skarbinski, J., Rosenberg, E., Paz-Bailey, G., Hall, H. I., Rose, C. E., Viall, A. H., Mermin, J. H. (2015). Human immunodeficiency virus transmission at each step of the care continuum in the United States. *JAMA Internal Medicine*, 175(4), 588. <https://doi.org/10.1001/jamainternmed.2014.8180>
- Smith, D. K., Mendoza, M. C. B., Stryker, J. E., & Rose, C. E. (2016). PrEP awareness and attitudes in a national survey of primary care clinicians in the United States, 2009-2015. *PLoS ONE*. <https://doi.org/10.1002/chem.200800760>
- Stefan, M. S., Blackwell, J. M., Crawford, K. M., Martinez, J., Wu Sung, S., Holliday, S. A., ... Cykert, S. (2010). Patients' attitudes toward and factors predictive of human immunodeficiency virus testing of academic medical clinics. *American Journal of the Medical Sciences*, 340(4), 264–267. <https://doi.org/10.1097/MAJ.0b013e3181e59c3e>
- Traynor, S. M., Rosen-Metsch, L., & Feaster, D. J. (2018). Missed opportunities for HIV testing Among STD Clinic Patients. *Journal of Community Health*, 43(6), 1128–1136. <https://doi.org/10.1007/s10900-018-0531-z>

- Turner, L., Roepke, A., Wardell, E., & Teitelman, A. M. (2018). Do You PrEP? A review of primary care provider knowledge of PrEP and attitudes on prescribing PrEP. *Journal of the Association of Nurses in AIDS Care*, 29(1), 83–92.
<https://doi.org/10.1016/J.JANA.2017.11.002>
- U.S. Department of Health & Human Services. (2019). What is ‘Ending the HIV epidemic: A plan for America’? Retrieved February 2, 2020, from <https://www.hiv.gov/federal-response/ending-the-hiv-epidemic/overview>
- U.S. Department of Health and Human Services. (2020). *U.S. statistics: Fast facts*. Retrieved from <https://www.hiv.gov/hiv-basics/overview/data-and-trends/statistics>
- U.S. Department of Veterans Affairs. (2018). CD4 count. Retrieved July 23, 2019, from <https://www.hiv.va.gov/patient/diagnosis/labs-CD4-count.asp>
- U.S. Department of Veterans Affairs. (2019). *HIV: Ending the HIV epidemic: A plan for America*. U.S. Department of Veterans Affairs. Retrieved from <https://www.hiv.va.gov/ending-hiv.asp>
- U.S. Department of Veterans Affairs. (2020). Fargo VA Health Care System. Retrieved February 1, 2020, from <https://www.fargo.va.gov/index.asp>
- U.S. Preventive Services Task Force. (2019a). Final recommendation statement: Human immunodeficiency virus (HIV) infection: screening.
- U.S. Preventive Services Task Force. (2019b, July). Final recommendation statement: Prevention of Human immunodeficiency Virus (HIV) infection: Preexposure prophylaxis. Retrieved August 12, 2019, from <https://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatement>

Final/prevention-of-human-immunodeficiency-virus-hiv-infection-pre-exposure-prophylaxis

U.S Department of Veterans Affairs. (2019). *Fact sheet: Human immunodeficiency virus (HIV)* .

Retrieved from www.hiv.va.gov

Veteran's Health Administration. (2017). PrEP overview for providers. Retrieved from

<http://www.hepatitis.va.gov/>.

Weiss, G., Smith, D. K., Newman, S., Wiener, J., Kitlas, A., & Hoover, K. W. (2018). PrEP

implementation by local health departments in US cities and counties: Findings from a 2015 assessment of local health departments. *PLOS ONE*, *13*(7), e0200338.

<https://doi.org/10.1371/journal.pone.0200338>

Wimberly, Y. H., Hogben, M., Moore-Ruffin, J., Moore, S. E., & Fry-Johnson, Y. (2006).

Sexual history-taking among primary care physicians. *Journal of the National Medical Association*, *98*(12), 1924–1929. Retrieved from

<http://www.ncbi.nlm.nih.gov/pubmed/17225835>

Yap, P. K., Loo Xin, G. L., Tan, Y. Y., Chellian, J., Gupta, G., Liew, Y. K., Chellappan, D. K.

(2019). Antiretroviral agents in pre-exposure prophylaxis: emerging and advanced trends in HIV prevention. *Journal of Pharmacy and Pharmacology*, *71*(9), 1339–1352.

<https://doi.org/10.1111/jphp.13107>

Zablotska, I. B., & O'Connor, C. C. (2017). Preexposure Prophylaxis of HIV Infection: the Role

of Clinical Practices in Ending the HIV Epidemic. *Current HIV/AIDS Reports*.

<https://doi.org/10.1007/s11904-017-0367-7>

Zheng, M. Y., Suneja, A., Chou, A. L., & Arya, M. (2014). Physician Barriers to Successful

Implementation of US Preventive Services Task Force Routine HIV Testing

Recommendations. *Journal of the International Association of Providers of AIDS Care (JIAPAC)*, 13(3), 200–205. <https://doi.org/10.1177/2325957413514276>

Zigrand, C. (2019). Lessons from the VA on HIV PrEP. Retrieved February 1, 2020, from <https://www.medpagetoday.com/resource-centers/contemporary-hiv-prevention/lessons-va-hiv-prep/2494>

APPENDIX A: STATEMENT OF IMPLIED CONSENT

Introduction

You are being asked to take part in a research study, Identifying Risk for HIV and Initiation of PrEP Amongst Primary Care Providers. Kayli Gross from North Dakota State University is leading the study.

- You are asked to be in the study because you provide health care at the VA Fargo.
- Your participation in this study is voluntary. Even if you join the study, you may stop at any time.
- The reason we are conducting this study is to identify providers current knowledge and practice regarding HIV screening and PrEP.
- This study will be conducted via a pre-education and post-education surveys in association to the education provided to you today. We hope information from this study will improve your knowledge and comfortability with HIV screening and the prescribing of PrEP.
- The Department of Veterans Affairs and the research team are receiving no payments from other agencies, organizations, or companies to conduct this research.

What will happen in this study?

- If you decide to take part in this study, you will be asked to answer questions about incidence of HIV in North Dakota and the VA, your knowledge regarding the identification of persons at risk for HIV and PrEP as well as your current practice and intent to screen for HIV and prescribe PrEP.
- Answering the pre-survey and post-survey questions will take you about 5-10 minutes in total.
- You will not be compensated for participating in this study.
- Approximately 40-50 people will participate in this study.

Confidentiality

- Your answers will not be linked to you and you will not need to provide personal information.
- You will be taking this survey independently.
- Your individual answers will not be seen by your employer.
- The surveys and data collected from this study will be kept confidential.
- Each survey will be corresponded by a number and will be different for each individual survey per participant. The surveys are numbered solely for the purpose to keep the pre-survey data connected to the post-survey data.

What if I have questions or concerns?

If you have questions about the study, feel free to contact Kayli Gross at Kayli.C.Gross.2@ndsu.edu.

If you have questions about your rights as a study participant or want to report any problems or complaints, you can contact the Research Compliance Officer at Laurie.Leonhart@va.gov or the Office of Human Subjects Protection at humansubjects@usd.edu.

How do I agree to be in the study?

If you would like to take part in this study, please fully complete the pre-survey prior to the education presentation and fully complete the post-survey following. By completing and submitting the surveys, you are providing informed consent to participate in the study. If you change your mind and decide not to participate, you can simply not complete the surveys. You will not be penalized for not participating or not completing the surveys.

Thank you for taking time to consider taking part in this research study.

APPENDIX B: PRESURVEY

Presurvey

Number:

1) Age:

- 26-35 years
- 36-45 years
- 46-55 years
- 56-65 years
- 66-75 years
- 75 years +

2) Years in practice:

- Less than 5
- 5 to 9
- 10-14
- 15-19
- 20-24
- 25 +

3) Clinical Practice:

- General/Primary Care
- Walk-in/Emergency Services
- Family Medicine
- Hospital
- Other/specialty (please list):
- Student (what type of student):

4) Clinical Title:

- MD
- DO
- NP
- PA
- RN
- Student (list type of student):
- Other (please list):

5) The Department of Veterans Affairs is the single largest provider of HIV care in America:

- True
- False

6) In North Dakota, there has been an increase by _____% of newly diagnosed HIV/AIDS cases over the past 5 years.

- 13%
- 33%
- 53%
- 73%

7) Which persons may be at substantial risk for HIV: (select all that apply)

- sexually active men who have sex with men [MSM],
- heterosexually active women
- heterosexually active men
- sexually active transgender women and men
- adult persons who inject drugs [PWID]

- heterosexually active woman and men whose partners are HIV positive
- infrequently use condoms during sex with 1 or more partners with unknown HIV status
- diagnosed with or reported bacterial STI within 6 months

8) What is pre-exposure prophylaxis (PrEP) :

- A preventative medication taken within 72 hours of known HIV exposure
- A preventative medication, for HIV negative adults who are substantial risk for HIV acquisition
- A medication for HIV positive adults, to decrease viral load of HIV
- None of the above
- I have not heard of/do not have knowledge about PrEP

9) I am confident in my ability to identify persons at substantial risk for HIV whom are eligible for PrEP:

- Strongly Agree
- Agree
- Undecided
- Disagree
- Strongly Disagree

10) I am comfortable in discussing PrEP with high-risk patients:

- Strongly Agree
- Agree
- Undecided
- Disagree
- Strongly Disagree

11) Rate your intention to screen all persons aged 13–64 years for HIV at least once:

- Definitely
- Very Probable
- Probably
- Probably Not
- Definitely Not

12) Rate your intention to screen persons at high risk for HIV infection (including sexually active gay, bisexual, and other men who have sex with men (MSM)) at least annually:

- Definitely
- Very Probable
- Probably
- Probably Not
- Definitely Not

13) Rate your intention to prescribe PrEP to patients at substantial risk for HIV:

- Definitely
- Very Probable
- Probably
- Probably Not
- Definitely Not
- I do not prescribe medications

APPENDIX C: POSTSURVEY

Postsurvey

Number:

- 1) The Department of Veterans Affairs is the single largest provider of HIV care in America:
 - True
 - False

- 2) In North Dakota, there has been an increase by _____% of newly diagnosed HIV/AIDS cases over the past 5 years.
 - 13%
 - 33%
 - 53%
 - 73%

- 3) Which persons may be at substantial risk for HIV: (select all that apply)
 - sexually active men who have sex with men [MSM],
 - heterosexually active women
 - heterosexually active men
 - sexually active transgender women and men
 - adult persons who inject drugs [PWID]
 - heterosexually active woman and men whose partners are HIV positive
 - infrequently use condoms during sex with 1 or more partners with unknown HIV status
 - diagnosed with or reported bacterial STI within 6 months

- 4) What is pre-exposure prophylaxis (PrEP) :
 - A preventative medication taken within 72 hours of known HIV exposure

- A preventative medication, for HIV negative adults who are substantial risk for HIV acquisition
 - A medication for HIV positive adults, to decrease viral load of HIV
 - None of the above
 - I have not heard of/do not have knowledge about PrEP
- 5) I am confident in my ability to identify persons at substantial risk for HIV whom are eligible for PrEP:
- Strongly Agree
 - Agree
 - Undecided
 - Disagree
 - Strongly Disagree
- 6) I am comfortable in discussing PrEP with high-risk patients:
- Strongly Agree
 - Agree
 - Undecided
 - Disagree
 - Strongly Disagree
- 7) Rate your intention to screen all persons aged 13–64 years for HIV at least once:
- Definitely
 - Very Probable
 - Probably
 - Probably Not

Definitely Not

8) Rate your intention to screen persons at high risk for HIV infection (including sexually active gay, bisexual, and other men who have sex with men (MSM)) at least annually:

Definitely

Very Probable

Probably

Probably Not

Definitely Not

9) Rate your intention to prescribe PrEP to patients at substantial risk for HIV:

Definitely

Very Probable

Probably

Probably Not

Definitely Not

I do not prescribe medications

APPENDIX D: DENVER HIV RISK SCORE TOOL

DENVER HIV RISK SCORE TOOL

Increase HIV Screening Efficiency

KEY POINTS

- Test everyone aged 15-65 at least once; test those at risk annually
- Use the Denver HIV Risk Score Tool to better target screening
- Ensure all HIV+ patients are linked to medical care

WHY

1 in 6 people in the US who have HIV do not know they are infected



30% of new infections are transmitted by individuals unaware of their infection

Skarbinski, JAMA Intern Med. 2015; 175(4): 588-596

WHO

Screen everyone aged 15-65

Screen persons known to be at risk annually [refer to Denver HIV Risk Score Tool]

Screen all pregnant women and those in labor whose HIV status is unknown

U.S. Preventive Services Task Force (USPSTF)
Grade A recommendations 4/2013

HOW

Opt-out HIV screening is recommended over opt-in screening (USPSTF & CDC).

Additional forms are not needed for HIV testing. A general informed consent for medical care sufficiently covers informed consent for HIV.

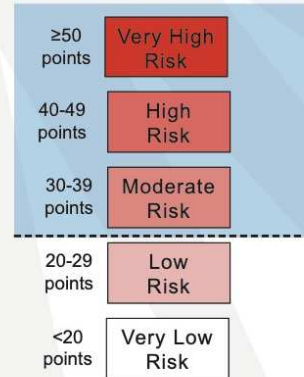
HIV testing does not need to include prevention counseling if counseling would be a barrier to screening.

DENVER HIV RISK SCORE TOOL

The Denver HIV Risk Score, a clinical prediction tool, can help identify patients with increased probability of undiagnosed HIV infection. This tool was developed in Denver, but validated for use in any jurisdiction.

		Score	
Age	22-25 or 55-60	+4	
	26-32 or 47-54	+10	
	33-46	+12	
Gender	Male	+21	
Self-reported race/ethnicity	Black	+9	
	Hispanic	+3	
Sex with men, women, or both?	Men or both	+22	
Injection drugs use?	Yes	+9	
Ever been tested for HIV?	Yes	-4	
Total Score			

Patients who score 30 points or greater should be considered at **increased risk for having undiagnosed HIV infection** and should be routinely offered HIV testing.



Haukoos, American Journal of Epidemiology, 2012; 175(8):838-46; Haukoos, Annals of Emergency Medicine, 2013;61(3):353-61



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DENVER HIV RISK SCORE TOOL

Increase HIV Screening Efficiency



HIV SCREENING TEST OPTIONS

Verify testing practices in your institution and state

At point of care:

- A rapid HIV-1/2 antibody test or a rapid combination HIV-1/2 antibody and p24 antigen test; results available in 10-20 minutes

Using a laboratory:

- A combination HIV-1/2 antibody and p24 antigen test will identify HIV infection 1-2 weeks earlier than antibody test alone; results usually available in 1-2 days
- Confirmation of all HIV+ tests by an HIV-1/2 discrimination test; repeating the screening test with a second, but different screening test; Western blot; or viral load

ICD-10 Code for HIV Screening: Z11.4

HIV+



1. Order confirmatory HIV test
2. Deliver HIV+ results to the patient IN PERSON
3. Offer reassurance that HIV is a chronic disease that can be well controlled with medications and consistent care
4. Actively link patient to HIV medical care
5. Encourage partner testing

HIV-



- Patients with an HIV exposure in the past 72 hours are a nPEP candidate
- Patients with continued risk factors are a PrEP candidate

CDC PrEP Guidelines:
<http://www.cdc.gov/hiv/pdf/prepguidelines2014.pdf>



LINKAGE TO CARE

Actively linking a newly diagnosed HIV patient to medical care is the key to optimal management and control of HIV

Linkage to Care services include facilitating:

- Enrollment in HIV medical care
- Clinical interpretation, delivery and explanation of HIV+ test results
- Baseline CD4 count and viral load screening
- Financial screening and enrollment in medical coverage
- Initial assessment of comprehensive needs
- Educational counseling on transmission risk reduction
- Connection to long term case management

CONTACT INFORMATION

For assistance with developing customized HIV testing protocols for your facility, contact john@denverptc.org

For assistance with developing and implementing Linkage to Care programs, contact julia@denverptc.org

For assistance developing PrEP protocols for your facility, contact helen@denverptc.org

To order more Denver HIV Risk Score Tools, contact victoria@denverptc.org



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APPENDIX E: VA IRB APPROVAL LETTER



September 10, 2019

The University of South Dakota
414 E. Clark Street
Vermillion, SD 57069

PI: Tze Shien Lo Student PI: Kayli Gross
Project: 2019.089 - Identifying Risk for HIV and Implementation of PrEP Amongst Primary Care Providers
Review Level: Not Human Subjects
USD IRB
Date Received: 9/10/2019

The study submission and informed consent for the proposal referenced above has been reviewed via the procedures of the University of South Dakota Institutional Review Board .

Upon review of your application, the IRB determined these activities do not meet the regulatory definition of research and do not fall under the IRB's purview for the following reason(s):

The activities described in your application are intended to contribute to internal quality improvement and data will be collected for internal purposes only. If in the future, you decide to collect information with the intent to develop or contribute to generalizable knowledge (i.e., present your findings to benefit external organizations or agencies), you will be required to submit an application to the IRB for prospective review.

Please maintain a copy of this letter in your study file for documentation that your study does not meet the regulatory definition of human subject research and did not require IRB approval.

If you would like to discuss this or have further questions, please call our office at (605)677-6184

Sincerely,

A handwritten signature in black ink that reads 'Ann Waterbury'.

Ann Waterbury, M.B.A.
Director, Office of Human Subjects
University of South Dakota
(605) 677-6067

APPENDIX F: NDSU IRB APPROVAL LETTER



September 10, 2019

Dr. Kara Falk
Nursing

Re: IRB Determination of Exempt Human Subjects Research:
Protocol #PH20051, "Identifying Risk for HIV and Initiation of PrEP Amongst Primary Care Providers"

Co-investigator(s) and research team: Kayli Gross
Date of Exempt Determination: 9/10/2019 Expiration Date: 9/9/2022
Study site(s): Fargo VA
Sponsor: n/a

The above referenced human subjects research project has been determined exempt (category # 1) in accordance with federal regulations (Code of Federal Regulations, Title 45, Part 46, Protection of Human Subjects). This determination is based on the original protocol submission (received 9/5/2019).

Please also note the following:

- If you wish to continue the research after the expiration, submit a request for recertification several weeks prior to the expiration.
- The study must be conducted as described in the approved protocol. Changes to this protocol must be approved prior to initiating, unless the changes are necessary to eliminate an immediate hazard to subjects.
- Notify the IRB promptly of any adverse events, complaints, or unanticipated problems involving risks to subjects or others related to this project.
- Report any significant new findings that may affect the risks and benefits to the participants and the IRB.

Research records may be subject to a random or directed audit at any time to verify compliance with IRB standard operating procedures.

Thank you for your cooperation with NDSU IRB procedures. Best wishes for a successful study.
Sincerely,

A handwritten signature in purple ink that reads "Kristy Shirley".

Kristy Shirley, CIP, Research Compliance Administrator

For more information regarding IRB Office submissions and guidelines, please consult https://www.ndsu.edu/research/for_researchers/research_integrity_and_compliance/institutional_review_board_irb/. This Institution has an approved FederalWide Assurance with the Department of Health and Human Services: FWA00002439.

INSTITUTIONAL REVIEW BOARD
NDSU Dept 4000 | PO Box 6050 | Fargo ND 58108-6050 | 701.231.8905 | Fax 701.231.8098 | [ndsu.edu/irb](https://www.ndsu.edu/irb)

Shipping address: Research 1, 1735 NDSU Research Park Drive, Fargo ND 58102

NDSU is an equal opportunity institution.

APPENDIX G: FREQUENCY TABLES

Table G1

Pre-Question 5, Post-Question 1. Table of presurvey by postsurvey.

Presurvey	Postsurvey	
Frequency Percent	Correct	Total
Correct	2	2
	40	40
Incorrect	3	3
	60	60
Total	5	5
	100	100

The FREQ Procedure

Table G2

Pre-Question 6, Post-Question 2. Table of presurvey by postsurvey.

Presurvey	Postsurvey	
Frequency Percent	Correct	Total
Correct	1	1
	20	20
Incorrect	4	4
	80	80
Total	5	5
	100	100

The FREQ Procedure

Table G3

Pre-Question 7, Post-Question 3. Table of presurvey by postsurvey.

Presurvey	Postsurvey	
Frequency	8	Total
Percent		
4	1	1
	20	20
5	2	2
	40	40
8	2	2
	40	40
Total	5	5
	100	100

The FREQ Procedure

Table G4

Pre-Question 8, Post-Question 4. Table of presurvey by postsurvey.

Presurvey	Postsurvey		
Frequency	Correct	Incorrect	Total
Percent			
Correct	3	1	4
	60	20	80
Incorrect	1	0	1
	20	0	20
Total	4	1	5
	80	20	100

The FREQ Procedure

Table G5

Pre-Question 9, Post-Question 5. Table of presurvey by postsurvey.

Presurvey	Postsurvey		
	Agree	Disagree	Total
Frequency			
Percent			
Agree	1	0	1
	20	0	20
Disagree	1	0	1
	20	0	20
Strongly disagree	1	0	1
	20	0	20
Undecided	1	1	2
	20	20	40
Total	4	1	5
	80	20	100

The FREQ Procedure

Table G6

Pre-Question 10, Post-Question 6. Table of presurvey by postsurvey.

Presurvey	Postsurvey			Total
	Agree	Disagree	Undecided	
Frequency				
Percent				
Agree	1	0	0	1
	20	0	0	20
Disagree	1	0	0	1
	20	0	0	20
Strongly disagree	0	1	1	2
	0	20	20	40
Undecided	1	0	0	1
	20	0	0	20
Total	3	1	1	5
	60	20	20	100

The FREQ Procedure

Table G7

Pre-Question 11, Post-Question 7. Table of presurvey by postsurvey.

Presurvey	Postsurvey			
Frequency Percent	Definitely	Probably	Very Probable	Total
Definitely	1 20	0 0	1 20	2 40
Probably	0 0	1 20	1 0	2 40
Very Probable	0 0	0 0	1 20	1 20
Total	1 20	1 20	3 60	5 100

The FREQ Procedure

Table G8

Pre-Question 12, Post-Question 8. Table of presurvey by postsurvey.

Presurvey	Postsurvey			
Frequency Percent	Definitely	Probably	Very Probable	Total
Definitely	1 20	0 0	1 20	2 40
Probably	0 0	1 20	1 20	2 40
Very Probably	0 0	0 0	1 20	1 20
Total	1 20	1 20	3 60	5 100

The FREQ Procedure

Table G9

Pre-Question 13, Post-Question 9. Table of presurvey by postsurvey.

Presurvey	Postsurvey		
	Probably	Very Probable	Total
Frequency			
Percent			
I do not prescribe medications	0	1	1
	0	20	20
Probably	2	0	2
	40	0	40
Probably Not	1	1	2
	20	20	40
Total	3	2	5
	60	40	100

The FREQ Procedure

APPENDIX H: ADDITIONAL INFORMATION

Table H1

Provider responses. Tables of presurvey to postsurvey comparison.

Provider	Pre Q5	Post Q1	Pre Q6	Post Q2	Pre Q7	Post Q3	Pre Q8	Post Q4	Pre Q9	Post Q5
1	incorrect	correct	incorrect	correct	5	8	incorrect (have not heard of PrEP)	correct	strongly disagree	agree
2	correct	correct	incorrect	correct	8	8	correct	correct	undecided	disagree
3	correct	correct	incorrect	correct	5	8	correct	correct	agree	agree
4	incorrect	correct	incorrect	correct	4	8	correct	correct	disagree	agree
5	incorrect	correct	correct	correct	8	8	correct	incorrect	undecided	agree

Provider	Pre Q10	Post Q6	Pre Q11	Post Q7	Pre Q12	Post Q8	Pre Q13	Post Q9
1	strongly disagree	undecided	Probably	probably	probably	probably	probably not	probably
2	strongly disagree	disagree	definitely	very probable	definitely	very probable	probably	probably
3	agree	agree	very probable	very probable	very probable	very probable	probably	probably
4	disagree	agree	definitely	definitely	definitely	definitely	probably not	very probable
5	undecided	agree	probably	very probable	probably	very probable	I do not prescribe medications	very probable

APPENDIX I: EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

IDENTIFYING RISK FOR HIV AND IMPLEMENTATION OF PREP AMONGST PRIMARY CARE PROVIDERS

Approximately 1.1 million people in the U.S. are living with human immunodeficiency virus (HIV). As a completely preventable infection, national guidelines have been in place to test each person aged 13-65 years for HIV infections status. Although these recommendations are in place there has been minimal improvements as nearly 40,000 persons become infected with the virus each year.

By identifying infection status, a provider has a unique ability to offer medications to either prevent HIV infection for those at risk or prevent further infections by treating an HIV positive person with anti-retroviral therapy. Pre-exposure prophylaxis (PrEP) is a medication that providers can prescribe to patients who are HIV negative and at risk for acquisition.

Primary care providers have the critical role in prevention efforts by identifying PrEP candidates however are found to have little awareness of PrEP, comfort-level with PrEP which impacts the intention to prescribe PrEP.

FAST FACTS

- 15% of HIV infected persons are unaware they are HIV positive
- HIV positive persons that are unaware of their status are responsible for 40% of newly transmitted HIV infections
- The correct use of PrEP reduces the risk of HIV infection from sex by more than 90% and by more than 70% for those who inject drugs
- HIV testing and PrEP for the prevention of HIV are Grade A USPSTF recommendations: All non-grandfathered private health plans must cover PrEP without cost-sharing beginning no later than the 2021 plan year
- Prevention saves lives and money: The estimated discounted lifetime cost for persons who become HIV infected at age 35 is \$326,500
- Compared to HIV-providers (HIVPs), fewer primary care providers (PCPs) have heard of PrEP, were familiar with prescribing PrEP, or had prescribed PrEP

PROJECT PURPOSE

HIV screening rates and PrEP prescribing by providers remains insufficient to slow the epidemic of HIV due to many provider-identified barriers including lack of knowledge and comfort-level. The purpose of this practice improvement project was to identify and increase primary care provider knowledge, comfort-level, and intentions to screen for HIV and prescribe PrEP for the prevention of HIV.

PROJECT DESIGN

The target population for this project was primary care providers at a Midwest VA facility. The education was presented face to face to the providers in PowerPoint format. Pre and post education surveys were utilized to evaluate an expected correlation of increased knowledge, comfort, and intentions of HIV prevention practices with the given education.

PROJECT OBJECTIVES

- Increase primary care provider's intention to screen for HIV status after completion of the education module.
- Increase primary care provider knowledge regarding PrEP after completion of the education module
- Increase primary care provider awareness of individuals that would qualify for preexposure prophylaxis use after completion of the education module.
- Increase primary care provider intention to prescribe PrEP after completion of the educational module.

RESULTS

Five of eleven providers present successfully completed the pre and postsurvey. All of the providers (MDs and NPs) practiced in Primary Care/General practice.

Overall the net intention to follow the CDC/USPSTF guidelines for HIV screening did not change although intentions prior were already high

Providers' ability to identify the use of PrEP did not change however the comfort-level in discussing PrEP with high risk patients increased by 80%.

Three of five (60%) providers improved their ability to identify those at substantial risk for HIV.

Relatedly, four of five (80%) providers felt their comfort-level in identifying persons at risk for HIV that are eligible for PrEP had improved.

Intention to prescribe PrEP increased by 60% (three of five).

INTERPRETATION AND RECOMMENDATIONS

The evidence-based practice improvement project identified the need for HIV and PrEP related training among primary care providers in the Midwest region. With HIV and PrEP-related training, primary care providers did not change their likelihood of HIV screening, however their knowledge, comfort-level, candidate identification ability, and intent to prescribe PrEP increased.

It would be expected to see an increase in HIV screening and PrEP discussions or prescribing among the primary care providers who participated in this study. Per previous research, PCPs who have received educational interventions had either prescribed PrEP for the first time after intervention or had more prescribing occurrences.

Recommendations for future research would be to integrate HIV-related education for primary care providers within the region, especially rural, and evaluate if there is a change in practice related to HIV screening guideline adherence and PrEP prescribing. For further evaluation of knowledge, attitude, and behavior change, it's recommended to have future research focus on change of behavior following education intervention, as recommended and proved successful by numerous studies.